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D4.6: Qualitative research exploring public attitudes to AI and robotics

WP4 – AI and robotics – ethical, legal and social analysis

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Abstract

The SIENNA project – *Stakeholder-informed ethics for new technologies with high socio-economic and human rights impact* (website: http://www.sienna-project.eu/) – is a European Union (EU) funded project which is part of the Horizon 2020 research and innovation programme under grant agreement no. 786641. It deals with three emerging technology areas: human genomics, human enhancement, and artificial intelligence (AI) and robots.

This report presents findings from qualitative research which involved a day-long workshop in five countries comprising three two-hour discussion sessions, with one session focused on AI and robots. The overarching aim of this qualitative research was to engage a range of citizens to consider issues raised by the three technology areas. The specific objectives for the AI and robots sessions were to briefly explore citizen views and concerns about the following applications: Artificial Intelligence (AI), Robots, Drones, and Self-driving cars.

Workshops were held in 5 countries: France, Germany, Poland, Greece, and Spain. Each workshop consisted of 50-53 participants (total n= 253) including a minimum of 10 participants from pre-specified vulnerable groups. This report outlines initial participant associations with the technologies and perceived benefits and concerns for their use, and provides some very early insights into what mitigation measures citizens may want to see in place to address their concerns.

This qualitative research was conducted by a social research agency rather than academics. There are a number of important limitations to this research, which include referencing, methodological, sampling and analytical limitations. The results in this report should be read with reference to and in the context of these limitations. The results serve as indicative findings about public attitudes to this technology area and should be treated as a starting point for further academic research and analysis to build from. They should not be read in isolation and should be read with reference to the other reports that have been produced as part of the SIENNA project.

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Foreword by SIENNA

This report includes a unique and timely study of the understandings, expectations, preferences and attitudes of European citizens with respect to artificial intelligence and robotics. It is unique in its objectives and scope: to have 250 inhabitants of the European Union, from different countries, and representing a cross-section of society, talk about and discuss their beliefs and feelings about these technologies. It is also timely, in that right now, the policy activity around AI and robotics is at a peak, both in the European Union and across the world. Having the voices of ordinary citizens represented in the dialogue on AI and robotics is imperative. They will experience and work and live with this technology in, and they will ultimately decide whether or not to accept and embrace it.

Within the SIENNA project, this report will feed into our recommendations for ethical frameworks and ethical practices in the development and use of AI systems and robots, and our recommendations for regulation and other policy initiatives.

We hope, however, that the report will have broader usage. We believe that all technology developers and all policy makers, especially from the EU, but also from other countries, would benefit from reading it and finding out what ordinary citizens think and feel. Hopefully they could take their views and opinions into account in their choices and policies.

Complementary to this report, we have also carried out an international survey of public awareness of and attitude towards AI and robots. This was carried out in eleven countries, including five in the EU (France, Germany, Spain, Poland, Greece, The Netherlands and Sweden) and four others: United States, South Korea, South Africa, and Brazil. It can, like this report, be downloaded from our website: http://www. http://www.sienna-project.eu/publications/deliverable-reports/.

For media inquiries about this report, please contact Josepine Fernow at josepine.fernow@crb.uu.se.

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Executive summary

Overview of the research

The SIENNA project – *Stakeholder-informed ethics for new technologies with high socio-economic and human rights impact* – is a European Union (EU) funded project which is part of the Horizon 2020 research and innovation programme. It concerns three emerging technology areas: human genomics, human enhancement, and artificial intelligence (AI) and robotics. This report presents the findings from qualitative research exploring public attitudes to AI and robots.

The overarching aim of this qualitative research was to engage a range of citizens to begin to consider issues raised by the three technology areas. The primary research objectives were to:

- Obtain insights into awareness and understanding of AI and robotics and their applications
- Explore and improve understanding of citizens' views of the technology areas in general, and particular uses and applications
- Explore citizens' concerns about the three technologies (and specific applications) and how they would like these concerns to be addressed

The specific objectives for the AI and robotics sessions were to briefly explore citizen views and concerns about the following applications: Artificial Intelligence (AI) and robotics, drones, and self-driving cars.

This qualitative research – which was conducted by a social research agency (not academics) to explore public attitudes to AI and robotics – comprised three two-hour discussion groups which were held as part of day long workshops in five countries. Qualitative research enables some discussion about complex, sensitive and/or contentious topics on which it is important to gain a public view. The workshops were a chance to introduce citizens to the technology areas and provide their initial responses to stimulus materials introducing the technology areas. Qualitative research does not aim or allow for statistical analyses; the data is neither representative nor generalizable and is not meant to be used to provide statistically significant results. The findings are one way to further understand why and how individuals perceive the technology areas, notably what concerns them about their development and use. The findings cannot be taken to be indicative of wider views within each country.

Full day qualitative workshops were held in 5 countries: France, Germany, Poland, Greece, and Spain. These countries were selected by the SIENNA consortium to represent different geographical regions, modes of socioeconomic development, and cultural, political and religious identity. Each workshop (lasting 8.5 hours) included three two-hour sessions, one covering each of the three technology areas. All workshops were held on a Saturday between 6th and 27th April 2019 and consisted of 50-53 participants (total n= 253 participants).

Each workshop included a minimum of 10 participants from pre-specified vulnerable groups. Vulnerability, in this context, was defined as groups who might be at greater risk of disadvantage or of being adversely affected by the development and use of one or more of the three technology areas in their society (some criteria were more relevant to some technology areas than others). The vulnerability categories included the following: chronic health conditions; mental health conditions; genetic conditions; disabilities (including impairments to vision, hearing, mobility, breathing or dexterity and learning difficulties); those aged 70+; and immigrants (1st and 2nd generation). Some categories were more relevant to some technology areas than others.

Three to four members from the SIENNA consortium and their colleagues attended each of the workshops and were available to answer questions from participants during the discussions.

This research follows the more descriptive and interpretive traditions in qualitative research and is based on established qualitative analytical techniques used in social research agencies (rather than those typically used in academia). The analysis has focused on identifying key themes from within the accounts recorded by notetakers of the accounts provided by participants and should be understood within the limitations of the research and analysis context through which they were produced.

The report first outlines the research design (chapters 1 and 2) and then presents the findings about participant response to the stimulus materials. The discussion section presents key themes that emerged about public attitudes towards these AI and robots technologies.

Summary of limitations

There are a number of important limitations to this research which are outlined in Section 2.4, including referencing, methodological, sampling and analytical limitations. The results in this report should be read with reference to and in the context of these limitations. The results serve as indicative findings about public attitudes to this technology area and should be treated as a starting point for further academic research and analysis to build from. They should not be read in isolation and should be read with reference to the other reports that have been produced as part of the SIENNA project.

Most importantly, this project has been conducted by a social research agency and not academic researchers. This therefore limits the degree to which the research conforms with academic analysis and writing approaches and has not been referenced to the extent that would be expected in academic publications. It lacks introduction and discussion sections which contextualize the results with relevant academic literature to further understand the meaning of the results for the field.

This qualitative research involved a day-long workshop in each country comprising three two-hour discussion sessions, with one session focused on AI and robots. It was not possible within the time and budget constraints to conduct discussions to the point of saturation, as might be expected in some types of academic research. The limited length of the discussion sessions also means that this exercise cannot claim to have uncovered 'in depth' views of the public, but rather associations and initial responses to introductory materials about the three technology areas. Further to this, it is important to recognise that the results presented here can only be understood within the context of the stimulus materials that were presented to the participants. Furthermore, the project originally sought to understand public attitudes towards and concerns about the three technology areas and how citizens wanted to see their concerns mitigated. The discussions about mitigation were restricted to a limited amount of time and the presentation of these results should be viewed as limited and as an indication of participant views – they should not be used to inform decision-making about regulation of these technologies but rather a starting point for further research to build upon.

Small (qualitative) sample sizes mean the workshops were not representative of the local population, and cannot be taken to be indicative of wider views within each country. Where references are made to views in countries in this report, this should be understood as references to the views expressed in the workshop in that country. Qualitative research does not aim or allow for statistical analyses; the data is neither representative nor generalizable and are not meant to be used to provide statistically significant results. Considering the data as such would be an invalid and misleading representation of qualitative data.

This report makes references to results that were obtained from pre- and post-event questionnaires completed by the participants. We note that these should be read with caution. The questionnaires were conducted as a workshop activity and should not be interpreted or treated as a robust survey methodology as this is not what they were intended to be. This project was not conceived or designed to investigate

whether and how views about these technologies change, which would not be possible through this methodological approach, and the questionnaire results should be approached accordingly.

Finally, this report should also be read within the context of the limitations in which the analysis was conducted – namely time and budget restrictions. The analysis has been conducted to the standard that was possible within these constraints, but may not meet with academic expectations for qualitative research analysis. Again, we reiterate that it should therefore be treated as a starting point for further analysis.

Summary of findings

AI and robots were commonly conflated by participants, therefore some of the overall findings mentioned in this summary were repeated across the discussions and applications explored in the workshops.

Overall, there were high levels of awareness of the technologies but a limited understanding of how the technologies work and of the more complex applications and systems. The public's familiarity and understanding, although limited, contributed to overall acceptance of these technologies in all five countries. For the most part, participants viewed these technologies as already being a regular feature in their lives. However, it was clear that AI was less tangible and more complicated for them to understand than robot technologies.

Several of the applications which participants were less familiar with and/or struggled to fully understand drove anxiety and concern among participants, particularly when they saw it as potentially harmful to wider society or to vulnerable populations (e.g. children and young people, elderly people, people with mental health conditions, people with learning disabilities).

Overall, AI and robots were commonly seen as relevant to participants who were quite comfortable with their development and use in society. Robots were more acceptable when their role remained purely functional, rational and without emotions. Humanoid robots were the most controversial, least accepted, had the lowest perceived value and were seen as potentially harmful when used with children and vulnerable people.

Limited understanding and less familiarity with certain applications drove anxiety and concern among participants, particularly when they did not understand how it worked or fundamentally disagreed with the concept that the technology would make complex decisions. For example, full automation of self-driving vehicles was difficult for participants to grasp how the cars would be programmed to take into account every possible outcome in a collision and to decide on the one that would end in the least fatalities or injuries to people.

Although AI and robots were seen as already having been accepted into society to an extent, there were concerns about future applications and the need for regulations to protect the public from some of the unintended or undesirable consequences. These findings should be taken as a starting point for further academic analysis to build upon.

List of tables

List of acronyms/abbreviations

Abbreviation	Explanation
AI	Artificial Intelligence
EU	European Union
UN	United Nations

Table 1: List of acronyms/abbreviations

Glossary of terms

Term	Explanation
Artificial Intelligence	Computer programs that can perform intelligent tasks normally performed by humans.
Robotics	Field of science and engineering that deals with the design, construction, operation, and application of robots.
Robots	Machines that can do a series of complex tasks automatically and by themselves, tasks that humans would normally do. Humanoid robots were defined as robots (machines) designed to look like a humans.
Automation	Deployment of machines that can perform tasks autonomously, without being directly controlled by persons.
Drones	An aircraft that flies without any people on board and is controlled from the ground by an operator; automated following a pre-programmed mission; or by a mixture of both.

Table 2: Glossary of terms

1. Introduction

1.1 Introduction to SIENNA

The SIENNA project – *Stakeholder-informed ethics for new technologies with high socio-economic and human rights impact* – is a European Union (EU) funded project which is part of the Horizon 2020 research and innovation programme (grant agreement No 741716). It concerns three emerging technology areas: human genomics, human enhancement, and artificial intelligence (AI) and robotics.

These technology areas may offer benefits for both individuals and society – but also raise ethical challenges. SIENNA will address the ethical, legal and social issues (ELSI) covering these rapidly emerging technological fields and in particular the areas that may become more relevant to the publics' lives. It is therefore important and timely to develop ethical frameworks that will try to address both current and future ELSI.

The University of Twente (UT) leads a consortium of 11 international partners for this work. The project includes the following for each technology area: (1) review of the state of art; (2) analysis of legal and human rights issues; (3) a survey of normative documents; (4) ethical assessment; (5) surveys of citizens in 11 countries; (6) workshops in 5 countries; and (7) the proposal of an ethical framework. This work will then be used to contribute to suggestions for enhancement of current ethical and legal frameworks in each technology area as well as propose codes of conducts for stakeholders and offer additional guidance for research ethics committees.

A key feature of the SIENNA project is that stakeholders, including the general public, will be engaged throughout the project. Kantar (Public Division) was commissioned to conduct public opinion surveys and qualitative research to assess public awareness, understanding and perceptions of the three technology areas. This report presents the findings from the workshop discussions about AI and robots.

Further information about SIENNA project can be found on the SIENNA project website: http://www.sienna-project.eu/.

1.2 Aims of the citizens workshops

The overarching aim of the qualitative research was to engage a range of citizens to begin to consider issues raised by the three technology areas. The primary research objectives were to:

- Explore citizens' views of the technology areas in general, and particular uses and applications
- Explore citizens' concerns about the three technologies (and specific applications) and how they would like these concerns to be addressed

More specific secondary research objectives were used to structure the sessions and to try to achieve a level of consistency across the technology areas, whilst still allowing for divergence and flexibility as required by the area leads and their priorities. They were to explore:

- Awareness of the technology area and sources of awareness
- Feelings about the use of the technology
- Associations with and levels of understandings of the technology area
- Benefits, hopes and aspirations for the technology
- Risks and concerns about the technology – and what was driving these concerns
- Whether there should be a limit to use of the technology
- How citizens would like to see their concerns mitigated and who is seen to be responsible for the mitigation of public concerns
- Overall level of acceptability of / comfort with the development and use of the technology.

The specific objectives for the AI and robots' sessions were to begin to explore citizen views and concerns about AI and robot technologies, including the following applications: AI, robotics, drones and self-driving cars.

The results serve as indicative findings about public attitudes to this technology area and should be treated as a starting point for further academic research and analysis to build from. They should not be read in isolation and should be read with reference to the other reports that have been produced as part of the SIENNA project.

2. Methodology

2.1 Research design

2.1.1 Qualitative research: full day workshops comprising three two-hour discussion sessions (one of which focused on AI and robotics)

Qualitative research was conducted by a social research agency (not academics) to explore public attitudes to AI and robotics. The research comprised three two-hour discussion groups which were held as part of day long workshops in five countries. Qualitative research of this nature at Kantar is primarily informed by the approach to research described in Ritchie and Lewis (2003)[1]. Full day workshops were held in five countries: France, Germany, Poland, Greece, and Spain (listed in the order the workshops were held). Each day (8.5 hours) included an introductory plenary session and three two-hour sessions, one covering each of the three technology areas (these were rotated as shown in Table 3 below). All workshops were held on a Saturday between 6th and 27th April 2019 and consisted of 50-53 participants (total n= 253 participants).

Qualitative research of this nature enables some discussion about complex, sensitive and/or contentious topics on which it is important to gain a public view. The workshops were a chance to introduce citizens to the technology areas and provide their initial responses to stimulus materials introducing the technology areas. The workshops gave members of the public the opportunity to begin to consider issues and express opinions on topics of interest. The limited length of the discussion sessions means that this exercise cannot claim to have uncovered 'in depth' views of the public, but rather associations and initial responses to introductory materials about the three technology areas. In-depth exploration of the topic was also limited by the consortium's preference to ask participants to explore multiple examples of each type of technology, rather than a more focused selection for deeper discussion.

The qualitative research performed herein used purposive sampling. Quotas were set with the aim of including a broad range of demographics and the likely diversity of views in each of the five countries. However, we note that we cannot be sure this is the case or that the variables chosen constitute all of those that may be relevant to informing views about these technologies. Small (qualitative) sample sizes mean the workshops were not representative of the local population, and cannot be taken to be indicative of wider views within each country. Where references are made to views in countries in this report, this should be understood as references to the views expressed in the workshop in that country. Qualitative research does not aim or allow for statistical analyses; the data is neither representative nor generalizable and are not meant to be used to provide statistically significant results. Considering the data as such would be an invalid and misleading representation of qualitative data. The findings should be taken as one way to further understand why and how individuals perceive the technology areas and their uses, notably what concerns them about their development and use in their societies. Whilst the workshops enabled more detailed discussions than a survey, the depth of insight is limited due to the short time available to discuss three complex topics (120 minute per topic, and all three topics were done in one day) and the fact that a wide

[1] Ritchie, Jane., and Jane Lewis, *Qualitive Research Practice: A Guide for Social Science Students and Researchers*, Sage, London, 2003

range of examples and applications were included in each session. It should also be kept in mind, that while moderators who led the discussions were prepared for this task through a telephone briefing by the central research team, they were researchers from a social research agency and not experts in the technology areas, nor in the ethical, legal or social issues of the technology areas. Furthermore, group dynamic issues should be considered, such as some people feeling less able to express unpopular opinions in a group situation. Further detail about the limitations of this methodological approach are detailed in Section 2.4.

2.1.2 Description of the workshops

Here we offer a general description of all workshops and the way in which they were conducted. This is then followed in 2.1.3 by the specific details of the process for AI and robotic.

The five day-long workshops were held in Paris, Hamburg, Warsaw, Athens, and Madrid and were conducted in French, German, Polish, Greek and Spanish, respectively. The workshops in Paris and Hamburg were held on Saturday 6 April 2019, followed by Warsaw and Athens on Saturday 13 April, and Madrid on Saturday 27 April. The topic guide for the workshops, outlining the structure of the day and the topics for discussion posed, can be found in Appendix 1. Three to four SIENNA members with knowledge of, or expertise, in philosophy, (bio)ethics, law, or one of the three technology areas attended each of the workshops to observe or participate in the discussion (their role is outlined in detail below). Their names, affiliations, status, and which workshop they attended is provided in Appendix 2.

The design, topic guide, and stimulus materials for the workshops were developed by Kantar, with assistance from experts in the technology areas from the consortium. Firstly, the overall design and structure of the day was reviewed and agreed by the consortium in Autumn 2018. In Spring 2019, the consortium experts informed Kantar what topics they wanted each discussion session to focus on and provided examples and applications for each technology area to be used as tangible examples for the participants. Kantar then wrote the detailed topic guide (Appendix 1), which was reviewed at least twice by the consortium experts for each topic area. Kantar also developed the stimulus materials which were reviewed at least twice and signed off by the consortium, to ensure that the materials were accurate, up to date and balanced. In the case of AI and robots, much of the text in the stimulus materials was written by the consortium experts, although this was reviewed by Kantar to consider usability and the participant perspective. There was not sufficient time available to cognitively tests the stimulus materials for the public to ensure their accessibility which is a limitation of the design. The topic guide and stimulus materials were translated into the languages in which the workshops were held by the Kantar Brussels' translation unit. The translations were reviewed and signed off by members of the consortium.

Each workshop followed the same format: an initial plenary session involving all 50-53 participants and then break out groups comprised of 10-11 participants. Before the workshop began, participants were asked to complete a short pre-task activity to explore hopes and concerns about technology more generally and a short two question questionnaire to ascertain familiarity with the technologies and feelings about them. After the workshop, a short two question follow up activity was conducted to see how they then felt about the technology area (Appendix 3). The questionnaire responses are provided in Appendix 3. We note that the findings from the questionnaires in this report should be read with caution. They were conducted as a workshop activity and should not be interpreted or treated as a robust survey methodology as this is not what they were intended to be. Participants were asked to answer two questions before and after the workshop, to give an indicative suggestion as to whether and how views might have shifted about the technologies during the workshop. This project was not conceived or designed to investigate whether and how views about these technologies change, which would not be possible through this methodological approach, and the questionnaire results should be approached accordingly.

The 20-minute introductory plenary session involved a presentation from the lead moderator from Kantar and informed participants about the SIENNA project, purpose of the research, aims of the workshops, and the structure of the day. Participants were then organised into moderated break out groups to encourage more in-depth discussions and to try to enable all participants to participate and contribute their views. Participants were randomly allocated to break out groups to try to achieve a mix of demographics in each group as this encourages exchange between participants with different perspectives or experiences. This was done through the distribution of coloured stickers at registration.

The workshop then consisted of three two-hour sessions, one for each of the technology areas. Division of workshops into three sessions facilitated somewhat more focused discussions on each topic as well as even distribution of time across the technology. Each break out group was led by a Kantar moderator experienced in conducting qualitative research for a social research agency (we note they were not academic researchers nor did they have any expertise in the topic area) - to set the parameters for the discussion, to strive for an open and respectful exchange of views, that everyone felt able to contribute to as far as possible, and that the flow of the discussion remained relevant and covered the agreed topics as far as possible. An agreed topic guide was used to – as far as possible - facilitate consistent coverage of topics and framing of questions across the five countries (Appendix 1). The order of the technology areas was rotated across the countries, to counter any ordering effects and ensure each technology area had the opportunity to be the first discussed.

Rotation of technology areas across the workshops

	Paris 6 April 2019	**Hamburg 6 April 2019**	**Athens 13 April 2019**	**Warsaw 13 April 2019**	**Madrid 27 April 2019**
ORDER OF SESSIONS					
SESSION 1 (2 hours)	Enhancement	AI & robots	AI & robots	Genomics	Enhancement
SESSION 2 (2 hours)	Genomics	Enhancement	Enhancement	AI & robots	Genomics
SESSION 3 (2 hours)	AI & robots	Genomics	Genomics	Enhancement	AI & robots

Table 3: Rotation of technology areas across the workshops

Although the exact structure of the two-hour sessions for each technology area varied according to the priorities identified by each work package leader, all sessions covered awareness and associations and understandings of the technology area, as well as some discussion about how to mediate/mitigate any citizen concerns raised where time allowed - and we note that mitigation was not covered for all topics by all break out groups due to time constraints. Basic information was introduced to inform the discussion, followed by some limited further materials on the tangible applications and benefits, risks and ethical issues associated with the specific subjects outlined by work package leaders for each technology area (see Appendices 1&4). The materials were in the format of paper handouts. They were read through by the participants with the assistance of their moderator as required. The handouts were translated into the language in which the workshop was being conducted. There was not sufficient time in the project timeline to cognitively test these materials before they were used, which is a limitation of the approach. However, in addition to this guide, discussions were always led by the priorities, interests and concerns of the participants.

