



## **Special Eurobarometer 382**

# **PUBLIC ATTITUDES TOWARDS ROBOTS**

## **SUMMARY**

Fieldwork: February – March 2012

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This survey has been requested by Directorate-General for Information Society and Media (INFSO) and co-ordinated by Directorate-General for Communication (DG COMM "Research and Speechwriting" Unit).

[http://ec.europa.eu/public\\_opinion/index\\_en.htm](http://ec.europa.eu/public_opinion/index_en.htm)

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The interpretations and opinions contained in it are solely those of the authors.

**Special Eurobarometer 382 / Wave EB77.1 – TNS Opinion & Social**

**Special Eurobarometer 382**

**Public Attitudes towards Robots**

Conducted by TNS Opinion & Social at the request of  
Directorate-General for Information Society and Media (INFOS)

Survey co-ordinated by Directorate-General Communication

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## INTRODUCTION

This summary presents the main results of a Special Eurobarometer survey into public attitudes towards robots<sup>1</sup>. The aim of the survey is to gauge public opinion towards robots by measuring public perceptions, acceptance levels, worries and reservations among EU citizens aged 15 and over in the 27 Member States.

The first part begins with a short introduction in which EU citizens' interest in scientific discoveries and technological developments is discussed, as this is an important analysis variable. The chapter then looks at familiarity with and personal experiences of robots, and general and more specific attitudes towards robots.

The second part examines the areas of application for robots and presents the areas where EU citizens believe robots should be used as a priority and where they believe robots should be banned.

In the last part, the focus is on the future of robots. The chapter examines the acceptance of tasks performed by robots and asks when EU citizens believe it will become commonplace for robots to do household tasks.

This survey was carried out by TNS Opinion & Social network in the 27 Member States of the European Union between 25 February and 11 March 2012. 26 751 respondents from different social and demographic groups were interviewed face-to-face at home in their mother tongue on behalf of the Directorate-General for Information Society and Media (INSFO). The methodology used is that of Eurobarometer surveys as carried out by the Directorate-General for Communication ("Research and Speechwriting" Unit)<sup>2</sup>

\* \* \* \* \*

*The Eurobarometer web site can be consulted at the following address:*

[http://ec.europa.eu/public\\_opinion/index\\_en.htm](http://ec.europa.eu/public_opinion/index_en.htm)

*We wish to thank the people throughout European Union who have given their time to take part in this survey. Without their active participation, this survey would not have been possible