The workshop closed with a short reflective plenary session, bringing all the participants together to reflect on how their views had developed over the course of the day. This also provided the SIENNA members

present the opportunity to pose any final questions they had to the participants and participants to ask questions.

A small number of changes were made to the guide based on experiences at the first two workshops in Paris and Hamburg to help the smooth flow of the further events. This included increasing the amount of introductory time in the break out groups to maximise the opportunity to establish rapport before the first session began and a reduction in length of the final plenary session, which was felt to be less productive at the end of lengthy day for participants. No changes were made to the stimulus materials due to lack of time to have these translated.

2.1.3 Description of the AI and robot session

The AI and robots session in each workshop explored views about and concerns with the development and use for two areas, AI and robotics. Drones and self-driving cars were discussed separately as applications of AI and robotics.

The full topic guide and stimulus materials can be found in Appendices 4-5. The tables below provide an outline summary of the structure of the session to show what topics were discussed.

Structure and general content of the AI and robots session

Artificial Intelligence (AI)	Timing	Name of stimulus used
Awareness Awareness and associations Sources of awareness	5 mins	
Information provided **Views on self-driving cars technology** Feelings about the development and use of the technology Most and least acceptable examples Concerns and benefits Acceptability of use	15 min	AI STIM 1,2,3
Professions Comfort of use Concerns about use	7.5 min	
Personal Comfort of use Concerns about use	7.5 mins	

Robots	Timing	Name of stimulus used
Awareness Awareness and associations Sources of awareness	5 mins	
Information provided **Views on robot technology** Feelings about the development and use of the technology Most and least acceptable examples Concerns and benefits	15 min	ROBOT STIM 1-4

Acceptability of use		
Workplace and home Comfort of use Concerns about use	7.5 min	
Humanoid Robots Comfort of use Concerns about use	7.5 mins	

Robots and Jobs (Germany and Greece only)	Timing	Name of stimulus used
Awareness Awareness and associations Sources of awareness	5 mins	
Information provided **Views gathered** Feelings about the topic Concerns and benefits mitigations	15 min	JOBS STIM 1,2,3
Regulation Views on regulation	7.5 min	
Compensation View as a way to mitigate concerns	7.5 mins	

Drones (France only)	Timing	Name of stimulus used
Awareness Awareness and associations Sources of awareness	5 mins	
Information provided **Views on drones technology** Feelings about the development and use of the technology Most and least acceptable examples Concerns and benefits Acceptability of use	15 min	DRONE STIM 1,2,3
Police use Comfort of use Concerns about use	7.5 min	
Private use Comfort of use Concerns about use	7.5 mins	

Self-driving cars (Poland and Spain only)	Timing	Name of stimulus used
Awareness Awareness and associations Sources of awareness	5 mins	
Information provided **Views on self-driving cars technology**	15 min	CARS STIM 1,2,3

Feelings about the development and use of the technology Most and least acceptable examples Concerns and benefits Acceptability of use		
Decisions Comfort and concerns about decision making	7.5 min	
Accountability Concerns	7.5 mins	

Mitigation - All topics and all countries	Timing	Name of stimulus used
Ways to mitigate concerns AI, robots, drones, self-driving cars Legislation Making decisions Role of government Extra action for vulnerable groups	15 mins	

Table 4: Structure and general content of the AI and robots session

2.1.4 Role of SIENNA consortium members in the workshops

Three to four members from the SIENNA consortium and their colleagues attended each of the workshops. Not all were experts in the ethics of the technology areas, but each had a degree of knowledge and/or expertise in at least one of the following areas: law, political science, philosophy, bioethics or the technology area and ranged in experience from doctoral students to professors.

All SIENNA consortium members were provided with a written and telephone briefing before the workshops to ensure they were informed of best practice at the workshops. They were given the opportunity to contribute to a one hour telephone de-brief sessions afterwards with the Kantar research teams which gave the chance for them to talk about their main take-aways from the workshop. The full list of expert attendees and their affiliations can be found in Appendix 2.

The purpose of their attendance was to enable participants to ask questions and for them to provide accurate, up to date, and balanced information as far as possible. Whilst they sat with the break out groups, there was a limit to how much participants could engage with them due to time restrictions during the workshops due to the amount of material to be covered. However, participants were able to interact with the experts during the breaks, ask questions at the break out tables, and ask any outstanding questions in the final plenary session.

2.1.5 Ethics and data protection

Kantar Public Division adheres to the following standards and industry requirements: Market Research Society (MRS) and ESOMAR (the global voice of the data, research and insights community) professional codes of conduct, ISO 20252 international market research quality standard, ISO 9001 international standard for quality management systems and the Data Protection Act 2018. Ethics approval was not required by Kantar for this research in any of the five countries where the workshops were conducted, but the MRS and

code of conduct was followed which provides ethical guidelines for the industry[2]. Furthermore, the coordinating university, University of Twente, obtained ethics approval from the SIENNA project.

Participants took part voluntarily and provided informed consent for participation; this was ascertained through the use of a recruitment screening questionnaire which informed participants about the SIENNA project as the project commissioner for the research, aims and purpose of the research, how data would be used, and what participation would involve. Further information was provided via a Participant Information Sheet. Participants were informed that members of the consortium would be present at the workshops. They were able to withdraw from participation at any point during the workshop. As vulnerable groups were involved in the workshops, extra measures were taken to support their participation in the research: most of the discussions took place in break out groups with staff from Kantar moderating the groups; vulnerable groups were dispersed among the break out groups to avoid stigmatization; and accessible venues were chosen to accommodate vulnerabilities and sufficient time for extra breaks was allowed as required. Permission was also obtained from the participants – during recruitment and at the workshop itself – for the SIENNA consortium to audio record the discussions for use for their own analysis. A GDPR compliant consent form was used to gain permission from participants. The consortium is the data controller for these recordings.

2.2 Sampling and recruitment

The workshops were held in Germany, France, Poland, Greece and Spain. The consortium selected these countries based on different geographical regions within Europe, modes of socioeconomic development, and cultural, political and religious culture. The choices were influenced by the requirement that these countries should also have partner representation in the project (some EU partners in the project were themselves chosen in part to reflect geographic, economic and cultural diversity in the project).–While the consortium would have preferred a greater variation in religious traditions (as is, three of the five countries are predominantly Catholic and one is Greek Orthodox) this was not achieved and is a limitation of the research.

The workshops were held in the capital/large cities of Paris, Hamburg, Warsaw, Athens, and Madrid to best ensure successful recruitment, easy travel for participants, and the availability of suitably sized and equipped venues to hold these events. It was not feasible within the scope of the project to include participants from different regions of the countries, as we would not expect research participants to travel for more than an hour to attend a day-long event and there was not sufficient budget for travel and accommodation. Whilst a minimum number of three participants from more rural areas were included in each workshop, the urban locations and bias towards city-based experiences should be noted as a limitation of this methodology.

A total of 253 participants took part in the research, with 50-53 attending in each location. Each workshop included a minimum of 10 participants from pre-specified vulnerable groups, to include the views of these audiences in this research. A full break down of the achieved sample can be found in Appendix 5.

2.2.1 General composition of the workshops

Quotas were set with the aim of including a broad range of demographics and the likely diversity of views in each of the five countries. However, we note that we cannot be sure this is the case or that the variables

[2] Market Research Society, "Code of Conduct 2019".
https://www.mrs.org.uk/pdf/Draft%20MRS%20Code%20of%20Conduct%202019%20-converted.pdf

chosen constitute all of those that may be relevant to informing views about these technologies. Minimum quotas were set to ensure the inclusion of a range of participant characteristics. However, it is important to note that small sample sizes mean the workshops were not representative of the local population, and cannot be taken to be indicative of wider views within each country. Qualitative research does not aim or allow for statistical analyses; the data is neither representative nor generalizable and are not meant to be used to provide statistically significant results. Considering the data as such would be an invalid and misleading representation of qualitative data. The findings should be taken as one way to further understand why and how individuals perceive the technology areas and their uses, notably what concerns them about their development and use in their societies.

Quotas were set for gender, age (from aged 18 and including a minimum for those 70+), education level, work status (including students and retirees), occupation type, ethnicity, whether religious or not, character of their area of residence (urban or more rural), parents and non-parents, and comfort with technology. Occupation was established by asking what is/was the participant's last main paid occupation and selection was based on minimum quotas assigned for different categories (see Appendix 5). Ethnicity was established by asking participants how they would describe their ethnicity. However, due to legal restrictions in France, participants were not asked for their ethnicity but were instead asked 'whether they feel they belong to a minority group due to the country they or their parents were born in'. Minimum quotas were set for areas of residence to include views from more rural locations in the research and higher rural quotas were set for Madrid and Warsaw as it was deemed easier for participants to travel in from more rural locations in these cities (although we note the urban bias of the workshops as discussed above). Venues were chosen to, as far as possible, accommodate those travelling from outside of the city. Comfort with technology was established by asking proxy questions about how comfortable participants were using the internet to buy goods and services; change energy supplier, and complete banking transactions. A refusal code was available for every question.

A quota was not included for socio-economic group due to the lack of availability of an agreed definition that could be applied consistently across the countries.

2.2.2 Vulnerable groups

A minimum of ten participants from vulnerable groups attended each workshop to attempt to allow diversity of views in the research. No vulnerable person included had severe disabilities or conditions that prevented them from joining the other participants, so they were included across the break out groups, rather than separated from the general population, also to avoid stigmatisation.

Vulnerable groups, in this context, were defined as groups who might feel they are at greater risk of disadvantage or of being adversely affected by the development and use of one or more of the three technology areas in their society. The vulnerability categories included the following: chronic health conditions; mental health conditions; genetic conditions; disabilities (including impairments to vision, hearing, mobility, breathing or dexterity and learning difficulties); aged 70+ (potentially including those living in nursing/care homes); and immigrants (1st and 2nd generation).

Lists of some of the most common conditions in Europe were provided for categories 1-4, but recruitment was not limited to these as 'Other - specify' codes were available to record other possible conditions. Due to the low prevalence of rare genetic conditions, participants were asked if they or a close relative had 'a condition which has a genetic component (e.g. that can or will be passed from parents to children)' – and this included cancer and diabetes – or 'had ever been concerned that either you or a close family member has an illness which has a genetic component (even if this turned out to **not** be the case)'. Immigrants also needed to meet vulnerability criteria which were defined as one or more of the following: refugee or asylum seeker;

not fluent in the main language of the country (but skilled and confident enough to participate); not confident reading or writing in the main language of the country; age 60+, low educational attainment, unemployed, semi or unskilled jobs; or a minority ethnic group.

We note that in Warsaw, the number of participants classified as vulnerable was substantially higher (40). While the general recruitment was conducted in the same way as in the other four countries, there were more participants who had chronic health conditions, relatives with cancer, and vision impairments among older participants.

The sample excluded some vulnerable groups for whom participation would have been too great a burden. The sample did not include individuals who had mental impairments that rendered them unable to give valid informed consent (e.g. dementia, Alzheimer's). The agreed screener document monitored for people's level of comfort in participating (by describing the event to them and what they will be asked to do and giving a choice as to whether they felt able to participate or not) and any extra needs those who did feel able to participate had, to ensure participants were fully informed of what the workshops entailed. Where it was not possible to include some vulnerable groups, and to boost these perspectives in the research, options were given to include close relatives of vulnerable groups to represent their experiences. 'Close relative' was defined as a partner, a parent / grandparent, a child or step child, a sibling, or a family member who had lived with a vulnerable person. Some participants were recruited on this basis and this is detailed in Appendix 5.

2.2.3 Recruitment

54 participants were invited to each workshop, including an over-recruitment of four in anticipation of an 8% drop out rate. A screening questionnaire was used during recruitment to ensure a consistent approach was taken across the countries, which was reviewed and signed off by the consortium.

At recruitment, to support the informed consent process, all participants were provided with information about the SIENNA project, the purpose of the research, the aims of the workshops, what participation in the workshop would involve, and how their data would be used. Furthermore, a detailed description of the workshop was provided to aim to inform participants what would be asked of them. Participants were also provided with a Participant Information Sheet (PIS), giving more detailed information about what the workshop would involve and contact details if they wanted further information.

Recruitment for the workshops was conducted by experienced, local qualitative recruiters in each of the countries. It was carried out in accordance to the screening document agreed with the consortium and to be compliant with GDPR and Market Research Society standards. A variety of recruitment approaches were taken across the five countries and were dependent on the networks and databases that were available there, meaning it would not be possible for further research to replicate this process which is a limitation of the approach. In France, participants were recruited via a national database of c.250,000 people which is refreshed on a monthly basis. Participants opted in by responding to a questionnaire and were then telephoned if they were eligible. In Germany, the recruiter recruited from a panel of over 10,000 people, first using email and then re-contacting via phone. In Greece, Kantar Greece's panel involving over 20,000 participants across the country was used (aged 10-70). In Poland, recruitment was done face to face in the city centre, with five recruiters stopping citizens in the street for 25 days between them. In Spain, a recruitment agency was used which recruited via telephone from a database of over 30,000 people. Participants were offered a financial incentive to thank them for their time and participation and to cover travel and childcare costs, the amount being in line with local guidelines and norms (150 EUR in Germany; 200 EUR in France; 120 EUR in Spain; 100 EUR in Greece; and 300 PLN in Poland).

2.3 Analytical approach: thematic qualitative analysis

2.3.1 Raw data collection

The raw data was collected through the one-day workshops described in section 2.2. Three types of raw data were collected at the workshops; (1) audio recordings of the sessions; (2) notes taken by the note-takers; and (3) pre and post event questionnaires completed by the participants.

The workshops were conducted in hotels; in some cases, in one room and in others the groups were spread into smaller rooms, as the space allowed. The plenary sessions were led by a Kantar moderator experienced in conducting qualitative research for a social research agency (we note they were not academic researchers). The break out groups were each led by a Kantar moderator (with experience of conducting research in a social research agency context), who audio recorded the discussions. A member of staff from Kantar also took notes throughout the sessions. In Germany and Greece, the notetakers recorded into a structured template which mirrored the order of the discussion points in the topic guide. In France, Poland, and Spain, the note takers took notes in blank documents as this was their preference for recording the most accurate notes possible.

2.3.2 Analytical approach

This report should also be read within the context of the limitations in which the analysis was conducted – namely time and budget restrictions. The analysis has been conducted to the standard that was possible within these constraints but may not meet with academic expectations for qualitative research analysis. Again, we reiterate that it should therefore be treated as a starting point for further academic analysis.

This research follows the more descriptive and interpretive traditions in qualitative research (Spencer et al: 2003). It presents what participants mean and understand about the technology areas, analysing the 'situated accounts' provided within the workshops (Kvale:1996). The analysis for this report has focused on identifying themes from within the accounts recorded by the notetakers of the accounts provided by the participants in the workshops (Ritchie and Lewis:2003). The project did not seek to force a consensus; while it focuses on aggregate level results, it has sought to explore the diversity of views present across the sample as far as was possible within the limitations of the analytical approach which were defined by the budget available. We remind the reader that the results of qualitative analysis are to some extent subjective (to those conducting the analysis) and should be understood within the limitations of the research context through which they were collected which were taken into account as far as possible within the analysis; e.g. group dynamics, uneven coverage, the influence of other views, and within the limits of the information that was provided to participants and the questions that were asked to them (Ritchie and Lewis:2003) - as well as the fact that the analysis was conducted from notes and not verbatim transcripts meaning that nuances will have been lost in the analysis process.

2.3.3 Analysis process

This section outlines the analysis process undertaken to provide transparency about how the data was managed and interpreted so that comprehensive coverage of the dataset was achieved within the limited time and budget available for this project. Analysis consisted of two stages, firstly management of the data and then interpretation of it to produce a descriptive account afterwards. The analytical process consisted of the following:

- In the workshops, three types of raw data were collected: (1) audio recordings of the sessions; (2) notes taken by the notetakers; and (3) pre- and post-event questionnaires completed by the participants. We note that the audio recordings were not transcribed, a decision made by the

consortium due to budget limitations – and this should be noted as a limitation of the analytical process because it means that nuances have been lost in the process and means the analysis reported here was an analysis of accounts recorded by notetakers of accounts provided by participants. Recordings were reviewed by the lead moderators in order to collect illustrative quotations for the country level reports (by listening to relevant sections highlighted in the note taker notes, they were not reviewed in their entirety). Notes were recorded as accurately as possible into a blank document in all countries except Germany and Greece, where note takers used a structured template which reflected the order of the discussion topics in the topic guide. The notes were not translated, again due to budget constraints. The variety of approaches taken to recording the notes also limits the extent to which comparison between the countries has been possible.

- The audio recordings, notes, and questionnaires responses – all in the language in which the workshop was conducted – were reviewed by the lead moderators (experienced in qualitative research conducted in a social research agency environment rather than an academic environment) to produce five country level reports. They did this by reading the notes, and entering common themes identified into a structured country level report template provided by the project team.
- The country level reports were provided to Kantar Public UK approximately two weeks after the final workshop in Spain in a highly structured template, which closely mirrored the discussion points in the topic guide and asked the country lead moderators to draw out thematic findings for each discussion point (e.g. associations, awareness, response, reported benefits and risks/concerns associated with each technology area, how concerns should be mitigated and who is responsible for this). The template also instructed the lead moderators to include quotations to illustrate the findings, because the purpose of the quotations is to illustrate the key themes identified. The use of this structured country report template meant that the analysis was not a bottom-up, grounded approach.
- The analysis process also included 1-3-hour telephone de-brief sessions one week before and one week after the reports were submitted, led by the Kantar UK project lead or project director. These focused on and were used to draw out the key themes for each discussion point for each technology area (meaning those which were discussed mostly commonly across the groups). One hour telephone de-brief sessions were held with the lead moderators in each country after each workshop with the Kantar UK team. The lead moderators reported key findings for each discussion topic for each technology area. The Kantar UK team noted these to keep track of key themes emerging during the fieldwork period. One hour de-brief phone calls were held with some of the SIENNA members who attended the Paris, Hamburg, Warsaw, and Madrid workshops who also contributed their thoughts to this process.
- After the five country level reports were submitted to the team in Kantar UK, a final two-hour telephone based de-brief session was held with all the lead moderators to discuss the key themes to try to ensure they were consistent with their experiences in the workshops – before the final reports were drafted. A one-hour telephone de-brief was then held with the experts from the SIENNA consortium to check the headline findings were consistent with the observations and experiences of those who attended the workshops and to enable other consortium members to request what areas they wanted the further analysis to focus on.
- Kantar UK staff then spent more time reading the country level reports to produce report outline structures for each of the three reports. They identified key themes for each discussion topic for each technology area across the five countries – key themes being those that emerged most strongly across the break out groups. The report outline structures were provided to and agreed with the SIENNA leads to ensure the report structures took into account the interests of the technology leads.
- The final phase of the analysis was then conducted by te Kantar UK staff and involved reviewing the five country level reports to identify more detailed themes and sub themes for each discussion topic

for each technology area. This was done by reading and annotating the country level reports where themes were reoccurring. Quotations were selected which supported and illustrated key findings in the reports at this stage. It is important to note the distance this final report has moved away from the original accounts provided by the participants, as the analysis has involved multiple layers of interpretation, beginning with the notetaker, the country lead who wrote the country level report, and then the final report authors.

Verbatim quotes are used throughout this report to illuminate and bring to life key findings and are attributed as follows: *"Quote."* (Location).

2.4 Limitations

In this section we consolidate the limitations of this research exercise, which include referencing, methodological, sampling and analytical limitations. The results in this report should be read with reference to and in the context of these limitations. The results serve as indicative findings about public attitudes to this technology area and should be treated as a starting point for further academic research and analysis to build from. They should not be read in isolation and should be read with reference to the other reports that have been produced as part of the SIENNA project.

2.4.1 Referencing limitations

Most importantly, this project has been conducted by a social research agency and not academic researchers. This therefore limits the degree to which the research conforms with academic analysis and writing approaches and has not been referenced to the extent that would be expected in academic publications. This report does not follow common academic standards for publishing qualitative research exercise results. It lacks introduction and discussion sections which contextualize the results with relevant academic literature to further understand the meaning of the results for the field. This decision was made by Kantar and the consortium to meet the time and budget constraints within which the project was conducted. Clearly, each discussion group could and should be more deeply analysed to fully understand their meaning and how this pushes our understanding of public views toward AI and robots further. Ideally such further analysis will be conducted by academic partners through academic publications.

2.4.2 Methodological limitations

This qualitative research involved a day-long workshop in each country comprising three two-hour discussion sessions, with one session focused on AI and robots. Qualitative research of this nature at Kantar is primarily informed by the approach to research described in Ritchie and Lewis (2003)[3].

Originally the research was conceived of as a piece of deliberative research. However, time and budget constraints meant that this approach could not be employed as it was not possible to fund a study which would allow the reconvening of participants or enough time for discussion which would allow the level of reflection required for deliberative research. The research follows the standards and conventions used in

[3] Ritchie, Jane., and Jane Lewis, *Qualitive Research Practice: A Guide for Social Science Students and Researchers*, Sage, London, 2003

social research agencies. It was not possible within the time and budget constraints to conduct discussions to the point of saturation, as might be expected in some types of academic research.

The limited length of the discussion sessions also means that this exercise cannot claim to have uncovered 'in depth' views of the public, but rather associations and initial responses to introductory materials about the three technology areas. In-depth exploration of the topic was also limited by the consortium's preference to ask participants to explore multiple examples of each type of technology, rather than a more focused selection for deeper discussion.

Further to this, it is important to understand that the results presented here can only be understood within the context of the stimulus materials that were presented to the participants. All three technology areas are complex, and participants commonly had little to no previous awareness and understanding of the technologies. Therefore, discussion was limited to their response to the high-level introductory materials they were exposed to. It is particularly important to note the limited definitions that were provided to participants and the large number of examples that participants had to comprehend within a limited time frame. Furthermore, the project originally sought to understand public attitudes towards and concerns about the three technology areas and how citizens wanted to see their concerns mitigated. The discussions about mitigation were restricted to a limited amount of time and the presentation of these results should be viewed as limited and as an indication of participant views – they should not be used to inform decision-making about regulation of these technologies but rather a starting point for further research to build upon.

It should also be kept in mind that while moderators who led the discussions were prepared for this task through a telephone briefing by the Kantar project team, they were not experts in the technology areas, nor in the ethical, legal or social issues of the technology areas.

2.4.3 Sampling limitations

As well as the design of the exercise, it is important to understand the limitations of the sampling approach taken in this qualitative exercise. Quotas were set with the aim of including a broad range of demographics and the likely diversity of views in each of the five countries. However, we note that we cannot be sure this is the case or that the variables chosen constitute all of those that may be relevant to informing views about these technologies.

Small (qualitative) sample sizes mean the workshops were not representative of the local population and cannot be taken to be indicative of wider views within each country. Where references are made to views in countries in this report, this should be understood as references to the views expressed in the workshop in that country.

Qualitative research does not aim or allow for statistical analyses; the data is neither representative nor generalizable and are not meant to be used to provide statistically significant results. Considering the data as such would be an invalid and misleading representation of qualitative data. The findings should be taken as one way to further understand why and how individuals perceive the technology areas and their uses, notably what concerns them about their development and use in their societies. We also note that it is not possible to carry out sub group analysis through this style of qualitative research, as there are not sufficient numbers to represent sub groups, moderators are not able to accurately allocate participants in their group to sub groups, and because this is not possible within the dynamics of a group research setting where some voices may be more dominant than others.

Recruitment for the workshops was conducted by local qualitative recruiters in each of the countries. It was carried out in accordance to a screening document agreed with the consortium and to be compliant with GDPR and Market Research Society standards. A range of recruitment approaches were taken across the five

countries and were dependent on the networks and databases that were available there. It would not be possible for further research to replicate this process.

This report makes references to results that were obtained from pre and post questionnaires completed by the participants. We note that these should be read with caution. The questionnaires were conducted as a workshop activity and should not be interpreted or treated as a robust survey methodology as this is not what they were intended to be. Participants were asked to answer two questions before and after the workshop, to give an indicative suggestion as to whether and how views might have shifted about the technologies during the workshop. This project was not conceived or designed to investigate whether and how views about these technologies change, which would not be possible through this methodological approach, and the questionnaire results should be approached accordingly.

2.4.4 Analytical limitations

Finally, this report should also be read within the context of the limitations in which the analysis was conducted – namely time and budget restrictions. The analysis has been conducted to the standard that was possible within these constraints but does not meet with academic expectations for qualitative research analysis. Again, we reiterate that it should therefore be treated as a starting point for further analysis. We remind the reader that the results of qualitative analysis are to some extent subjective (to those conducting the analysis) and should be understood within the limitations of the research context through which they were collected; e.g. group dynamics, uneven coverage, the influence of other views, and within the limits of the information that was provided to participants and the questions that were asked to them (Ritchie and Lewis:2003).

The approach follows in the descriptive and interpretive traditions for qualitative research (Spencer et al: 2003). However, it does not conform with academic standards for grounded or thematic analysis. For example, there was not sufficient budget available for the transcription of the audio files which would be required for a purist implementation of these approaches. The analysis in this report has been conducted based on the notes taken by note takers for each of the discussion groups which were collated into country level reports (according to a structured template) and then comparison was made between these country level reports and themes drawn out accordingly – rather than robust and systematic thematic analysis being conducted as may be expected in academia.

There are three final limitations to be noted. The results are presented as an aggregate of the dataset comprising of the material across the five countries. Whilst we acknowledge that the five countries have different political, economic, social and cultural contexts (and indeed were chosen by the consortium for this reason), it is not possible to draw any conclusions about the impact of these differences on the results within the limits of the design. It is also not possible to compare the results of the three technology areas as the analysis process does not allow for systematic comparison between the technology areas. Finally, where technologies are referred to as being most and least acceptable in these reports, this refers to them appearing to be acceptable through the discussions in the workshops and should not be taken to imply statistical significance as is established through quantitative research.

3. Results and discussion: Artificial Intelligence and Robots

This section reports on participant responses to the stimulus materials presented about the development and use of AI and robot technologies.

3.1 Introduction

During the workshops, the following definitions of terms were provided to participants and the findings should therefore be interpreted with reference to these. All the materials presented and given to participants are provided in Appendix 4 and the discussion flow is described in the methods chapter.

- **Artificial intelligence (AI)** – computer programs that can perform intelligent tasks normally performed by humans.
- **Machine learning (presented in discussion of AI) –** when a system can learn and improve from experience itself.
- **Algorithm (presented in discussion of AI) –** a list of instructions a computer is given to solve a problem. The steps need to be done in the right order.
- **Robots** were defined as machines that can do a series of complex tasks automatically and by themselves, tasks that humans would normally do.
- **Humanoid robots** were defined as robots (machines) designed to look like a human; androids are made to look as though they have human skin or speak like people.

This session of the workshop explored public attitudes towards the use of AI and robot technologies. Special sessions were included on drones (in France), self-driving cars (in Poland and Spain), and a special session on robots and jobs (in Greece and Germany). The workshops explored awareness, associations, and understanding of AI, robots, drones, and self-driving cars. The sessions then explored response to the use of these technologies, including the level of (un)acceptability, the benefits and concerns about the use of these technologies, and in what circumstances participants were more and less comfortable with these technologies being used. The session concluded by discussing participant views about what measures should be in place to mitigate their concerns about the use of AI and robot technologies, including drones and self-driving cars. Participants considered what role governments and businesses should have in mitigation of concerns and who is responsible for taking action to address these concerns. It should be noted that there was limited time for discussion of mitigation and therefore these findings should be taken as tentative and do not indicate recommendations from Kantar or SIENNA.

It should be noted that awareness of AI and robot technologies was quite high and knowledge and understanding, although limited, was higher than that for the other SIENNA technology areas. However, participants often conflated the technologies, therefore findings often overlap. Information about the technologies was provided to allow for a more informed discussion (Appendix 4). However, participants' understanding of the more technical aspects of these technologies, particularly AI, remained limited. Therefore, an important limitation to note is that these discussions took place within the context of participants understanding of the technologies being at a basic level. Furthermore, sub group analysis is presented in this chapter where it is relevant, meaningful and adds value to the discussion – and within the limitations of the analytical approach described in the methodology – rather than systematically throughout the report.

3.2 Artificial Intelligence

It should be noted that the information provided to the participants (Appendix 4) used familiar and tangible examples of AI applications in order to easily communicate the principles to participants and make the topic more accessible for them. Therefore, the findings will be discussed within the context of the materials presented in the group discussions (Appendix 4).

3.2.1 Awareness, associations and understanding – spontaneous and prompted

Across all five countries, there were **high levels of awareness** with AI applications, particularly those applications that participants use on a regular basis and those that are regularly mentioned in the media.

The pre-workshop questionnaires showed participants were most commonly 'not very familiar' and 'quite familiar' with AI, and felt mostly 'curious' about AI technologies. After the provision of information, participants shifted to being more 'hopeful' as well as 'curious' about AI technologies; and in terms of the impact on society the felt mostly 'quite positive' about the technologies. These views, taken from the pre- and post-questionnaires, were evenly spread across all five countries. However, France was slightly more 'hopeful' than curious in the post-workshop questionnaire.

AI technologies were **spontaneously associated** with applications such as Alexa, Spotify, GPS, Siri, Google Assistant and other smart home apps and devices, such as Roomba and smart fridges. There was a tendency to conflate AI with robot technologies. Robots were spontaneously mentioned during discussions about AI applications. However, AI was seen as more confusing and less tangible than robots, particularly in Germany. Confusion among participants was often about not fully understanding what does and does not constitute AI. In Poland, a small number of participants spoke about the autonomy of AI and the capacity of AI to learn and adapt. The concept of autonomy was seen by these participants as a potential 'threat to humankind,' because it has the potential to place people in a position of inferiority to an AI application or because it will have a 'stupefying effect' on humans.

Despite having high levels of awareness and a range of associations, understanding of how the applications work remained at a basic level. When participants were knowingly unfamiliar or struggled to understand how the applications worked they were fearful, confused and uncertain about how AI would ultimately impact their lives, particularly in Greece. Although participants appeared to understand the basic principles of AI and acknowledged its value in their lives, they struggled to understand how AI applications work at a more technical level. Their understanding of the principles was likely due to exposure to the applications in their everyday lives.

3.2.2 Benefits

Overall, participants were able to identify several benefits of AI technologies. Applications were seen as **most beneficial when participants perceived that it added value to human life and when the added value was easily identifiable**. For participants, added value was when an AI application was able to do something humans are unable to do at the same speed or with the same level of precision as AI; or when AI is used for doing jobs and/or tasks which are dangerous for humans. As illustrated in the quote below, there were some applications they did not see as providing this.

"*One day I saw a mattress with AI, I don't know what it will do for you.*" (Spain)

There was wide spread positivity among participants when AI applications where **seen to free humans up from mundane tasks** and allow them more time to focus on what participants viewed as more human and emotional tasks.

> *"Instead of going to the supermarket, AI allows you to make your order while you are driving. Your shopping will have reached your home by the time you arrive there."* (Greece)

There were **mixed views about the use of AI in health and social care**. Despite concerns (see next section), the use of AI in these settings was seen as **beneficial when it completed tasks with greater precision, accuracy and speed** than humans**.** For example, using AI to process large quantities of information, such as health and medical publications to aid in making a diagnosis. Among this discussion about reviewing large quantities of information, there was a lack of discussion about the potential negative uses, such as for political purposes.

In Greece, participants discussed the **additional benefit of creating new/different jobs** and that AI systems' lack of emotion meant they could be used objectively in situations where humans may be too emotional. Within certain sectors, such as banking, participants thought that an **AI application's objectivity, impartiality and lack of emotion could be beneficial.** Examples mentioned were cash machines and online banking systems, which they viewed as needing to be unemotional and systematic.

3.2.3 Concerns

Overall, participants across all five countries were **primarily concerned with the loss of control** they associated with AI – meaning that their autonomy, freedom and their intellectual capabilities would diminish as AI applications become more integrated into their lives. There were concerns about the potential for AI to become more intelligent than humans and for humans to become so reliant on AI to help them make decisions that humans would eventually be unable to think for themselves, become less autonomous and ultimately become lazy – therefore leading to AI having more control of humans and society as a result.

> *"Living in the box. You don't have to go out anymore, you're getting thicker and thicker and more and more immobile."* (Germany)

> *"If this continues, we all stay at home, we will order our bread, our pizza, we will have our dog bark on command and we will not need to leave our home anymore."* (France)

> *"It makes your life easier, but in the end we're too controlled by machines, manipulated." (Spain)*

This concern around loss of freedom and autonomy strongly emerged. Participants discussed this in respect to politics (voting in particular) and the banking sector; commenting that the use of AI to detect bank fraud was one example of the potential for limiting consumers' freedom.

> *"I'm not very much in favour of more complicated systems that make access to money even more difficult and make you feel even more controlled. A human is needed to evaluate specific situations, already in general banks lack empathy, so an AI would be even worse"* (France)

An overriding concern among participants, across all five countries, was **the potential dehumanisation of society**. Meaning that over time, humans would make fewer connections with one another and become more isolated.

> *"There aren't any relationships between people anymore."* (Spain)

Despite being able to identify some benefits of the use of AI in health and social care sectors, there was a **concern about the loss of human connections, which were seen as critical to these sectors.** For example, participants noted that the use of AI applications in the healthcare sector was only beneficial if it was used in conjunction with a healthcare practitioners' supervision and final say about a patient's care.

There was a widespread concern and commonly raised question about **who owns, has access to, develops, and regulates AI technologies**. There was uncertainty about the motivations of those with control over how these technologies are implemented and developed. For some participants, this concern was about an increase in socioeconomic inequalities, as they viewed that only those with the resources will have access to these technologies and will therefore control how they are developed and regulated for their own benefit and not for all of society. While for other participants, the concern was harder to pinpoint beyond a general view that some people may have ill intentions and motivations. Participants struggled to articulate exactly what these might be.

> *"I am not afraid of the machines, I am more afraid of those that operate them"* (Greece)
>
> *"Not the entire population has the resources to program machines. They are then programmed only by one class of society."* (Germany)

Despite identifying the potential for new jobs in AI, participants across all five countries also raised concerns about **job losses and unemployment** related to the greater use of AI. Some participants were concerned that alternative jobs would not be sufficient and unemployment would increase, particularly in manufacturing industries. Across all five countries, participants thought AI is more efficient than humans and so will be more frequently used by employers as a cheaper and faster means to get work done. In Spain there was more discussion and intrigue about the potential for new types of jobs being created as a result of this technological shift. Furthermore, there was an overarching view that loss of certain types of jobs was an inevitable part of societal evolution and technological progress.

There was **concern among participants about AI systems making complex decisions that require a mix of objectivity and emotional intelligence** (i.e. judiciary, online dating, and voting in political elections). AI systems were viewed as not having a balance of these two human characteristics, which participants viewed as being fundamental to making these types of decisions. They were concerned that AI applications are too objective, fact driven and inflexible and as a result would not be able to make a balanced decision in the same way that a human would be able to in complex social situations. However, participants also noted that they would not want AI systems to be programmed to have emotional intelligence. Rather, their role should only be to assist in processing information and guiding the decision making, which is ultimately made by a human.

> *"The machine will not detect remorse, won't know if somebody is sorry to have done what they are guilty of. It won't recognize the suspect."* (Poland)
>
> *"People do make mistakes, but it's easier to accept that. It's hard to accept that a robot would be making decisions about somebody's guilt. Automation brings to mind enhanced speed and quantity… of decisions, not their quality."* (Poland)

When asked to consider the use of AI technologies in the judicial sector, participants initially thought that AI has an advantage in making fact-based decisions, void of emotional bias. However, on further consideration, they were concerned about AI's ability to make decisions on whether somebody is guilty. There was a widespread view among participants that making these types of judgement requires critical thinking and emotional intelligence, and they thought that AI would be too rigid, lack emotional intelligence and be unable to take into consideration factors that are not predicted by laws. Furthermore, they consider the human factor as necessary to having a fair and just trial process.

> *"Judges have to examine all facts and then they are free to make their own conclusions."* (Greece)

> *"A human judge will take into account that a woman who killed her husband is a mother of 3 children and that her husband was abusing her."* (Greece)
>
> *The machine will not detect remorse, won't know if somebody is sorry to have done what they are guilty of. It won't recognize the suspect."* (Poland)

When prompted to discuss an AI voting application, the overriding response across all five countries and particularly in Spain and Germany, was negative. This AI application was presented to participants, in the stimulus materials, as using AI to learn about a person's life and then recommend how they should vote in elections (Appendix 5). There was concern that it was not an appropriate use of AI because the technology is **open to manipulation and it would not allow people to consider alternatives** that reinforced their previous life choices. There was limited discussion about any potential positive uses of this type of AI application – rather participants could only see the potential issues, such hacking, data protection, political deception and that people might disengage from politics all together. There was a general view among participants that the use of such technologies in voting was a way to restrict freedom of will, manipulate people, and to keep records of each person's political preferences. Their preference was for these technologies to be used merely as an information source, like a database where they can find information about all parties and decide what is the best voting option for them.

> *"People know and make decisions about their willingness to participate in elections and their choice of candidates on their own. It is possible to hack the devices – they are susceptible to bias and manipulations."* (Poland)
>
> "*I have my own convictions and I won't follow what a machine tells me. I have a brain and I make decisions by myself."* (Poland)
>
> *"Those algorithms may be used for earning votes. There are no independent people, and this would be created by IT specialists who have their specific convictions."* (Poland)
>
> *"Facebook has an AI that only shows us more of what we know already. It's like propaganda."* (France)

While in Germany and France the **dating application was seen as already widely accepted and used by society**, in other countries (notably Spain), there was more concern about the use of dating applications. Participants in Spain were of the view that dating is a part of the human experience and that **only humans should be making decisions on this**, as it is seen as too emotional for AI systems and it would diminish spontaneity.

> "*Nobody decides for me, but helps me to meet somebody who is a better match, even from the other end of the world. It can bring together people who complement each other perfectly."* (Poland)
>
> *"it has become mainstream. I have been to four marriages of people who met in that way."* (France)
>
> *"[I find] Internet dating creepy enough. All anonymous, fake pictures, lies."* (Germany)

Discussions about military use of AI applications indicated that **participants were conflicted about where they stand on the benefits and concerns associated with this use**. Some participants said that it would be beneficial to reduce the number of people having to fight in wars and being traumatised. However, alongside discussions of any benefits, participants quickly raised concern about the use of AI applications in this in this context, stating that it could lead to accidental killing of innocent civilians if the data used in targeting areas

was incorrect and that the use of drones was demoralising because it puts too much distance between the operator, working for the military, and their targets.

3.2.4 Level of (un)acceptability

Overall, from the pre-workshop questionnaire, participants were 'quite positive' and 'curious' about AI technologies. Over the course of the workshop discussions they moved towards being both 'curious,' 'hopeful' and 'quite positive' about the impact that AI technologies will have on society. AI applications were generally seen to have already been accepted in society. This was particularly the case for applications that are most relevant and useful for participants' everyday lives.

While quite accepting of familiar AI applications, participants were **somewhat tentative about the technology and their level of positivity needs to be considered in the context of the materials presented**. For example, responses to AI technologies may have been less positive if the AI applications discussed were focused on analysing personal data used by social media companies, use in policing, and/or use for surveillance purposes, rather than the focus on more accessible and familiar examples such as consumer goods. The examples of AI applications were selected because they were familiar examples of AI and would aid participants' understanding and allow for a more informed discussion about the technologies.

Although AI was seen by participants as already having a place in their lives and as an inevitable progression of modern society, **the level of acceptability was contingent on humans retaining control over these AI technologies**. The technologies were less acceptable when AI was presented as fully autonomous and capable of independent decision-making without human supervision. There was a fear that human lives might be at risk of fatality or injury if humans did not have the final say and/or were not able to intervene when deemed necessary. This was particularly important in discussions about self-driving cars and technology used in the health care sector.

Another critical factor for acceptability was whether the technology was seen to add value. Added value was associated with technology that **assists humans to have an easier and better quality of life.**

3.3 Robots

During the workshops, the following definition was provided to participants and the findings should therefore be interpreted with reference to it:

- **Robots** were defined as machines that can do a series of complex tasks automatically and by themselves, tasks that humans would normally do.
- **Humanoid robots** were defined as robots (machines) designed to look like a human; androids are made to look as though they have human skin or speak like people

For this section, the findings will be discussed within the context of the materials presented in the group discussions (Appendix 4).

3.3.1 Awareness, associations and understanding – spontaneous and prompted

Overall, **participants across the five countries were aware of robot technologies**. Similar to AI technologies, the pre-workshop questionnaires showed participants were most commonly 'not very familiar' and 'quite familiar' with robots; and felt mostly 'curious' about robot technologies. After the provision of information, participants shifted to being more evenly split between 'hopeful' and 'curious' about robot technologies, and in terms of the impact on society, they felt mostly 'quite positive' about these technologies. These views, taken from the pre- and post-workshop questionnaires, were evenly spread across all five countries.

However, Poland stood out as being more 'curious' than 'hopeful' in comparison to other countries in the post-workshop questionnaire.

Spontaneous mention of sources of awareness tended to be films (i.e. Terminator, I Robot) and/or television series (e.g. Black Mirror) that depict robots. Additionally, they were aware of robots through online sources including social media, and word of mouth. There was an assumption, among participants, that they understood what robot technologies are. However, they mainly associated robots with simple, everyday machines that operate under an automated program, and perform simple repetitive actions. A limited few made spontaneous mention about the existence of more evolved, complicated types of robots that may even look like humans (such as 'Sophia').

Participants most **commonly referred to robots being used in factories, manufacturing, and as household assistants** such as vacuum cleaners and lawnmowers. These robot applications were more tangible and easier to understand than some of the AI applications or the more complex usages of robot technologies. Occasional spontaneous mention was made about robots being used in surgery.

> *"In factories where orders are prepared the robot goes and fetches the articles and puts them in cartons."* (France)
>
> *"I never fancied vacuuming and when a machine does the work for me, it's wonderful."* (Germany)
>
> *"Robots that operate on you, I wouldn't put myself in the hands of a robot."* (Spain)

Robots were **spontaneously associated with decreasing job vacancies and increased unemployment**, particularly in manufacturing and factory settings. Similar to the discussions about AI applications, participants tended to view the development of robots as inevitable and they considered robots as part of their daily lives already. While participants tended to be fairly neutral about robots and could identify their added value, they were also concerned about job losses, future unemployment and alternative jobs not being available.

3.3.2 Benefits

Overall, participants were primarily focused on the **practical, functional, logistical and physical benefits of using robot technologies**. There was positivity about the potential for robots to help humans save time on tasks and decrease the amount of effort or time spent on non-fulfilling tasks, like routine, boring, low value, and low status jobs. The view was that this would allow humans to lead more fulfilling lives.

> *"It makes life easier."* (Spain)
>
> *"If a robot can empty the trashcans why not?"* (France)
>
> *"You take 20 minutes to tighten a screw and the robot takes 20 seconds."* (Spain)

Robot technologies were also seen as **most beneficial when they could do jobs that are dangerous for humans** (i.e. involving chemicals or explosives) and when they are there to **assist humans in doing a better job but not to replace them** (i.e. police robots).

> *"Safety – If a bomb disposal expert does well, great, but if not, we lose a person instead of a robot."* (Poland)
>
> *"They could defuse a bomb." (France)*

Additionally, participants identified benefits of robots in the healthcare profession. In this sector, they were **positive about robots freeing up healthcare professionals from doing mundane, repetitive tasks and allowing them to focus on the more human and emotional tasks** important for these professions. Furthermore, there was enthusiasm for the introduction of robot technologies in the medical field if it will save and/or improve lives, particularly for children and families.

> *"The robot should be a bed, scanning the body, administering drip infusion, getting into the surgery room on its own."* (Poland)
>
> *"Tasks such as bedsheet replacement could be done by a robot, but more complex tasks should be performed by people."* (Poland)
>
> "*OK if the robot is used for making the beds so nurses can spend more time with the residents."* (France)

Some participants could also see that it might be **beneficial to have robots replace an animal, in an effort to fight loneliness** among the elderly and those with dementia. In these circumstances, participants acknowledged that taking care of an animal was a substantial task for an older person or someone with dementia. Some participants were of the view that if a robot animal was found to be helpful then it should be used.

> *"A robot dedicated to the elderly – it is used and proves to work well where a real pet cannot be given. It may help."* (Poland)

3.3.3 Concerns

Overall, there was a **concern about the 'unknowns' of the future uses and developments** of robot technologies. Participants questioned whether robots could become **manipulative and be able to dominate humans.** This appeared to be a key driver for why participants wanted humans to be able to maintain control and supervision over robots.

Despite identifying some benefits of robot technologies, there **was widespread concern about job losses** across all five countries. This was particularly a concern for **manufacturing and low skilled jobs** that participants viewed as already being replaced by robot technologies and most likely to continue to be replaced. Furthermore, there was a concern that large businesses will be the primary beneficiaries of these technological advancements, at the expense of workers and society more widely. This is because participants saw that businesses have the most to gain, in terms of increasing profit, by using robots that are more precise, efficient and cheaper than humans.

> *"Efficiency has increased, but at the same time many jobs are lost."* (Germany)

In Germany and Greece (where extra sessions were held on this topic to expand the debate) participants went one step further, raising the concern that **there will not be alternatives in place to compensate for the loss of jobs**. Alternatives meaning that new types of jobs would not be created quickly enough, retraining schemes would not be in place to prepare people for these new jobs, and/or that financial compensation would not be available for the loss of jobs. Participants in Poland and Spain were less concerned than other countries, as there was an assumption that new types of jobs will be created, and they see it as a normal progression of society, whereas in France and Germany there was a concern about what people will do once jobs are lost, if new ones are not created or people are not skilled to take them on.

> *"Where 100 people used to work, only one will work later. Then alternatives have to be created."* (Germany)

There was widespread concern about humanoid robots. In discussions about them, participants mentioned that they found them **unnerving, too artificial, unnecessary and potentially confusing for children and vulnerable people.** Participants also struggled to see humanoid robots as adding value, but rather taking away human contact and increasing isolation overall. Furthermore, it was imperative to participants that robots be easily distinguishable from humans and they do not see the reason or need for them look like people. The concern about using humanoid robots in work with children was unsettling for participants to the point that they suggested a ban on being able to use them in this context.

> *"A human being is different to a robot. I cannot imagine talking to somebody who has no heart. I cannot imagine that such robot would help me in any way. I think that it actually fosters child isolation instead of helping."* (Poland)

> *"In my opinion such robots should be visually distinctive, so that we'd know we're dealing with a robot."* (Poland)

> *"The subject of humanoids, I don't like anything about it. It makes my skin crawl, even those that are there to help. A machine is a machine. I don't like interacting so closely with them."* (Spain)

> *"It's like covering the issue up. I prefer a big robot, a square machine and that's it, for the robot to be a robot."* (Spain)

Overall, participants were less concerned about the functional and logistical use of robots. However, when **emotional intelligence** or the expectation for it to develop connections with humans was added to their role, this is when participants were concerned. For example, across all five countries, robots were not perceived to add value when they were programmed to engage in intimacy (i.e. sex robots), or to be in a caring position (i.e. social care, teaching, nursing).

> *"Maybe, in the case of the child, if the family can't be with them 24 hours a day, then for some time, knowing that it in no way replaces human warmth. And the touch and the rest, in the case of sexual relations, I don't think it's right. And the patient with dementia might be able to take a place in front of a real dog that has to be taken out on the street and so on."* (Spain)

> *"A robot could never offer the mother's hug and affection. Robots could only help caregivers, but they could never become caregivers themselves."* (Greece)

> *"It has also been proven that these interpersonal relationships also contribute to a faster recovery. These are aspects that a computer can never do."* (Germany)

> "*A machine cannot adapt to a human. A nurse will be talking to these people, remind them of their history, but a robot would not ask such type of questions."* (France)

> *"Human contact, it's the essence of life."* (France)

In Greece and Germany there was a **concern about robot technologies being used for military purposes**, particularly because smaller and/or poorer countries will be disadvantaged and potentially dominated by larger and/or more wealthy countries with access to these technologies.

In respect to the **use of police robots there were mixed views**. Some countries were concerned with robots being developed for use in positions of authority (i.e. judges and police). There was a fear about the potential for these technologies to be used against citizens and they wanted regulation to protect citizens against this.

> *"There is no mediation, when there are violent protests, the robot simply wants to arrest people as that is his task, while a human could exchange and maybe appease the situation."* (France)

3.3.4 Level of (un)acceptability

Overall, participants were **quite accepting of robot technologies being part of their daily lives**, **as long as the role was to assist in aiding humans** to live better and more fulfilling lives by saving time and/or reducing effort for unwanted, risky and/or undesirable tasks that detract from more meaningful and/or fulfilling tasks. The pre- and post-workshop questionnaires indicated that participants shifted from mostly 'curious' to being more even split between 'hopeful' and 'curious' about robot technologies and they felt 'quite positive' about the impact of these technologies on society.

> *"The goal should be to save time by using robots in meaningless jobs, in order to have more time as a parent to spend with your child and not the other way around."* (Greece)

Similar to acceptability of AI technologies, **acceptability of robots is dependent of humans having the 'final say'** / ultimate control over robots.

Among participants in all five countries, the level of **acceptability of robot technologies was down to whether they are programmed with emotions and emotional intelligence**. There was much less acceptance of robots when emotions were part of their programming and/or the role that they would play in society. Feelings and emotional intelligence are seen to be a distinctly human characteristics – therefore participants tended to be uncomfortable with the idea of robots being sentient and or being in a position of supporting humans in an emotional capacity.

> *"It can sing to us, tell stories, read… but for relationships another person is needed. It is not pedagogical, neither for a child or another grown-up."* (Germany)

> *"For chores, not relations. Human beings have feelings."* (Poland)

> *"I think it's awful when the robot's supposed to treat someone or amuse them. Where you should use robots is in logistics or the car industry"* (Germany)

> *"I refuse to be judged by a machine. I am a human being and only a human being has the right to judge me"* (Greece)

Robots being in a position of **working with children was also a less acceptable** prospect for many participants. While there was recognition that robots may become increasing integrated into the lives of future generations, there was concern about what this would do for child development and whether this would be confusing for children – the uncertainty around this meant that participants struggled to accept the use of robots in this way. This was less concern in Germany, although it was still mentioned by some participants.

> *"I don't get it… How will my child evolve emotionally if it interacts primarily with emotionless things?"* (Greece)

> *"The robot could dance with children or do gymnastics, while the educator does something else."* (Germany)

> *"I also have a great concern that this interpersonal relationship will be lost. That makes me really afraid even for my two small kids."* (Germany)

3.4 Drones (France only)

An additional session of public attitudes to drones was held in France. However, the topic of drones was mentioned in other discussions as well, during conversations about robots more generally.

During the workshops, the following definition was provided to participants and the findings should therefore be interpreted with reference to it:

- **Drone -** an aircraft that flies without any people on board and is controlled from the ground by an operator; automated following a pre-programmed mission; or by a mixture of both

For this section, the findings will be discussed within the context of the materials presented in the group discussions (Appendix 4).

3.4.1 Awareness and associations

Overall there was a high level of awareness of drones among participants in France. All participants had heard of them from the television, media, large chain retailers, online sources, and from friends or acquaintances that own them for personal use. Participants **did not perceive drones to be a particularly new technology or an unknown subject** – rather they were seen as trendy and accessible, with several participants owning one themselves.

> "*You see them in television programs with the filming of landscapes"* (France)

> *"They can be bought too easily"* (France)

At the start of the group discussion, participants spontaneously mentioned that they **were not particularly concerned about drones**. Although, there were some initial **negative associations with drones, in respect to them being a device for spying, surveillance, and intrusion into personal lives.** Some participants commented that it was difficult to know who is piloting a drone, which could be concerning.

> "*Drones are modern detectives. It's an eye"* (France)

Other associations with drones were related to equipment like radars and GPS or in respect to drones being used for security, exploration, to transport food to regions that are difficult to access, and to discover landscapes.

Similar to both AI and robot technologies, the pre-workshop questionnaires showed participants were most commonly 'not very familiar' and 'quite familiar' with drones, and felt mostly 'curious' as well as 'neutral' about drones. After the provision of information, participants shifted to being almost evenly split across 'neutral, 'curious,' and 'hopeful'. In terms of the impact on society, they felt mostly 'quite positive' and 'neutral' about drones. These views, taken from the pre- and post-workshop questionnaires, were mixed across all five countries.

3.4.2 Benefits

Drone technology was seen as **most beneficial and least controversial when it was used primarily for recreation**. There was an overall interest and excitement about the use of drones for recreational purposes. Mainly for being able to use the technology to take beautiful and unique photos while on holiday or at special events, such as weddings or birthdays.

> "*To have a panorama of landscapes. I think it's good for points of view, photos. Why not in weddings, events… we would have a different point of view from height, the wedding seen from the sky."* (France)

> *"It's a hobby, it makes beautiful holiday movies, it makes beautiful views."* (France)

> *"Makes for beautiful holiday pictures."* (France)

Several other applications were identified as beneficial for professional use, as well private recreational use. **Drone technology was seen as a beneficial tool to assist 'risky' professions, such as military, firefighters, police, rescue teams, and prison guards**. Participants viewed drones as a useful, complementary tool for these professionals, helping to maximize their efficiency and ability to protect the public.

> *"Seeing the extent of fire damage"* (France)
>
> *"One may be able to find the wrong doer, to identify a thieve"* (France)
>
> *"Saving people in the mountains who get lost. If they are in a crevasse and it is not accessible, it is then possible to target the injured"* (France)
>
> *"It may be good for monitoring prisons, rather than putting the lives of prison guards in danger. A drone that revolves around the prison and over the courtyard"* (France)

A small number of participants saw drone technology as **beneficial for other professions that need access to physically harder to reach areas**, such as engineering, construction-related jobs and environmental research.

> "*it can save time to monitor bridges, see if the bridge had a crack or not, it's also a money-saver"* (France)
>
> *"For people who do roofing"* (France)
>
> *"For research in forests, in very steep zones"* (France)

3.4.3 Concerns

Only a minority of participants raised concerns about the use of drones. These **concerns were mainly about the potential for police and government use of drones to intrude on people's private lives**. Although they primarily saw drone use by the police and government as beneficial for protecting citizens, the concern was that it could drift towards an over-protective tool for police and governments that are obsessed with security. The fear was that it could easily become a tool for increased surveillance of citizens by police and government.

> *"Walking through the streets under surveillance creates a climate of fear…. The risks are that the state is behind it and that it facilitates police repression"* (France)
>
> "*We are filmed everywhere. I'm not in favour. It's like in China. We already have cameras in the street, but now with drones it's even worse"* (France)
>
> *"Drones will go from quiet surveillance to something rather detrimental and malicious. We must be careful with these cameras that are filming us all the time."* (France)

To a lesser degree, participants were **concerned about the potential for ill-intentioned civilians to use drones to facilitate illegal activity,** such as burglary, drug use or terrorism, and to facilitate stalking and spying on fellow citizens.

> *"It can drift, get into people's daily lives. In extreme cases, you can even follow someone."* (France)
>
> *"It can help malicious people or terrorists to spot their next move."* (France)

> "O*ne of the fears is surveillance between neighbours. That the spies will start spying on each other."* (France)
>
> *"Criminals will use drones."* (France)

Among an even smaller number of participants, there was a **concern about the potential for misuse of drones by police, to disrupt citizens' right to protest**. These participants feared that drones would be used to disperse tear gas to end a protest.

> *"It may be useful to get overview of a mass protest, but drones should not be used to for spreading tear gas."* (France)

There was a **widespread concern about the use of drones for military purposes**. Some participants referred to the use of drones by the US to kill specific identified targets, which they viewed as immoral.

> *"Americans use drones to kill people at a distance, that is not a military action. It's murder at large distance. It's like a sniper."* (France)
>
> *"It's a machine against a human being. It's not moral. The machine is not at risk."* (France)
>
> *"Drones were used in the Gulf war. Innocent civilians were killed. They confused a marriage with a place where terrorists were in hiding and they killed many innocent people."* (France)

3.4.4 Level of (un)acceptability

For the most part, participants in the group discussion were **already familiar with the use of drones and were generally quite accepting of their use in society**. Some participants owned drones themselves and/or were contemplating getting one for recreational use. The post-workshop questionnaires showed that participants views (in France), were almost evenly split across 'neutral', 'curious', and 'hopeful'; whereas in the pre-workshop questionnaire they were less 'neutral' and split between 'hopeful', 'excited', and 'curious' about drones. This increased neutrality about drones could be attributed to the group opening up discussions about potential for spying/surveillance, which was a concern for many participants.

Drones were **most acceptable to participants when they were used for recreational purposes**. Despite having identified a concern about the potential for spying on fellow citizens, few participants had concerns about personal, recreational use of drones. The use of drones was also acceptable if used by the police and government **to protect civilian lives, but not if it was used to increase surveillance on civilians or to inhibit the right to protest.**

Overall **acceptability of the use of drones was linked to participants' awareness of the existence of legislation** regarding ownership and use of this technology. Although participants were vague about the details of this legislation, they were reassured that it existed, that they could refer to it if necessary, and they trusted that was in place to protect civilians against ill-intended usage, either personally or professionally.

> "*For free time, I'm not interested, you need a license to have it fly, they have a number like the I-phone so you know who is piloting it."* (France)
>
> *"The small ones now have a little chip, the true drones have a chip. You are obliged to register, to give your address and you cannot touch (remove) the chip."* (France)

3.5 Self-driving cars (Poland and Spain only)

An additional session of public attitudes to self-driving cars was held in Poland and Spain. During the workshops, the following definition was provided to participants and the findings should therefore be interpreted with reference to it:

- **Self-driving cars –** cars, trucks and trains that can drive themselves by sensing their environment; using a combination of different types of sensors like radar, sonar and GPS to detect and to try to avoid obstacles.

For this section, the findings will be discussed within the context of the materials presented in the group discussions (Appendix 4).

3.5.1 Awareness, associations and understanding – spontaneous and prompted

There was **widespread awareness and understanding of the concept of self-driving cars**, but little understanding of exactly how the technology works. Similar to both AI, robot technologies and drones, the pre-workshop questionnaires showed participants across all five countries were most commonly 'not very familiar' and 'quite familiar' with self-driving cars, and felt mostly 'curious', with 'hopeful' and 'excited' also being common responses. After the provision of information, participants shifted to slightly more 'curious', and in terms of the impact on society, they felt mostly 'quite positive' about self-driving cars. These views, taken from the pre and post questionnaires, were mixed across all five countries.

Awareness had mostly been gained via news, television (films and documentaries), and from friends. In Poland, some participants' awareness was gained via motor shows and car expos. In Spain, participants were aware of self-driving cars already being manufactured and tested in countries such as the USA. They understood, at a basic level, what these vehicles were capable of and were aware of the technology being introduced into society already. Some participants associated self-driving cars with technologies already in existence or in use other industries.

> *'The autopilot function in aircrafts has been used for a long time. Cars have the cruise control system" (Poland)*

While participants tended to express interest and curiosity about the technology being introduced into their lives, they were also **concerned because they were aware of examples of self-driving cars getting in to accidents once introduced**. Awareness of these examples was cause for concern and fear about the potential for failures. Some participants said these examples made them question whether the technology would be integrated into their lives as quickly as was thought.

There was **widespread interest in the developments of the technology**, because of what it means for society's overall technological advancements. However, participants were eager to know how issues of technology and system failures would be dealt with.

3.5.2 Benefits

Overall, participants were able to identify several benefits for self-driving cars. It was seen to be **most beneficial for reasons of convenience**. For example, being helpful on a long drive and for people that do not like driving or are unable to drive. Having more options for transportation was identified as the main convenience if the human driver is either unwell, having drinks/going on a night out or wants to sleep or do another activity while driving.

> *"It has a lot of advantages, that it can take you as a passenger without having a licence, without having to be awake. If it really worked I think the invention is impressive... but it's scary"* (Spain)
>
> "*I don't like to drive, I'd prefer to be driven*" (Poland)
>
> *"For people like me who are scared of driving"* (Spain)

There was some discussion about the potential for this technology to benefit older and/or disabled people. It could allow more freedom of mobility.

> *"For people that aren't mobile"* (Spain)

Within both countries, participants acknowledged that a **key benefit would be the reduction in the number of traffic accidents and ultimately improved safety**. This was balanced with the acknowledgement of their concerns about accidents taking place when the technology was newly introduced. Participants' statement about the reduction in traffic accidents was about the longer-term use of the technology, after the initial transition/introductory period. Self-driving cars were seen as beneficial to overall driving safety if driving under difficult conditions, such as bad weather or bad roads. They were also seen as less susceptible than humans to states of being that could impact on driving skills, such as emotions, distractions, exhaustion, and being under the influence of drugs or alcohol.

> *"The car would make decisions faster than the human. It's better. Decisions might be more accurate, unaffected by panicking, stress etc. Car is safer – less susceptible to distortions of the clarity of a given situation, such as tiredness, distraction, confusion, impaired objectivity*" (Poland)
>
> *"Machines will do better in difficult driving conditions, e.g., in the dark, in challenging weather conditions, emergencies*" (Poland)
>
> *"It'll be much safer than human driving"* (Spain)

In Poland, participants also mentioned that there would be fewer traffic violations and fines because self-driving cars would be more likely to obey traffic regulations.

3.5.3 Concerns

Although participants were able to identify multiple benefits, there was **a concern, across both countries that without robust regulation and adaptation of current infrastructure, the transition period** could lead to more accidents initially with little certainty about liability. Participants struggled to see how self-driving cars and 'normal' cars could co-exist successfully without this.

In respect to accidents between a self-driving car and 'normal' cars, there was a **concern about the uncertainty around who would be held responsible and accountable**. Participants assumed that it might be a combination of the owner and manufacturer, and stated that there should also be a role for insurance companies in such accidents.

> *"I don't know who is liable, I don't know... If it is the car that makes a mistake, then the manufacturers" (Spain)*

Related to their concern about accidents was a concern about the risk of system and technological failures. Participants were **concerned about the potential for failures if there was incomplete data within the systems and sensors** that enable self-driving cars to function autonomously. Furthermore, they were concerned about the susceptibility of these systems to hacking.

> "*Just like GPS, where the inserted information may be inaccurate, outdated, and you end up driving into a field, a tree or a lake*" (Spain)

> *"A clever hacker can cause a global catastrophe within 3 hours*" (Poland)

There was a significant concern about how a self-driving car would respond if it had to make a choice in a collision involving pedestrian(s). Participants **were fearful that there would be no way to programme a car that could predict all the potential situations** (i.e. between owner and pedestrian)

> *"It may be that some unpredicted situation occurs. For example, the robot may be programmed to maintain a specific distance, and suddenly someone cuts in and the decision has to be made about what to do, and it does not work out. Or a child appears on the road and there is a decision to be made; hit the child or hit the tree. I know what I would do, but what would the automated vehicle do?"* (Poland)

While participants saw the benefit of their own use of this technology, there was a concern with allowing children to use self-driving cars without an adult present.

> *"Convenient, you send the child to school in the car, if everything works well... I think I'd go as well just in case, because of security"* (Spain)

3.5.4 Acceptability

Overall participants were quite accepting of the technology and viewed the development of self-driving cars as a reality and an inevitable part of societal progression. However, participants across both countries were of the view that **humans should retain the ability to take control and have the final say.** Self-driving cars were **least acceptable when they were described as fully autonomous**. As with other AI and robot technologies, participants were more likely to accept the technology if the option for a human to take over control remained in place. The partial and conditional levels of automation were widely accepted and perceived as being feasible to introduce in the short term.

Higher levels of automation, which allow passengers to sleep in the vehicle while driving or parking by itself, generated more debate among participants and was more difficult for them to accept. The only exception to the view around full autonomy of self-driving cars was if the decision made by the technology is considered to be safer than the decision made by a human being. Participants gave examples of humans potentially being affected by emotions and therefore incapable of making rational decisions.

> *"The human being has to have the final say."* (Germany)

> *"The machine shouldn't decide anything about the human, just suggest."* (France)

> *"But in the case of humans, adrenaline distorts judgement, while robots make pre-programmed decisions."* (Poland)

Across both countries, participants were more positive and accepting of the use of self-driving technology for public transportation, such as trains and buses. Mainly because the use of separate railway tracks and/or traffic lanes limited the level of interaction with other traffic and was viewed as being safer. In Poland, participants were primarily accepting of the concept of using autonomous trains but would be a more significant challenge to integrate, although they saw it as an interesting concept.

> *"I trust trains because they seem safer, roll on railway tracks, in easier conditions – less variables."* (Poland)

4. Participant views on ways to mitigate their concerns about AI and robot technologies

This section reports on discussions held with the participants about what measures they wanted to see in place to address their concerns about AI and robots. We note that these findings are limited due to the short amount of time allocated to this discussion and the findings should therefore be read as highly tentative. We also note that these views are not presented as Kantar (Public Division) or SIENNA's recommendations, but as reporting of participant views. They should be taken as a starting point for further academic analysis and expert input to build upon.

4.1 Participant views on mitigation of concerns about Artificial Intelligence systems

There was widespread agreement across all five countries that the use of **AI technologies requires robust regulations and standards (e.g. code of ethics)** within every application domain and particularly in those applications used in the health and transportation industry. Participants saw that the use of AI in the health and transportation industries was the most potentially risky to human lives if there were system and/or technological failures. For example, the risk of accidents between pedestrians and fully autonomous self-driving cars, and the risk for misdiagnosis if AI applications had incorrect or incomplete patient data. Thus, participants were open to the idea of legislation to prevent AI applications from causing any physical or emotional damage to people.

It was also widely agreed that a fundamental regulation in respect to AI technologies, would be for **humans to retain an overall supervisory role and maintain the ability to take over control to make any final decisions**. Participants wanted this to be regulated across all applications of AI – that advice and suggestions were allowed, but there would always be a human in charge. Furthermore, if a decision was made based on suggestions or advice from an AI application, there should be a process of appeal.

> "*AI is a good thing, as long the machine does not make the final decisions"* (France)
>
> *"Should be an ongoing process of reflection, machines can assist in taking decisions, but should not be the ones who have final responsibility"* (France)
>
> *"Give advice, my opinion is that AI gives input to make the decision, but the doctor will make the final call"* (France)

Regulation was widely seen as being necessary, not only once the technologies are introduced into society, but in the development stages as well. Participants understood that the nature of these technologies was that they were constantly being developed through a process of multiple iterations and testing. Therefore participants suggested that commissions be set up to discuss the latest developments. The commissions would also provide advice and feedback about the safest way to develop the technology and with the least negative impact on society. It was unclear exactly who participants thought should be part of these commissions, but the general idea was that it could be a combination of experts, legislators, as well as non-expert citizens.

Overall participants wanted to see greater transparency from government and business about the current developments, the potential risks of these technologies and how to minimize them.

Any regulations would need to cover issues of liability, to protect humans when/if things go wrong.

Across all five countries, some participants were **concerned about whether regulations would be able to keep up with the pace of the development of the technologies**. Despite best efforts of governments and

interest groups, participants acknowledged that the advancement of these technologies and their introduction into society will likely surpass the speed of regulations.

In Germany, there was a concern that European Union regulation of these technologies could potentially **slow technological progress and ultimately lead to Europe being less competitive**, particularly if the rest of the world continues to rapidly develop these technologies without regulation.

In Greece, participants also wanted to see **education and awareness raising programmes and campaigns taking place, as a way to mitigate civilian concern**, in addition to regulations and standards. Participants suggested using simple, practical examples, to allow people to understand the emerging technologies and how they are going to affect their lives and to explain the value that such technologies can offer and find ways to incorporate them in their everyday life.

There were **mixed views among participants about who should be responsible for creating regulations and standards.** Participants mentioned many different parties that should be responsible in addressing their concerns. Government was widely seen to be responsible for leading the creation of regulations and standards. However, participants across all countries mentioned the importance of also having private sector professionals and other public institutions involved in this process. **Local governments and international organizations like the EU and United Nations were among the first ones that came to mind**. Inventors, manufacturing companies or any corporation that uses AI systems should also be considered responsible. Finally, people recognized that each citizen should have personal responsibility for the proper use of such systems. In France, participants commented that banks and insurance companies will also need to play a role in regulations. Some see regulations of these technologies as a worldwide issue and called for a globalised, international involvement in developing regulations.

4.2 Participant views on mitigation of concerns about robots

It was generally agreed that regulations were necessary to ensure that robots are only used in particular sectors (e.g. domestic work and factory work), in order to protect jobs in sectors that participants viewed as requiring emotional connections with humans (e.g. healthcare and social care sectors)

A common **concern across all five countries was about the future employment,** this was primarily in respect to robot technologies. However, it was also mentioned within discussions of AI technologies. Participants tended to acknowledge that the loss of jobs would be difficult to prevent and therefore requires strategies to reduce the negative impact this could have in society. Some suggestions mentioned by participants included:

- Having quotas on share of human vs. robot 'workers'
- Strategic development of new jobs as a replacement
- Sponsored retraining for those who will or are likely to lose their jobs due to robots and AI technologies being implemented
- Financial compensation of salary losses until a new job is found
- Tax on companies that use robot technologies – to compensate for the loss of jobs and to provide funds to address the issue of future unemployment

> *"If a robot replaces workers, the person or company who uses them should pay for it, if the robot replaces 6 workers, he should pay compensation for 6 workers."* (France)

As with AI technologies, participants wanted to see an increase in transparency from companies and governments, not only about the developments and risks of the technologies, but also about funding decisions; for example, an explanation about which technologies would receive funding and why that decision was made.

In Greece, there was an overall view that robot technologies should be banned from authority positions as a means to maintain control over what types of decisions robots would make and to ensure that humans remain in control of their lives and choices.

Similarly to AI technologies, governments and international organisations, such as the EU and United Nations, were mentioned as those that should be responsible for creating regulations and for mitigating citizens' concerns. Additionally, participants wanted to see that inventors/creators of the technologies, the manufacturing companies, and the business that use these technologies should also be part of the measures to mitigate their concerns using the suggested methods listed previously in this section.

Furthermore, education and re-training combined with a period of economic compensation was considered the most fair and hopeful way to mitigate concerns. There was a widespread view that this combination of mitigation tactics would allow people to sustain their value and sense of self-worth in the long run. However, some participants raised concerns about the potential inability of some people (particularly older people) to re-educate themselves.

4.3 Participant views on mitigation of concerns about drones (France only)

In France, there was less discussion among participants about the future of regulations because they were **aware of the existence of legislation about ownership and use of drones** – although they were vague about the details of this. However, they did want to know more about legislation to protect citizens against surveillance from the government and regulations of use by police. There was also limited time for this discussion due to time constraints.

4.4 Participant views on mitigation of concerns about self-driving cars (Poland and Spain only)

While there was **widespread positivity, curiosity and excitement in the post-workshop questionnaires, participants were uncertain as to how the technology use will be managed, regulated and how liability, in the event of an accident, will be determined**. They also found it difficult to imagine a period during which current cars will coexist with self-driving cars. There was an assumption among participants that it would take a long time to update the roadway infrastructure that is required to have only self-driving cars on the road and that this is not in likely to happen in the next 5 years.

> *"It would be better if manufacturers were held accountable, because they are the ones responsible for their product. Why would the car owner be held responsible if he/she uses it well and something goes wrong?"* (Poland)

There was an overall **assumption among participants that there would be a key role for insurance companies** in assessing liability and accountability in accidents between self-driving vehicles and other vehicles on the roadways and with pedestrians.

In Poland, participants wanted to the see that **regulations were in place during the development stages** of this technology to ensure that self-driving cars were not designed to be fully autonomous. There is a need for regulation around programming of this technology.

In Spain, participants wanted there to be **regulation as soon as possible, because they were of the view that self-driving cars are already being introduce into society** and would likely be introduced into their society in the very near future. There was concern about how this will be managed and that regulations developed by the local government will not be able to keep up with the pace that the technology is introduced.

5. Results and discussion

The results in this report should be read with reference to and in the context of the limitations set out in Section 2.4. The results serve as indicative findings about public attitudes to AI and robots and should be treated as a starting point for further academic research and analysis to build from. They should not be read in isolation and should be read with reference to the other reports that have been produced as part of the SIENNA project. This project has been conducted by a social research agency and not academic researchers. The report lacks contextualization of the results with relevant academic literature to further understand the meaning of the results for the field. Clearly, each discussion group could and should be more deeply analysed to fully understand their meaning and how this pushes our understanding of public views toward AI and robots further. Ideally such further analysis will be conducted by academic partners through academic publications.

5.1 Summary of findings

AI and robots were commonly conflated by participants, therefore some of the overall findings mentioned in this section were similar across the discussions and applications explored in the workshops.

Overall, there were high levels of awareness of the technologies but a limited understanding of how the technologies work and of the more complex applications and systems. The public's familiarity and understanding, although limited, contributed to overall acceptance of these technologies in all five countries. For the most part, participants viewed these technologies as already being a regular feature in their lives, however it was clear that AI was less tangible and more complicated for them to understand than robot technologies.

Several of the applications which participants were less familiar with and/or struggled to fully understand drove anxiety and concern among participants, particularly when they saw it as potentially harmful to wider society or to vulnerable populations (e.g. children and young people, elderly people, people with mental health conditions, people with learning disabilities).

Overall, AI and robots were commonly seen as relevant to participants who were quite comfortable with their development and use in society. Robots were more acceptable when their role remained purely functional, rational and without emotions. Humanoid robots were the most controversial, least accepted, had the lowest perceived value and were seen as potentially harmful when used with children and vulnerable people.

Limited understanding and less familiarity with certain applications, drove anxiety and concern among participants, particularly when they did not understand how it worked or fundamentally disagreed with the concept that the technology would make complex decisions. For example, full automation of self-driving vehicles was difficult for participants to grasp how the cars would be programmed to take into account every possible outcome in a collision and to decide on the one that would end in the least fatalities or injuries to people.

Although AI and robots were seen as already having been accepted into society to an extent, there were concerns about future applications and the need for regulations to protect the public from some of the unintended or undesirable consequences. These findings should be taken as a starting point for further academic analysis to build upon.

5.2 Five key themes

Overall, there seemed to be widespread acceptance of the development and use of AI and robot technologies. AI and robot technologies were most acceptable when they were seen to assist humans in leading easier and more fulfilling lives. They were less acceptable if human lives were at risk or when they were seen to be emulating distinctly human characteristics, namely emotions and physical appearance.

From review of the benefits and concerns associated with each of these technologies and the discussions about how acceptable their development and use were across the five countries, **five key themes emerged regarding levels of acceptability** of AI and robot technologies. The analysis process which identified these themes -along with the limitations of this - is described in section 2.3 and should be read with reference to this. Whilst acknowledging the limitations and weaknesses of the analysis process, the identification of these themes can help us begin to understand why some of the AI and robot technologies were more acceptable than others. This section serves as a starting point for further academic analysis to build upon.

Consideration of these factors individually and in combination can help us to understand why some of the AI and robotic technologies were more acceptable than others. Beyond risks and control, there were not many broad ethical concerns dominating the discussions.

1. **Control:** the use of AI and robot technologies was more acceptable when humans maintain control over the technologies

There was widespread agreement, across all five countries, that acceptance of these technologies was linked to humans maintaining control over the technologies and that they would never be used to make decisions entirely on their own. In one way, control meant that humans would always have oversight, supervision and ultimately make any final decisions based on suggestions or advice provided by AI and robots. In another way, control meant that when humans were not comfortable with a decision made by the technology, they would be able to take over control; for example, with conditionally autonomous self-driving cars. Situations in which the technology was seen to be fully autonomous and making decisions on its own, without the input of a human, were not acceptable. A guarantee that humans retain control and supervision is crucial to making any AI and robot application more acceptable.

2. **Familiarity/relevance:** the use of AI and robot technologies tended to be more acceptable the more familiar and relevant they were to participant's lives.

Similar to other technology areas explored in the workshops, the acceptability of AI and robot technologies was linked to the level of familiarity participants had with the applications. The more familiar there were with it and the more relevant it was in the daily lives meant that participants tended to have a more of an understanding of the concept and of the value of the technology. To a lesser extent they could understand how it worked.

3. **Understanding** – technologies were more acceptable when participants were confident in their ability to understand the purpose of the technology and how it works.

AI and robot technologies were more acceptable when participants understood their purpose and how they worked, at least the principles of this. Participants tended to be more accepting of robot technologies and appeared more confident in their understanding of how the technology works and its overall purpose. This level of confidence could be attributed to their associations with more simple, everyday, tangible uses of robot technologies (i.e factory robots, domestic robots). Whereas, AI technologies were seen as less tangible, meaning participants were not as confident in their ability to understand how they work. This meant that

overall the basic implementation of robot technologies were more acceptable than other more complex AI technologies.

4. **Perceived value:** the use of AI and robot technologies tended to be more acceptable the more their use was seen to add value to human lives.

Applications which provided more practical and functional value were more acceptable, whereas those which attempted to provide emotional value, or where the added value was not immediately apparent, were less acceptable. Applications with high added value were those that provided a purely functional, rational and practical purpose – doing tasks that humans could not do with the same level of precision and speed, and tasks that humans should not, or do not want to do, because they are burdensome, dangerous, or require processing of large volumes of data. Applications with the lowest added value were ones that included emotions as a key aspect of their design and purpose; for example, providing empathy, intimacy, emotional complexity and emotional intelligence. Humanoid robots were seen as potentially harmful when used with children and vulnerable people. The most controversial and least acceptable use of robot technology was the use of humanoid robots. Participants struggled to see the value in a robot looking like a human, other than to potentially replace humans, which was an unsettling prospect for many participants.

5. **Safety:** the use of AI and robot technologies tended to be more acceptable when their level of risk was low

The extent to which technologies pose a physical or psychological risk to humans shaped how acceptable they were seen to be. Technologies perceived to be lower risk, such as robots used for domestic chores or AI used to personalise shopping experiences, tended to be more acceptable. Technologies perceived to have higher risk, such as AI used for self-driving cars and robots used for surgical procedures were less acceptable or acceptable only with certain conditions, such as human oversight and control.

Consideration of these themes, individually and in combination, can help us begin to understand why some of the AI and robot technologies were more acceptable than others. This report serves as a starting point for further analysis.

5.2 Moral values

Throughout the workshops and across all five countries, particular values and morals were openly discussed, directly or indirectly, by participants:

- Freedom and autonomy
- Fairness (including justice, non-discrimination, and equality)
- Responsibility and accountability
- Privacy

There was concern among participants about the potential loss of **freedom and autonomy**, as a result of overreliance on these technologies for critical thinking and decision making. Participants generally saw the benefit only when these technologies were used in a consultative role and people retained their freedom to make any final decisions about their lives or the lives of others.

Furthermore, use of these technologies in certain sectors or domains, such as banking or politics (specifically voting in elections) were on the one hand accepted for offering products or options better suited to their needs. However, use was also perceived to be an excess of control and a way to take away people's ability to decide for themselves.

Loss of freedom and autonomy was also linked to participants' concerns that in the future these technologies may surpass human abilities, and in some industries (e.g. manufacturing) that this has already happened. This drove fear among participants about not only potentially losing their freedom of choice and ability to make decisions, but that they might be overpowered by these technologies.

Discussions of **fairness, justice and equity** tended to emerge when participants were asked to consider potential mitigations. A combination of compensation and education or re-training was considered the best and most fair solution. This ideal combination would enable people to get their basic survival needs met while going through a period of re-education or re-training.

Furthermore, discussions of fairness, justice and equity were raised in conversations about the use of these technologies in the judiciary sector. This was one of the most controversial areas of use, and participants found it difficult to accept that AI and/or robots could have more capacity for judgement than a human being. Therefore, they were less accepting of the idea of these technologies having any type of authority (e.g. a robot judging humans in legal proceedings). Participants typically held the view that decisions taken by AI are devoid of human judgement, in that they lack flexibility, emotional intelligence and would not take into consideration that every human being and circumstance is different.

> *"I refuse to be judged by a machine! I am a human being and only a human being has the right to judge me!"* (Greece)
>
> *"According to the data you put into the machine, if you put in all the cases... but you can't put the psychological part into the machine."* (Spain)
>
> *"I'm not going to put my freedom in the hands of a machine"* (Spain)

Discussions around **responsibility and accountability** were often intertwined with discussions about safety and protecting people from potential physical and emotional harm. Participants were concerned about possible system failures and the risk to human life that these may pose, particularly when considering automated vehicles or use in healthcare / medical procedures. Within these sectors, a system failure was seen as likely to have a detrimental effect on human lives and this raised questions about who would ultimately be held responsible. However, participants were conflicted about the issue of safety, because they could also see potential for increased safety, particularly when used for jobs that are physically risky to humans and/or that autonomous vehicles could eventually be safer than human drivers, after the transition period.

One area of significant concern about emotional harm was around the need for these technologies to be distinct and easily distinguishable by all humans, particularly vulnerable groups such as children, elderly and people with disabilities. In general, participants wanted assurances that humans were safe and protected from risks through accountability and responsibility measures.

The value of **privacy** was less apparent than discussions about freedom, fairness and accountability / responsibility. However, participants did discuss feeling insecure about the safety of their personal data and the vulnerability of these technologies and systems to hacking. They were worried and sceptical about the effectiveness of these systems to protect against this. One area where the value of privacy featured more, was in respect to the use of drones. There was a widespread agreement among participants that while drones for recreational / private use were mainly not concerning, there remains the potential for drones to be used as a surveillance tool; by the government, police, ill-intentioned private citizens, as well as criminal and/or terrorist organisations.

Appendix 1 – SIENNA Qualitative workshops - Topic Guide

Logistics

Location	Date	Timings	Location
Hamburg	Saturday 6th April	09:00-17:30	ms Teststudio, Ute Fehling, Mönckebergstraße 18, 20095 Hamburg
Paris	Saturday 6th April	09:00-17:30	LE PAVILLON DE CHESNAIE, Route de la Pyramide, 75012 Paris
Warsaw	Saturday 13th April	09:00-17:30	Centrum Konferencyjne Golden Floor Tower, ul. Chłodna 51; 00-867 Warszawa
Athens	Saturday 13th April	10:00-18:30	DIVANI CARAVEL HOTEL, 2 Vassileos Alexandrou ave. 16121 Athens
Madrid	Saturday 27th April	09:00-17:30	Hotel Puerta de América, Avenida de América, 41, 28002 Madrid

Topic guide

Background

Aim

- The aim of the panels is to engage citizens in deep consideration of the issues raised by three technologies (Human genetics and genomics; Human enhancement; and Artificial intelligence and robotics)

Primary objectives

- To explore and understand citizens' views of the technology areas and particular uses and applications
- To explore citizens' concerns about the three technologies (and specific applications) and how they would like these concerns to be addressed

Methodology

- Full-day Saturday citizens panels in five countries - held in the (main) national language
- Citizen panels provide a forum for discussion and deliberation of complex, sensitive and/or contentious topics on which it is important to gain a public view. They give members of the public the time, space and information they need to consider issues and express confident opinions.
- Deliberation begins by providing background information and obtaining participants' initial views. Over the course of the panel, experts provide information, informing participants' discussions. Discussions will build incrementally – first introducing basic principles, then looking at potential applications and issues of ethical and legal regulation. Discussions will start from the point of view of participants, allowing them to frame content, raise questions and identify concerns or areas of uncertainty. Stimulus materials will be used to encourage discussion and provoke debate.
- The day includes both plenary sessions and breakout group discussions where participants are split into five groups of 10 participants. The breakout groups will each comprise participants from a range of demographic groups and discuss each of the topics and respond to provided stimulus materials.
- Each panel will be moderator by x5 local KP moderators, with an additional x5 KP notetakers, with one moderator and one notetaker in each breakout group.
- 2-5 experts will attend each workshop

Materials

X1 Leader pack:

Client Research Observation and Monitoring Confidentiality Agreement	X1 (A4, black and white, single side)
Expert name badges	As required
Participant SIENNA audio recording consent forms	X54 (A4, black and white, single side)
Stickers	X54 (x5 different colours)
Incentives and signature sheets	X54
Participant questionnaires booklets	X54 (A4, colour, doubled sided, stapled)
Laptop and connector cable with the introductory presentation pre-loaded	X1
Flip chart pens	X3
Audio security confirmation form	X1 (A4, black and white, single side)

X5 Moderator packs <u>each</u> with:

Encrypted GDPR-compliant audio recorder	X1
Laptop with note taker template pre-loaded (for notetaker to use)	X1
Flip chart pens	X3
Pens	X11
Fictional segments	X11 (A4, colour, single sided)
Stimulus materials	X11 copies (A4, colour, doubled sided) EACH **SUB TOPIC** SHOULD BE SEPARATELY STAPLED (e.g. 'DRONES' should be **separate stapled** pack)

Topic guide

ALL TIMINGS MUST BE MOVED FORWARD BY ONE HOUR FOR ATHENS WORKSHOP TO START AT 10:00

1. 07:30 – 08:15: Set up by local Kantar team (45 mins)

2. 08:15 – 08:30: Kantar lead to brief expert(s) (15 mins)

PLENARY	**Timing**	**Stim**

2.1 Kantar local lead to brief experts
 	
• Introduce the venue (e.g. toilets, fire exit)
• Sign Observation agreement (Kantar lead to talk through requirements)
• Collect name badges
• Briefing points
  ○ Ask them to give a short introduction in the introductory plenary (4.1)
  ○ X1 experts to observe each break out group
  ○ Experts to circulate around the break out groups throughout the day
  ○ Experts only to answer questions during break out sessions when invited by the moderator
  ○ Experts should provide unbiased accurate, and up to date information and provide succinct answers and avoid the use of jargon and complex / academic language
	15 mins	**Name badges**
		
		Client observation agreement

3. 08:30 – 09:00: Participants arrive (30 mins)

REGISTRATION AREA – with coffee and biscuits (to be left out)	**Timing**	**Stim**
3.1 Registration • Register and receive incentive • Give a random sticker to allocate to a break out group (use 5 colours to ensure each group has a mix of demographics) • Sign consent form • Hand out questionnaire booklet ○ Ask participants to complete Section 1 (pre-task) and Section 2 (pre-questionnaire) before the workshop starts	**30 mins**	**Signature sheet** **Incentives** **SIENNA audio recording cons**

		ent forms **Stick ers** **Quest ionna ire bookl et**

4. 09:00 – 09:20: Introductory plenary (20 mins)

PLENARY	**Timing**	**Stim**
4.1 Introduction • Welcome from Kantar lead moderator • Kantar local lead to give introductory presentation (USING SLIDES PROVIDED) • Experts to introduce themselves (name, role, university, area of expertise) • Introduce 'burning issues board' (where unresolved issues are written up to draw on-going conversations to a close) • Participants join their break out group (indicated by their sticker) • **KP moderator to check all participants have completed their pre-workshop questionnaire before they join their break out group**	**20 mins**	**Introductory presentation slides**

5. 09:20 – 09:40 Introductions (20 mins)

- **Experts split across the break out groups – they will observe and help answer any questions <u>only</u> when indicated by moderators**

BREAK OUT GROUPS	**Timing**	**Stim**
5.1 Moderator introduction • Moderator introduction – name, role • Reassure participants there are no right or wrong answers, this is not a test, and that we are interested in their views • Check whether they have any questions about the introductory presentation • Reiterate ground rules ○ Take turns, do not speak over each other, respect each other's views	**10 mins**	

• Check permission for Kantar audio recording and begin audio recording • Confirm participants give permission for the SIENNA experts to record the discussions and for them to analyse the data for academic publications. **5.2 Participant introductions** • Participants to briefly introduce themselves ○ First name, who they live with, any jobs or hobbies		

TOPIC ORDER TO ROTATE AS FOLLOWS:

	Paris	Hamburg	Athens	Warsaw	Madrid
TOPIC 1	Enhancement	AI & robots	AI & robots	Genomics	Enhancement
TOPIC 2	Genomics	Enhancement	Enhancement	AI & robots	Genomics
TOPIC 3	AI & robots	Genomics	Genomics	Enhancement	AI & robots

ROLE OF EXPERTS DURING THE BREAK OUT GROUPS:

- **One expert per group - where there are <5 experts – experts rotate between (not during) sessions**
- **Observe and help answer any questions only when indicated by moderators**

6. 09:40 – 11:40 Topic 1 (120 mins) – BREAK OUT GROUP

7. 11:40 - 12:00: BREAK (20 mins)

REGISTRATION AREA – with coffee and snacks (to be left out)	**Timing**	**Stim**
• Experts circulate and allow participants to ask them questions	**15 mins**	

8. 12:00 – 14:00 Topic 2 (120 mins) – BREAK OUT GROUP

9. 14:00 - 14:50: LUNCH (50 mins)

REGISTRATION / PLENARY AREA (venue dependent) – food and drinks to be left out	**Timing**	**Stim**
• Experts circulate and allow participants to ask them questions	**45 mins**	

10. 14:50 – 16:50 Topic 3 (120 mins) – BREAK OUT GROUP

11. 16:50 - 17:05: BREAK (15 mins)

REGISTRATION AREA – with coffee and snacks (to be left out)	**Timing**	**Stim**
• Experts circulate and allow participants to ask them questions	**15 mins**	

12. 17:05 – 17:20 Reflective session (15 mins)

- **Experts to observe and help answer any questions <u>only</u> when indicated by lead moderator**

PLENARY	**Timing**	**Stim**

KP TO RECORD THE PLENARY SESSION AND KEEP NOTES FOR THE ANALYSIS
 	
Set up x1 flipchart for each technology area and Kantar lead moderator to flip chart:
 	
• Any final questions **to experts**
  ○ Kantar moderator to ask experts if they have any response to the issues on the burning issues board
 	
• Briefly reflect on **key hopes and concerns** for each of the 3 technology areas [**REVERSE** the order you have discussed the topics today]
  ○ Briefly reflect on whether any of the four fictional segments may have different / additional concerns
 	
• Reflection on how they would like to see their concerns for each area mitigated
  ○ **Whose responsibility** it is to mitigate citizen concerns
  ○ **Whether and what role there is for the EU regarding regulation in these areas**
	20 mins	

• Overall – what are participants' **main concerns** about the development of technology in our society more generally	**5 mins**	
• Opportunity for experts to ask any final questions **to participants**	**5 mins**	

13. 17:20 – 17:30 Close (10 mins)

PLENARY	Timing	Stim
13.1 Close • Thank participants • Final questions • Confirm everyone has incentives	**2 mins**	
13.2 Questionnaires • Ask participants to complete the SECTION 3 (post questionnaire) of their questionnaire booklet (ASK PARTICIPANTS TO RETURN THESE TO THEIR BREAK OUT MODERATOR FOR ANALYSIS)	**8 mins**	Questionnaire booklet

14. 17:30 – 18:00 De-brief and clean up (30 mins)

	Timing	Stim

• Kantar lead moderator to lead de-brief with experts
  ○ What were the most interesting findings for each technology area
  ○ What, if anything, surprised them
  ○ What, if anything, will they do differently as a result of attending the workshop
  ○ Whether any changes need to be made to the guide or materials for future sessions
	15 mins	

• Kantar team clean up • Ensure that questionnaire booklets are returned **to the break out group moderator / notetaker** to be analyzed with their notes/recordings	**15 mins**	

IF AUDIO RECORDERS ARE NOT PASSWORD PROTECTED AND ENCRYPTED – TRANSFER AUDIO FILES TO ENCRYPTED LAPTOP AND KP LEAD TO SIGN THE AUDIO SECURITY FORM AND SCAN AND EMAIL THE FORM TO KP UK

AI & Robots (120 mins) – BREAK OUT GROUPS

SECTION 1: ACCEPTABILITY OF AI SYSTEMS CONDUCT WITH ALL COUNTRIES

35 MINS	**Timing**	**Stim**
1.1 AWARENESS AND ASSOCIATIONS • What are your associations with 'artificial intelligence'? Why? • How aware were you of **artificial intelligence (AI) systems** before this workshop? ○ Sources of awareness	**5 mins**	
1.2 INFORMATION MODERATOR TO HAND OUT X1 COPY OF AI STIM 1,2,3 TO EACH PARTICIPANT AND TALK THROUGH • How do you now feel about the development and use of AI systems in our society? • What do you think are the main benefits? • What are your main concerns?	**15 mins**	**AI STIM 1,2,3**

1.3 USE BY PROFESSIONALS
 	
Moderator: AI systems can be used by professionals to make decisions that would normally have been made by humans. They could be used in:
  ○ Banking – to decide whether an individual qualifies for a loan
  ○ Medicine – to decide whether a patient has surgery
  ○ Law – to decide whether an individual is guilty of a crime
 	
• How comfortable are you with each of these uses and why?
• What are your main concerns about the use of AI systems by professionals?
	7.5 mins	

1.4 PERSONAL USE Moderator: AI systems can be used by individuals to make decisions that would normally have been made by humans about some personal issues such as: ○ Nutrition – to decide what you should eat	**7.5 mins**	

○ Romance – to decide who you should date ○ Democracy – to decide who you would vote for ○ Driving – to decide whether you should drive after drinking alcohol ○ Financial – to decide how much money you can withdraw from the bank • How comfortable are you with these uses and why? • What are your main concerns about the personal use of AI systems?		

SECTION 2: ROBOTS CONDUCT WITH ALL COUNTRIES

35 MINS	**Timing**	**Stim**
2.1 AWARENESS AND ASSOCIATIONS • What are your associations with the term 'robots'? – why? • How familiar were you with **robots** before this workshop**?** ○ Sources of awareness	**5 mins**	
2.2 INFORMATION MODERATOR HAND OUT X1 COPY OF ROBOT STIM 1-4 TO EACH PARTICIPANT AND TALK THROUGH • How do you now feel about the development and use of robots in our society? • What do you think are the main benefits? • What are your main concerns?	**15 mins**	**ROBOT STIM 1-4**
2.3 WORKPLACE AND HOME Moderator: robots can be used in a variety of workplaces: ○ construction/factory work, safety inspection work, taxi driving, package delivery, searching and rescuing, policing, bartending, nursing in the hospital, looking after children in day-care. • How comfortable are you with these uses and why? • What are your main concerns? Briefly - moderator: robots can be used in the home for tasks such as:	**7.5 mins**	

○ cleaning and serving, playing with children, being a pet-like companion, being a romantic partner. • How comfortable are you with these uses and why? • What are your main concerns?		
2.4 HUMANOID ROBOTS Moderator: robots are being developed that look and behave like humans. They could be used in: ○ customer service, patient nursing, elderly care, teaching of autistic children, companionship (including sex robots), and entertainment. • How comfortable are you with these uses and why? • What are your main concerns about the use of robots that look like humans? ○ **Should** robots be made to looks like humans?	**7.5 mins**	

SECTION 3A: DRONES
CONDUCT IN FRANCE ONLY

35 MINS	**Timing**	**Stim**
3A.1 AWARENESS AND ASSOCIATIONS • What are your associations with the term 'drones'? – and why? • How aware of **drones** were you before this workshop**?** ○ Sources of awareness	**5 mins**	
3A.2 INFORMATION MODERATOR TO HAND OUT X1 COPY OF DRONES STIM 1,2,3 TO EACH PARTICIPANT AND TALK THROUGH • How do you now feel about the development and use of drones in our society? • What do you think are the main benefits? • What are your main concerns?	**15 mins**	**DRONE STIM 1,2,3**
	7.5	

3A.3 POLICE Moderator: drones may be used in the future by the police for surveillance of high crime areas, reporting any crimes they detect. Smaller drones may also be used as mobile security cameras. • How comfortable or uncomfortable do you feel about use of drones by the police and why? • What are your main concerns?	**mins**	
3A.4 PRIVATE USE Moderator: drones can also be bought and used by members of the public and have grown in popularity recently. • How comfortable or uncomfortable do you feel about this and why? • What are your main concerns? ○ Should citizens be able to fly a small drone anywhere, or should restrictions / limitations be put in place through regulation?	**7.5 mins**	

SECTION 3B: SELF DRIVING CARS CONDUCT IN POLAND AND SPAIN ONLY

35 MINS	**Timing**	**Stim**
3B.1 AWARENESS AND ASSOCIATIONS • What are your associations with the term 'self driving cars? – and why? • How aware were you of **self driving cars** before this workshop**?** ○ Sources of awareness	**5 mins**	
3B.2 INFORMATION MODERATOR TO HAND OUT X1 COPY OF CARS STIM 1,2,3 TO EACH PARTICIPANT AND TALK THROUGH • How do you now feel about the development and use of self driving cars in our society? • What do you think are the main benefits of this technology? • What are you main concerns about the development and use of self-driving cars?	**15 mins**	**CARS STIM 1,2,3**

3B.3 DECISIONS Moderator to explain that human drivers occasionally have to make split-second decisions in difficult driving situations. Self-driving cards will be programmed to make decisions and they may sometimes have to make ethical decisions and choose between two bad outcomes (e.g. whether to protect the safety of their driver or a pedestrian) • How comfortable or uncomfortable do you feel about this and why? • What are your main concerns about this? • What would be your priorities for how self-driving cars make decisions such as these?	**7.5 mins**	
3B.4 ACCOUNTABILITY Moderator to explain that it is unavoidable that fully autonomous cars will sometimes make mistakes. • In case of an accident caused by an autonomous car, who (if anyone) should be held accountable and liable for the accident? The owner, passengers, designers, or no one? • What are your main concerns about accountability of driverless cars?	**7.5 mins**	

SECTION 3C: ROBOTS AND JOBS
CONDUCT IN GERMANY AND GREECE ONLY

35 MINS	**Timing**	**Stim**
3C.1 AWARENESS AND ASSOCIATIONS Moderator to explain that robots are increasingly being developed for and used in the workplace. • What do you think might be some of the impacts of the use of robots in the workplace for employees? ○ How have you heard about these impacts?	**5 mins**	
3C.2 INFORMATION MODERATOR TO HAND OUT X1 COPY OF JOBS STIM 1,2,3 TO EACH	**15 mins**	**JOBS STIM 1,2,3**

PARTICIPANT AND TALK THROUGH • How do you now feel about the potential impact of robots on employment? • What are your main concerns? • Do you think there are any potential benefits for employees or society more widely? • Are there any other ways you think the risk of job losses can or should be mitigated?		

3C.3 REGULATION
 	
Moderator to explain that regulation might be one way to help mitigate concerns.
 	
• Should we protect certain kinds of jobs from robots? Which and why?
  ○ Jobs which give meaning to peoples' lives
  ○ Jobs with cultural value
	7.5 mins	

3C.4 COMPENSATION
 	
Moderator to explain that compensation might be one way to help mitigate concerns.
 	
• Are those whose jobs have been taken by robots owed compensation?
• What type of compensation?
  ○ Financial
  ○ Education / training
	7.5 mins	

SECTION 4: MITIGATION
CONDUCT WITH ALL COUNTRIES

15 MINS	**Timing**	**Stim**
5.1 MITIGATION • What would you like to see done to address your concerns about each of the following technologies: ○ Artificial intelligence systems	**15 mins**	

- Robots
- Drones / self driving cars / to address job losses caused by automation [SELECT THE TOPIC YOUR GROUP DISCUSSED]

- Who do you think is responsible for addressing citizen concerns?

Briefly:

- Is there a role for any of the following:
  - Legislation banning the manufacture of robots that can physically harm people (e.g. robot body guards, guard dogs, or use by the police to constrain people)
    - Who would be responsible if a robot causes physical harm
  - Legislation that prevents AI systems that make decisions about people? What kind of decisions?
    - What kinds of decisions can be made by AI?
  - How should AI systems that make decisions for people be regulated? Should they have to explain their decision making to the person affected?
    - What should happen if people do not understand the explanation?
  - Should the government do anything about job losses caused by robots? (e.g. taxing businesses that use robots, imposing quotas, universal basic income, or re-training programs for the unemployed?)
  - Does there need to be regulation around the use of humanoid robots? (e.g. for their use by children, or for their use for romantic/sexual use by adults?)

-
- What extra action might be required to address the concerns of vulnerable groups in society? For example, those with:
  - Health or mental health conditions
  - Disabilities
  - Immigrant communities

Appendix 2 – Experts attendance at the citizen workshops

Germany – Hamburg	France – Paris	Poland – Warsaw	Greece – Athens	Spain – Madrid
Lisa Tambornino, European Network of Research Ethics Committees (EUREC)	**Bernard Reber**, Sciences Po	**Zuzanna Warso**, Helsinki Foundation for Human Rights	**Maria Bottis**, Ionian University	**Javier Valls Prieto**, University of Granada
Saskia Nagel, University of Twente	**Roberto Gianni**, Sciences Po	**Emilia Niemiec**, Uppsala Universitet	**Maria Papaioannou**, Ionian University	**Ana Valverde**, University of Granada
Philipp Hoevel, European Network of Research Ethics Committees (EUREC)	**Alexandra Soulier**, Uppsala Universitet	**Konrad Siemaszko**, Helsinki Foundation for Human Rights (Observer)	**Marilena Siahou**, Ionian University	**Oscar Huertas**, Freelancer Communiation Granada Emprende
	Anaïs Rességuier, Trilateral Research (Observer)		**Martha Ioanna Stroumpou**, National Printing House in Athens	**Patricia Saldaña**, University of Granada

Appendix 3 – Pre and Post Questionnaire Results

The SIENNA Project Citizens' workshops: Pre-workshop questionnaire results

Q1 **How familiar are you with the technology? PLEASE TICK**								
	Very familiar	Quite familiar	Not very familiar	Not familiar at all	Excluded	No response	Total participants	**Valid participants**
Artificial intelligence								
France	4	25	17	3	0	4	**53**	**49**
Germany	1	13	26	10	0	0	**50**	**50**
Poland	2	10	29	7	0	2	**50**	**48**
Greece	2	16	21	11	0	0	**50**	**50**
Spain	5	12	24	9	0	0	**50**	**50**
TOTAL	**14**	**76**	**117**	**40**	**0**	**6**	**253**	**247**
Robots								
France	7	23	18	1	0	4	**53**	**49**
Germany	2	13	24	11	0	0	**50**	**50**
Poland	2	12	23	6	0	7	**50**	**43**
Greece	4	15	13	18	0	0	**50**	**50**
Spain	3	10	29	8	0	0	**50**	**50**
TOTAL	**18**	**73**	**107**	**44**	**0**	**11**	**253**	**242**
Drones								
France	10	22	16	1	0	4	**53**	**49**
Germany	1	16	21	11	0	1	**50**	**49**
Poland	4	16	23	6	0	1	**50**	**49**
Greece	5	12	14	19	0	0	**50**	**50**
Spain	3	14	26	7	0	0	**50**	**50**
TOTAL	**23**	**80**	**100**	**44**	**0**	**6**	**253**	**247**
Self driving cars								
France	7	21	18	3	0	4	**53**	**49**
Germany	2	14	20	9	2	3	**50**	**45**
Poland	3	10	20	16	0	1	**50**	**49**
Greece	4	13	16	17	0	0	**50**	**50**
Spain	3	11	29	7	0	0	**50**	**50**
TOTAL	**19**	**69**	**103**	**52**	**2**	**8**	**253**	**251**

Q2 Which of these words describe how you feel about each of the technologies? PLEASE TICK										
	Excited	Hopeful	Curious	Neutral	Anxious	Scared	Angry	No response	Total participants	**Valid participants**
Artificial intelligence										
France	9	8	28	1	3	1	0	3	53	**50**
Germany	1	11	19	8	9	3	0	0	50	**50**
Poland	4	11	22	6	2	0	2	3	50	**47**
Greece	10	11	17	3	7	5	1	0	50	**50**

Spain	6	8	27	2	2	5	0	0	50	**50**
TOTAL	**30**	**49**	**113**	**20**	**23**	**14**	**3**	**6**	**253**	**247**
Robots										
France	9	17	15	4	4	1	0	3	53	**50**
Germany	4	9	18	4	12	3	0	0	50	**50**
Poland	7	10	22	4	5	0	0	2	50	**48**
Greece	9	7	19	5	8	4	1	0	50	**50**
Spain	6	7	22	8	2	5	0	0	50	**50**
TOTAL	**35**	**50**	**96**	**25**	**31**	**13**	**1**	**5**	**253**	**248**
Drones										
France	10	14	13	6	5	1	1	3	**53**	**50**
Germany	2	5	9	10	19	4	0	1	**50**	**49**
Poland	4	9	20	6	7	1	0	3	**50**	**47**
Greece	13	1	12	12	6	9	1	0	**50**	**50**
Spain	9	7	15	16	1	2	0	0	**50**	**50**
TOTAL	**38**	**36**	**69**	**50**	**38**	**17**	**2**	**7**	**253**	**246**
Self driving cars										
France	9	15	15	4	2	4	1	3	53	**50**
Germany	8	7	12	8	12	2	1	1	50	**49**
Poland	6	14	15	5	6	1	1	2	50	**48**
Greece	9	9	12	8	7	7	0	0	50	**50**
Spain	13	11	10	7	1	7	1	0	50	**50**
TOTAL	**45**	**56**	**64**	**32**	**28**	**21**	**4**	**6**	**253**	**247**

The SIENNA Project Citizens' workshops: Post-workshop questionnaire

Q1 What kind of impact do you think each of these technologies will have on society? PLEASE TICK									
	Very positive	Quite positive	Neutral	Quite Negative	Very negative	Excluded	No response	Total participants	**Valid participants**
Artificial intelligence									
France	7	29	7	5	0	0	5	**53**	**48**
Germany	3	22	11	10	2	0	2	**50**	**48**
Poland	5	27	9	6	2	0	1	**50**	**49**
Greece	12	18	11	6	3	0	0	**50**	**50**
Spain	13	31	5	1	0	0	0	**50**	**50**
TOTAL	**40**	**127**	**43**	**28**	**7**	**0**	**8**	**253**	**245**
Robots									
France	9	26	6	6	0	0	6	53	**47**
Germany	7	23	12	4	2	0	2	50	**48**
Poland	11	27	9	0	1	0	2	50	**48**
Greece	6	24	12	6	2	0	0	50	**50**
Spain	5	33	7	3	2	0	0	50	**50**
TOTAL	**38**	**133**	**46**	**19**	**7**	**0**	**10**	**253**	**243**
Drones									
France	8	21	10	7	0	0	7	53	**46**

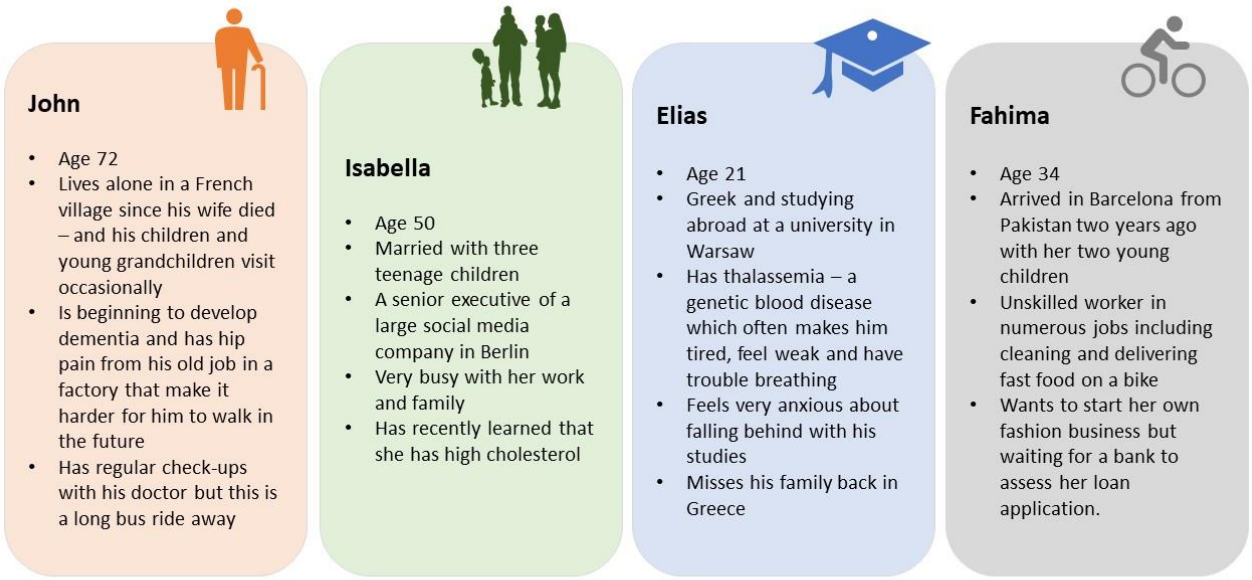
Germany	5	12	14	14	2	0	3	50	**47**
Poland	11	24	8	2	1	0	4	50	**46**
Greece	12	10	19	7	2	0	0	50	**50**
Spain	10	26	13	1	0	0	0	50	**50**
TOTAL	**46**	**93**	**64**	**31**	**5**	**0**	**14**	**253**	**239**
Self driving cars									
France	10	14	14	7	3	0	5	53	**48**
Germany	7	20	11	8	3	0	1	50	**49**
Poland	5	30	9	3	0	0	3	50	**47**
Greece	9	22	7	12	0	0	0	50	**50**
Spain	22	18	6	2	2	0	0	50	**50**
TOTAL	**53**	**104**	**47**	**32**	**8**	**0**	**9**	**253**	**244**

Q2 Which of these words now describe how you feel about each of the technologies? PLEASE TICK										
	Excited	Hopeful	Curious	Neutral	Anxious	Scared	Angry	No response	Total participants	**Valid participants**
Artificial intelligence										
France	10	21	6	0	9	1	0	6	53	**47**
Germany	3	12	17	4	10	2	0	2	50	**48**
Poland	4	13	17	5	5	0	3	3	50	**47**
Greece	8	17	11	3	13	2	2	0	50	**50**
Spain	12	17	12	2	1	4	0	2	50	**48**
TOTAL	**37**	**80**	**63**	**14**	**38**	**9**	**5**	**13**	**253**	**240**
Robots										
France	8	19	10	4	3	3	0	6	53	**47**
Germany	5	10	16	7	9	2	0	1	50	**49**
Poland	8	15	20	5	0	0	1	1	50	**49**
Greece	13	14	11	7	9	2	1	0	50	**50**
Spain	12	16	11	3	2	3	1	2	50	**48**
TOTAL	**46**	**74**	**68**	**26**	**23**	**10**	**3**	**10**	**253**	**243**
Drones										
France	4	10	13	11	4	3	1	7	53	**46**
Germany	4	5	8	13	12	6	0	2	50	**48**
Poland	6	13	18	8	4	0	0	1	50	**49**
Greece	15	5	5	14	5	5	2	0	50	**50**
Spain	14	18	8	7	0	1	0	2	50	**48**
TOTAL	**43**	**51**	**52**	**53**	**25**	**15**	**3**	**12**	**253**	**241**
Self driving cars										
France	9	7	14	8	3	5	1	6	53	**47**
Germany	8	9	16	10	3	2	1	1	50	**49**
Poland	5	15	19	5	2	2	1	1	50	**49**
Greece	13	9	11	6	4	8	1	0	50	**50**
Spain	14	9	13	6	3	3	0	2	50	**48**

TOTAL	**49**	**49**	**73**	**35**	**15**	**20**	**4**	**10**	**253**	**243**

Appendix 4 - Stimulus Materials

4.1 Fictional segments



FICTIONAL SEGMENTS

4.2 AI systems

What are artificial intelligence (AI) systems?

What is artificial intelligence?

Computer programs that can perform intelligent tasks normally performed by humans.

What is machine learning?

When a system can learn and improve from experience itself

What is an algorithm?

A list of **instructions** a computer is given to **solve a problem** – the steps need to be done in the right order

AI STIM 1

Examples of AI

What can AI be used for and what are the benefits and risks?

Detect bank fraud

To flag unusual activity to the customer

Benefits
- Protects customers' money
- Deters bank fraudsters

Concerns
- May increase hassle to access your money
- More people may have access to user's spending data

Make medical decisions

To suggest what treatment a patient should have

Benefits
- Saves medical staff time
- Easier to update than human doctors

Concerns
- Who is accountable?
- May not take into account contextual factors (e.g. the mental health impact of surgery on a patient)

Advise voters

To learn about a user's life and then recommend how they should vote in elections.

Benefits
- Help voters pursue their interests
- Increase voter turnout.

Concerns
- Could make voters less informed.
- Assumes voters should vote according to their interests rather than according to the collective good

AI STIM 3

What can AI be used for and what are the benefits and risks?

Assess loan applications

To decide whether someone should get a bank loan and at what rate

Benefits
- Faster assessments
- Reduces human error
- Less bank staff required

Concerns
- Malfunctions – people wrongly refused or given inappropriate loans
- Difficult to accommodate special circumstances

Military weapons

To move on minefields and battlefields. May be able to shoot enemy soldiers in the future

Benefits
- Lower risk of human deaths (for those with the technology)

Concerns
- Could make war more likely
- Civilians may be identified as enemy soldiers
- Risk - groups that oppose peace or tolerance use the weapons

Pre-select potential dates

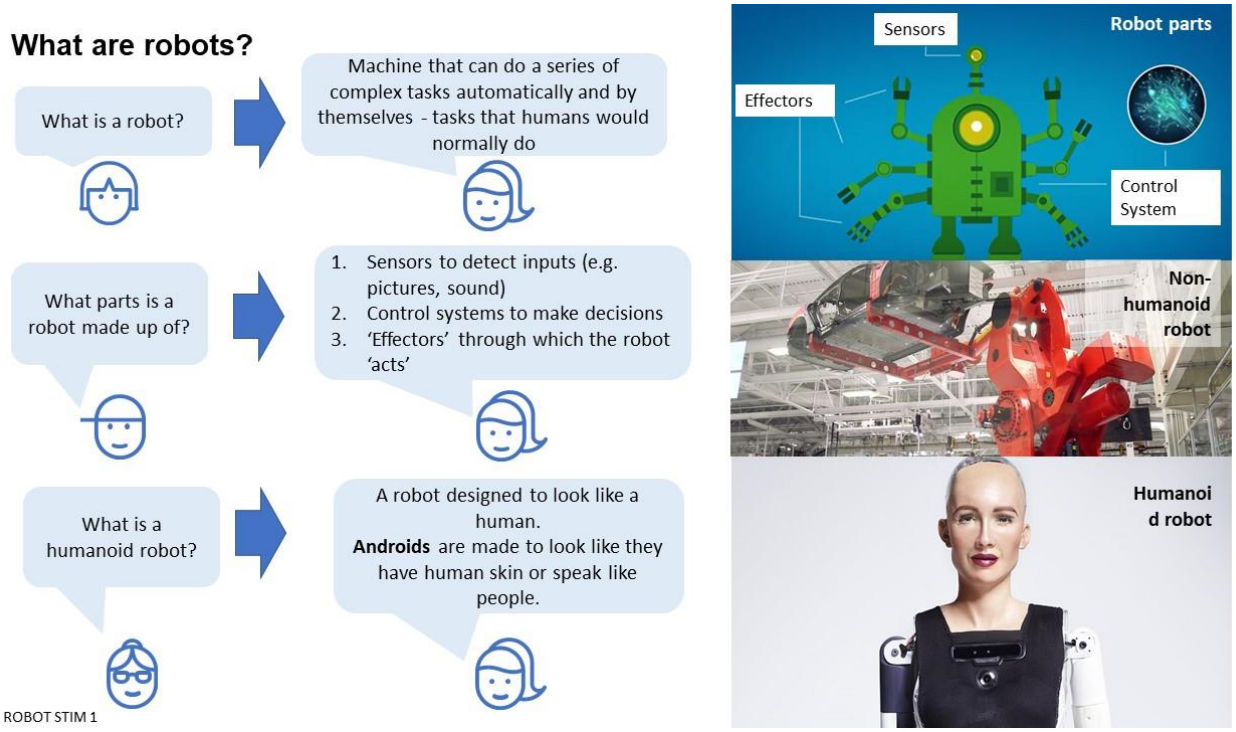
To match people with similar attributes/tastes

Benefits
- Saves time

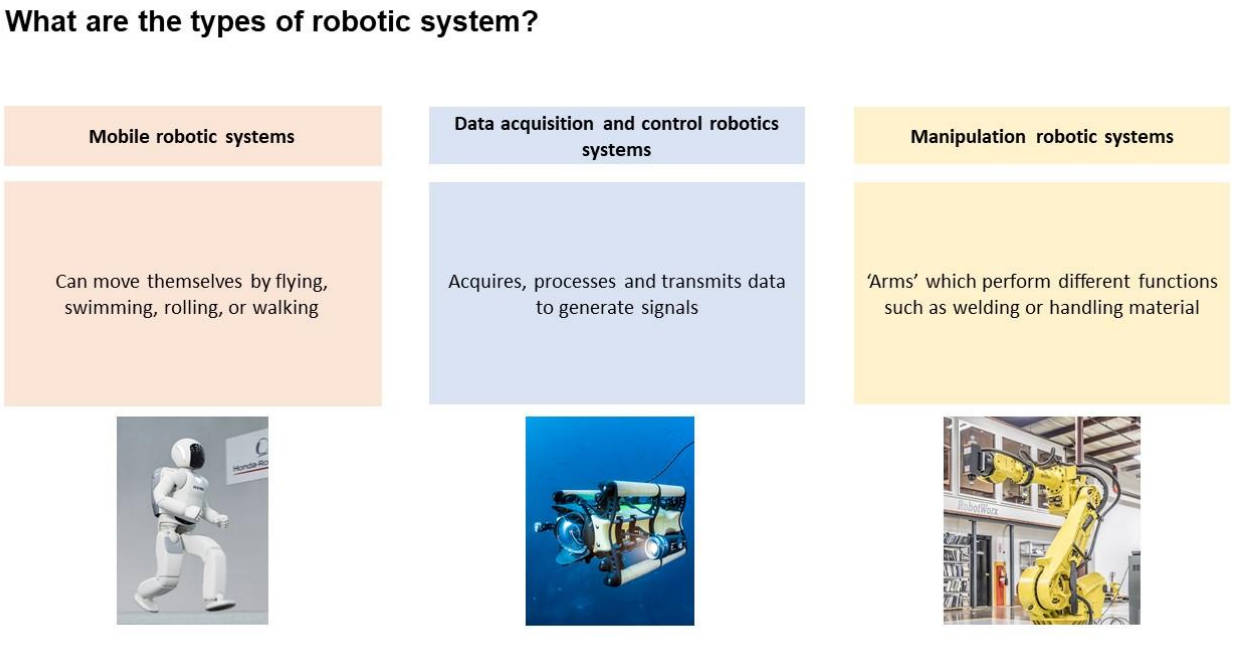
Concerns
- People may be less open to searching for partners outside their 'suggested matches'.
- Risk of decreasing the sense of commitment people feel

AI STIM 2

4.3 Robots



ROBOT STIM 1



ROBOT STIM 2

What can robots do for us and what are the benefits and risks?

Paro – Home

Companionship for dementia patients

Benefits
- Provide companionship

Concerns
- Dependency on robots
- Dementia patients may confuse with live animals
- Job losses in the care sector
- People may be more alone at the end of life.

Iceman - workplace

To quickly but delicately move car bodies between production lines

Benefits
- Reduces costs for business and consumers as a result
- Improves worker safety
- Reduces the time workers spend doing menial tasks.

Concerns
- Job losses in manufacturing

Harmony - humanoid

To provide sexual pleasure to its owner

Benefits
- Psychological benefits for some (e.g. those who have lost partners)

Concerns
- Exacerbates attitudes that view women as sexual objects
- Some have been based on children
- Facilitates social isolation

ROBOT STIM 3

What can robots do for us and what are the benefits and risks?

Roomba - home

To vacuum-clean the floor automatically using sensors

Benefits
- Saves time

Concerns
- More energy usage
- Increase inequality between people

Hospi - workplace

To deliver drugs in a hospital

Benefits
- Save nurses' time
- Saves delivery companies money

Concerns
- Errors could mean patients are given the wrong drugs
- Job losses in the courier industry.
- Street delivery robots a nuisance to pedestrians

Kaspar - humanoid

To interact with autistic children and break social isolation

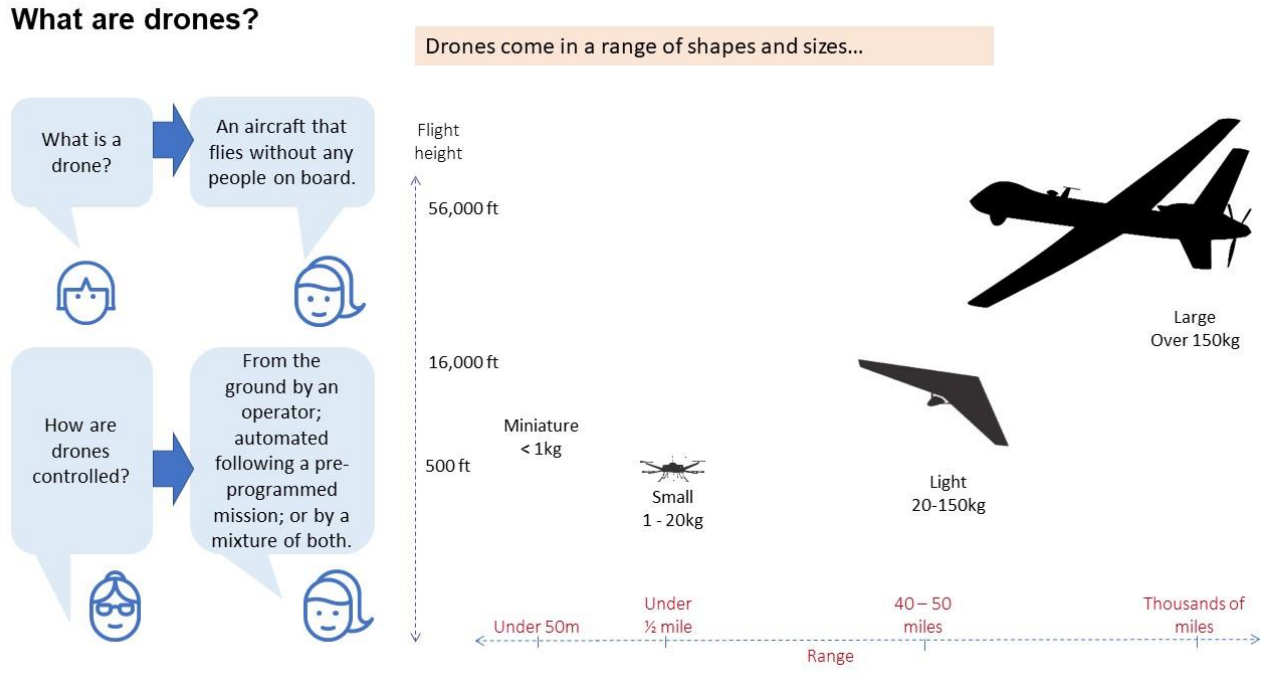
Benefits
- Increases the ability of autistic children to interact with others

Concerns
- Risk that child could form a detrimental relationship with the robot
- Dependence on the robot.

ROBOT STIM 4

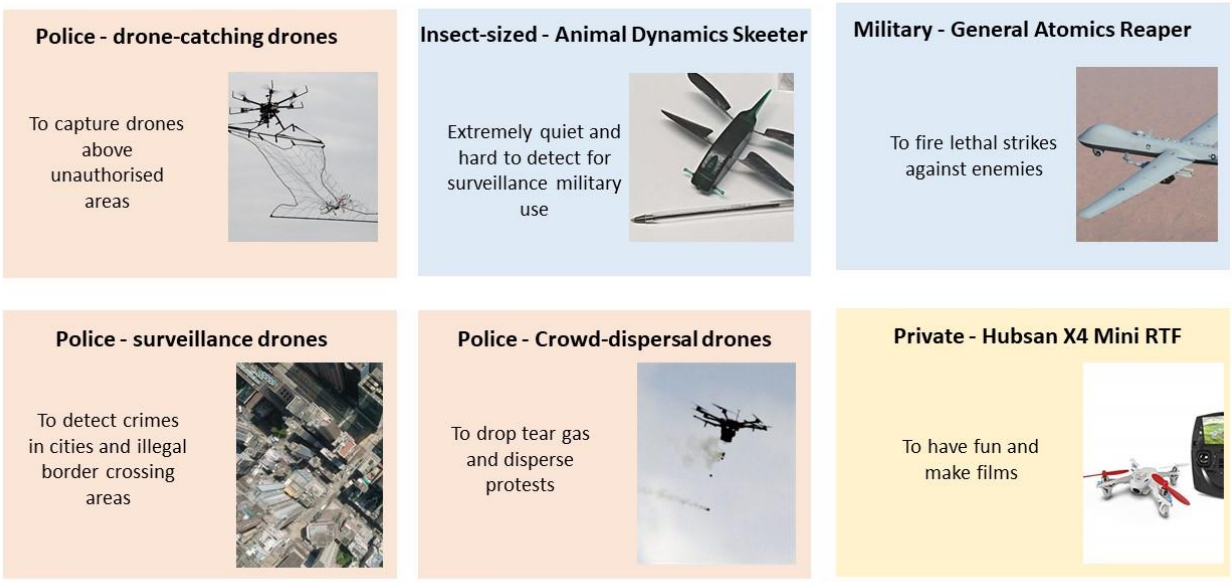
4.4 Drones

What are drones?



DRONE STIM 1

What can drones be used for?



DRONE STIM 2

What are the benefits and risks associated with drones?

Police drones

Benefits
- Search and rescue
- Deters crime and illegal/unsafe immigration
- Surveying natural disasters

Concerns
- Reducing participation and increasing animosity towards the state
- Oversurveillance concerns

Private drones

Benefits
- Showing children what forests, dams, cities, and volcanoes look like
- Art and leisure e.g. filming
- Surveying natural disasters
- Surveying crop-fields

Concerns
- Smuggling contraband to prisons
- Disrupting air traffic
- Carrying bombs or radioactive material
- Spying and intrusive photography

DRONE STIM 3

4.5 Self-driving cars

What are autonomous vehicles?

What is an autonomous vehicle?

Cars, trucks and trains that can drive themselves by sensing their environment

Can they crash into things?

Autonomous vehicles combine different types of sensors like radar, sonar and GPS to detect and to try to avoid obstacles.

Can I buy one?

Autonomous cars and trucks are being tested. Autonomous trains have been used since the 1960s on London Underground.

Partial automation
- Advanced cruise control and parking assistance
- Humans monitor and are in control of the vehicle.

Conditional automation
- Cars drive themselves on roads with physical barriers
- Driver in a position to resume control if needed.

Higher levels of automation
- Driver can sleep when car is in automated state
- The vehicle can abort the trip safely if the driver does not respond when required, by parking the car.

Full automation
- Car can drive on all roads and in all situations. The driver becomes a passenger and would not need a driving licence
- No human intervention required

CARS STIM 1

What can autonomous vehicles be used for?

Cars/buses: fully-autonomous

To collect the driver at specific places and times and park itself

Cars/buses: An autonomous shuttle or bus

To transport people cheaply along a fixed route

Trucks: An autonomous truck

To deliver freight cheaply. No one on board

Cars/buses: Shared autonomous taxis

To transport passengers to where they want to go with no driver

Cars/buses: Autonomous minibuses

Shared with a number of users or commissioned by a school or business

Trains: Automatic train operation

For cheap, 24/7 public transport

CARS STIM 2

Benefits and risks associated with autonomous vehicles?

Benefits

- Cheaper goods because freight transport is cheaper
- Non-drivers can travel anywhere more easily
- Safer roads
- More technical jobs to create the cars

Concerns

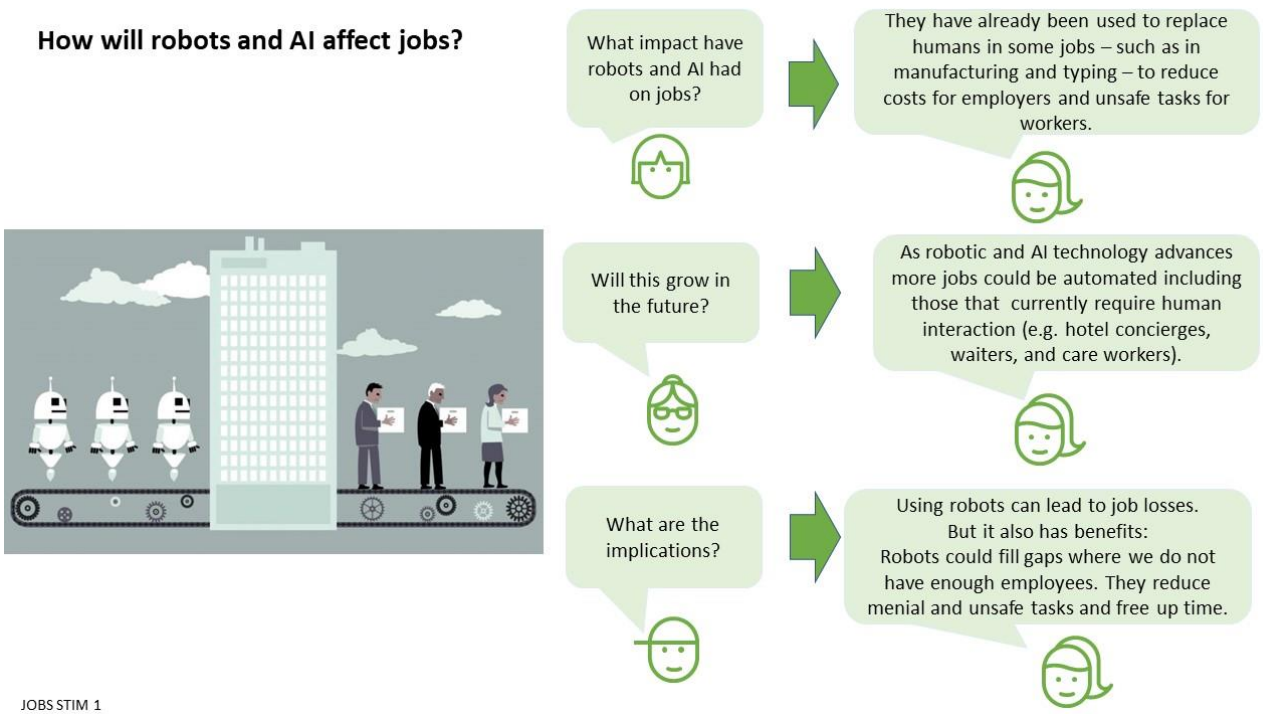
- Malfunction risk
- More emissions
- Data security concerns
- Job disruption

Ethical questions

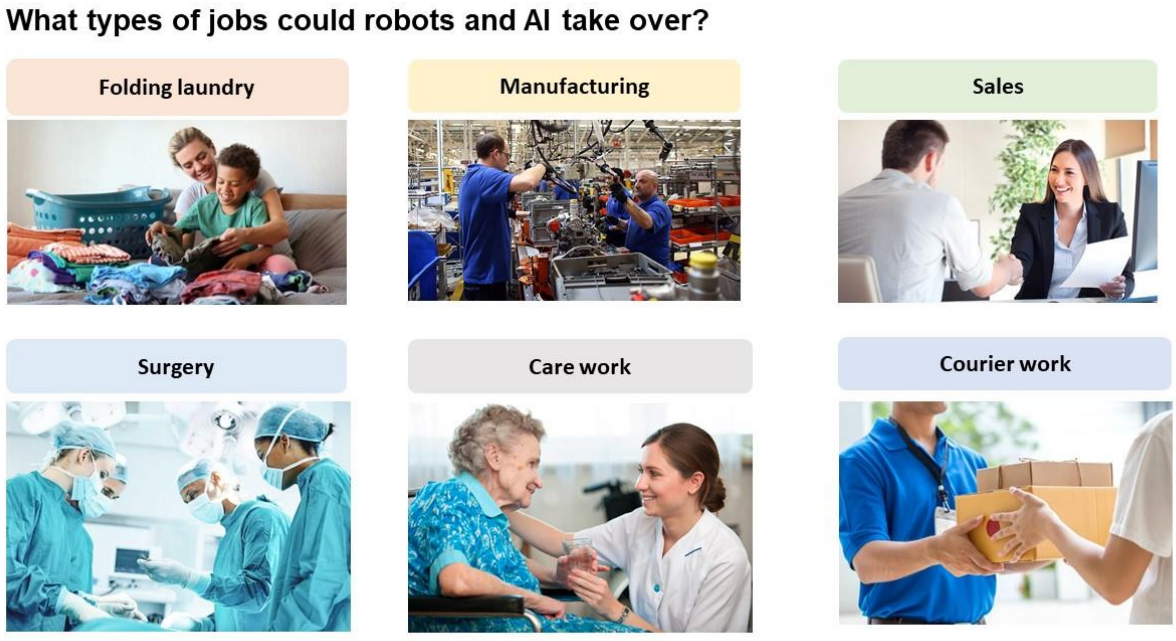
- Should a car prioritise the safety of its driver, passengers, other drivers or pedestrians?
- Who is liable for accidents?

CARS STIM 3

4.6 Robots and jobs



JOBS STIM 1



JOBS STIM 2

How could we manage the risk of job losses in our society?

Universal Basic Income

Every citizen, rich and poor, gets a basic income from the state

Compensation

People who lose their jobs to could be compensated with free training or given their old salary by the government.

Reducing work hours

Reducing working hours in other sectors so there are more jobs available there

Protective regulation

Laws that prevent certain jobs with cultural value from being automated

Negative income tax

The poorest people would get an income with no conditions on spending from the government.

Robot tax

Companies that use robots to replace workers would pay a tax, to discourage them from doing so

JOBS STIM 3

Appendix 5 – Achieved Sample

	OVERALL TARGET	PER COUNTRY TARGET	PARIS	HAMBURG	WARSAW	ATHENS	MADRID	TOTAL
TOTAL								
5 workshops of 50 participants (OVER RECRUIT TO 54)	250	50	53	50	50	50	50	253
GENERAL POPULATION QUOTAS								
GENDER								
Female	Min 100	20	29	21	25	24	25	124
Male	Min 100	20	24	29	25	26	25	129
Other / prefer not to say								
TOTAL	Min 200	40	53	50	50	50	50	253
AGE								
18-24	Min 25	5	9	10	12	10	11	52
25-34	Min 25	5	15	11	8	8	12	54
35-49	Min 25	5	14	9	11	12	11	57
50-59	Min 25	5	7	9	10	10	9	45
60-69	Min 15	3	7	7	6	8	5	33
70+	Min 10	2	1	4	3	2	2	12
TOTAL	Min 125	25	53	50	50	50	50	253
EDUCATION LEVEL								
University degree or above (or equivalent)	Min 50	10	29	21	17	19	21	107

High school/senior school (or equivalent)	Min 50	10	17	18	21	23	19	98
Below high school/senior school Inc. vocational qualifications (or equivalent)	Min 50	10	7	11	10	8	9	45
No educational qualifications			0	0	2	0	1	3
TOTAL	Min 150	30	53	50	50	50	50	253
WORK STATUS								
Student	40	8	8	8	10	10	8	44
Working	75	15	30	23	24	25	27	129
Not working	40	8	8	10	8	7	9	42
Retired	40	8	7	9	8	8	6	38
TOTAL	195	39	53	50	50	50	50	253
OCCUPATION								
Professional, managerial or administrative job managing people	25	5	18	13	8	6	6	51
Professional, managerial or administrative job not managing people	25	5	13	8	11	20	14	66
Skilled manual job	25	5	7	8	9	7	5	36
Semi-skilled or unskilled manual job	25	5	7	13	10	8	16	54
Other			8	8	12	9	9	46
TOTAL	100	20	53	50	50	50	50	253
ETHNICITY								
White			[redacted]	44	44	49	41	178

Non-white (Inc. Roma)	20	Min 5 Germany, Min 7 Spain, Min 3 Poland, Min 5 Greece		6	6	1	9	22
TOTAL	20	Min 3		50	50	50	50	200
MINORITY GROUP (FRANCE ONLY)								
Feel they belong to a minority group due to the country they or their parents were born in	7	Min 7 France	7					7
TOTAL	7	Min 7	7					7
RELIGION								
Catholicism	100	20	22	1	32	0	29	84
Orthodox Christianity			1	0	5	42	0	48
Protestantism			1	0	0	0	0	1
Islam			2	3	3	1	3	12
Judaism			1	0	0	0	0	1
Sikhism			0	0	0	0	0	0
Hinduism			0	0	0	0	0	0
Buddhism			2	1	0	0	0	3
Other			2	17	1	0	0	20
No/Agnostic/atheist	25	5	22	28	9	7	18	84
TOTAL	125	25	53	50	50	50	50	253
AREA OF RESIDENCE								
Urban (city)	Min 25	Min 5	16	32	33	30	29	140
Suburban (suburbs of city)	Min 25	Min 5	27	13	7	19	14	80

Rural/Semi rural (town or village)	Min 19	Min 3 France, Min 3 Germany, Min 3 Greece, Min 5 Spain, Min 5 Poland	10	5	10	1	7	33
TOTAL	Min 69	Min 3	53	50	50	50	50	253
LIFE STAGE								
Not parent	25	5	34	29	22	27	27	139
Parent	50	10	19	21	28	23	23	114
Total	75	15	53	50	50	50	50	253
INTERNET SCALE								
More negative (1-3)	60	12	10	12	12	12	12	58
Medium	60	12	10	16	12	17	13	68
Positive	60	12	33	22	26	21	25	127
TOTAL	180	36	53	50	50	50	50	253
VULNERABLE GROUPS QUOTAS								
10 Participants from Vulnerable Groups	50	10	19	15	40	10	10	94
CHRONIC PHYSICAL CONDITIONS								
Heart disease	5	1	0	1	2	0	0	3
Stroke			0	0	0	0	0	0
Chronic Obstructive Pulmonary Disease (COPD)			0	6	2	0	0	8

Emphysema and other respiratory conditions			0	0	0	0	0	0
Arthritis (including gout or fibromyalgia)			0	0	3	0	0	3
Asthma			0	0	1	0	0	1
Cancer			1	0	2	1	1	5
Osteoporosis			0	0	2	0	0	2
Kidney and or liver conditions			0	0	1	0	0	1
Epilepsy			0	0	0	0	0	0
High blood and or high cholesterol levels			0	0	8	1	0	9
Lupus			0	0	0	0	0	0
Glaucoma			0	0	2	0	0	2
Thyroid condition			1	0	2	0	0	3
Other			0	0	4	0	0	4
TOTAL	5	1	2	7	29	2	1	41
MENTAL HEALTH CONDITIONS								
Anxiety	5	1	1	0	2	0	0	3
Depression (including post-natal depression)			2	6	5	1	0	14
Panic attacks			1	0	0	0	0	1
An eating disorder			2	0	2	0	0	4
Obsessive Compulsive Disorder (OCD)			4	0	0	0	0	4
Asperger's Syndrome			0	0	0	0	0	0
Post-Traumatic Stress Disorder (PTSD)			0	0	0	0	0	0
Phobia(s)			1	0	0	0	0	1
Bipolar or other personality disorder			0	1	0	0	0	1
Schizophrenia and psychosis			0	0	2	0	1	3

Self-harm			0	0	0	0	0	0
Suicidal thoughts or attempted suicide			0	0	0	0	0	0
Other			0	0	2	0	0	2
TOTAL	5	1	11	7	13	1	1	33
PLEASE NOTE HERE WHO HAS EACH CONDITION (participant, partner, parent, child, step child, sibling, family member living at home at the time of the condition) (e.g. anxiety = participant, depression = participant's sibling)	**Paris:** 1 x participant = depression (themselves), OCD (themselves); 1 x participant = depression (relative), panic attacks (relative) OCD (themselves);1 x participant = anxiety (themselves), eating disorder (themselves), phobia (themselves) ; 1 x participant = OCD (themselves), eating disorder (themselves); 1 x participant = OCD (themselves) **Hamburg:** 1 x participant = bipolar disorder (themselves); 1 x participant = manic depression (themselves) and cardiac insufficiency (themselves); 1 x participant = depression (themselves), Multiple Sclerosis (themselves), Diabetes (themselves), Skin allergy (themselves); 1 x participant = depression (themselves) and Crohn's disease (themselves); 1 x participant = depression (themselves), arthrosis (themselves); 1 x participant = depression (themselves); 1x participant = depression (themselves) **Warsaw:** 1 x participant = depression (participant), depression (partner); 1 x participant = Eating disorder (child), 1 x participant = Autism (child); 1 x participant = Anxiety (participant), eating disorder (child), Schizophrenia (relative); 1 x participant = Autism (child); 1 x participant = Anxiety (parent), depression (parent); 1 x participant = depression (participant); 1 x participant = depression (relative); 1 x participant = depression (child); 1 x participant = schizophrenia (sibling) **Athens:** 1 x participant = depression (themselves) **Madrid:** 1 x participant = schizophrenia (son), psychosis (son)							
GENETIC DISORDERS								
Cancer	5	1	0	2	11	0	1	14
Type 1 Diabetes			0	1	5	0	0	6
Cystic Fibrosis			0	0	0	0	0	0
Crohn's Disease			0	0	0	0	0	0
Haemophilia			0	0	0	0	0	0
Down's Syndrome			0	0	0	1	0	1
Thalassemia			0	0	0	0	0	0

Sickle Cell Anaemia			0	0	0	0	0	0
Huntingdon's Disease			0	0	0	0	0	0
Tay-Sachs			0	0	0	0	0	0
Angelman Syndrome			0	0	0	0	0	0
Type 1 Neurofibromatosis			0	0	0	0	0	0
Tuberous Sclerosis			0	0	0	0	0	0
Autosomal Dominant Polycystic Kidney Disease (ADPKD)			0	0	0	0	1	1
Duchenne Muscular Dystrophy			1	0	0	0	0	1
Fragile X Syndrome			0	0	0	0	0	0
Edward's Syndrome			0	0	0	0	0	0
Patau's Syndrome			0	0	0	0	0	0
Turner Syndrome			0	0	0	0	0	0
Klinefelter's Syndrome			0	0	0	0	0	0
Other			1	1	0	0	0	2
TOTAL	5	1	2	4	16	1	2	25
PLEASE NOTE HERE WHO HAS EACH CONDITION (participant, partner, parent, grandparent, child, step child, sibling, family member living at home at the time of the condition) (e.g. diabetes = participant, cancer = participant's parent)	**Paris:** 1 x participant = myopathy (child), myopathy (child's father); 1 x participant = Duchenne muscular dystrophy (niece) **Hamburg:** 1 x participant = Meniere's disease (themselves); 1 x participant = cancer (other person); 1 x participant = factor V Leiden thrombophilia (themselves); 1 x participant = diabetes (other person) **Warsaw:** 1 x participant = cancer (participant), type 1 diabetes (parent); 1 x participant = cancer (parent), cancer (siblings); type 1 diabetes (relative); 1 x participant = cancer (partner); 1 x participant = cancer (parent); 1 x participant = cancer (parent); 1x participant = cancer (parent); 1 x participant = cancer (partner), type 1 diabetes (partner); 1 x participant = cancer (participant) cancer (parent), cancer (siblings); 1 x participant = cancer (partner); 1 x participant = cancer (relative); 1 x participant = type 1 diabetes (parent); 1 x participant = type 1 diabetes (parent); 1 x participant = cancer (parent) **Athens:**1 x participant = Down's Syndrome (child)						

	Madrid:1 x participant = cancer (themselves); 1 x participant = Crohn's disease (themselves), Autosomal dominant polycystic kidney disease (child)							
GENETIC CONCERN								
Cancer			0	2	6	1	0	9
Type 1 Diabetes			0	1	2	0	0	3
Cystic Fibrosis			0	0	0	0	0	0
Crohn's Disease			0	0	0	0	0	0
Haemophilia			0	0	0	0	0	0
Down's Syndrome			0	0	0	0	0	0
Thalassemia			0	0	0	0	0	0
Sickle Cell Anaemia			0	0	0	0	0	0
Huntingdon's Disease			0	0	0	0	0	0
Tay-Sachs			0	0	0	0	0	0
Angelman Syndrome			0	0	0	0	0	0
Type 1 Neurofibromatosis			0	0	0	0	0	0
Tuberous Sclerosis			0	0	0	0	0	0
Autosomal Dominant Polycystic Kidney Disease (ADPKD)			0	0	0	0	0	0
Duchenne Muscular Dystrophy			0	0	0	0	0	0
Fragile X Syndrome			0	0	0	0	0	0
Edward's Syndrome			0	0	0	0	0	0
Patau's Syndrome			0	0	0	0	0	0
Turner Syndrome			0	0	0	0	0	0
Klinefelter's Syndrome			0	0	0	0	0	0
Other			0	1	0	0	1	2
Total			0	4	8	1	1	14

PLEASE NOTE HERE WHO THE CONCERN WAS ABOUT (participant, partner, parent, grandparent, child, step child, sibling, family member living at home at the time of the condition) (e.g. diabetes = participant, cancer = participant's parent)	**Hamburg:** 1 x participant = cancer (other person); 1 x participant = cancer (other person); 1 x participant = diabetes (other person); 1 x participant = other (other person) **Warsaw:** 1 x participant = cancer (child); 1 x participant = cancer (participant); 1 x participant = cancer (participant); 1 x participant = cancer (partner), type 1 diabetes (parent); 1 x participant = cancer (participant); 1 x participant = cancer (participant); 1 x participant = type 1 diabetes (parent) **Athens:** 1 x participant = cancer (partner) **Madrid:** 1 participant = autism (son)							
DISABILTIES								
Vision (e.g. impaired vision, macular degeneration, blindness)	10	2	0	1	10	0	1	12
Hearing loss			1	0	3	0	0	4
Learning difficulties (including dyslexia and dyspraxia)			1	4	4	1	0	10
Impaired mobility			0	0	5	1	0	6
Breathing problems (reduced stamina, severe fatigue)			0	0	1	0	0	1
Dexterity			0	0	0	0	0	0
Other			0	0	1	0	1	2
TOTAL	10	2	2	5	24	2	2	35

PLEASE NOTE HERE WHO HAS EACH CONDITION (participant, partner, parent, grandparent, child, step child, sibling, family member living at home at the time of the condition) (e.g. impaired vision = participant's grandparent; hearing loss = participant's grandparent; impaired mobility = participant's sibling)	**Paris:** 1 x participant = hearing loss (themselves); 1 x participant = learning difficulties (themselves) **Hamburg:** 1 x participant = arthropathic (themselves); 1 x participant = walk with walking stick (themselves); 1 x participant = slipped disc (themselves); 1 x participant = arthropathic (themselves) 1 x participant = other (themselves) **Warsaw:** 1 x participant = vision (participant); 1 x participant = vision (participant), hearing loss (participant); 1 x participant = vision (participant); 1 x participant = cerebral palsy (child); 1 x participant = learning difficulties (child), breathing problems (partner); 1 x participant = vision (participant); 1 x participant = vision (participant); 1 x participant = learning difficulties (participant); 1 x participant = vision (participant); 1 x participant = vision (parent), learning (child), impaired mobility (child); 1 x participant = impaired mobility (participant); 1 x participant = impaired mobility (relative); 1 x participant = vision (participant); 1 x participant = impaired mobility (child); 1 x participant = learning difficulties (sibling); 1 x participant = vision (participant); 1 x participant = impaired mobility (participant); 1 x participant = hearing (parent); 1 x participant = vision (participant); 1 x participant = hearing loss (participant) **Athens:** 1 x participant = learning difficulties (participant), dyslexia (participant); 1 x participant = Impaired mobility (participant) **Madrid:** 1 x participant = retinitis pigmentosa (child); 1 x participant = Disabilities caused in childbirth (child); 1 x participant = Polio (relative)

IMMIGRATION								
At least one of my parent was born outside of this country	10	2	2	16	2	3	2	25
Born outside of this country	5	1	5	1	10	3	4	23
TOTAL	15	3	7	17	12	6	6	48
BASIS OF VULNERABILTY								
I am a refugee or asylum seeker	15	3	0	0	0	0	0	0
I am not fluent in the main language of this country			1	0	0	0	0	1
I do not feel fully confident reading or writing in the			0	0	1	0	1	2

main language of this country								
60+ years old			1	0	0	0	0	1
Low educational attainment			0	4	3	1	0	8
Unemployed			0	4	3	1	0	8
Semi-skilled or unskilled job			0	0	2	1	1	4
From a non-white ethnic group (Germany, Poland, Spain, Greece)				0	6	0	1	7
Feel they belong to a minority group due to the country they or their parents were born in (France only)			6					6
From a minority religious group in this country			2	2	3	0	0	7
TOTAL	15	3	10	10	18	3	3	44

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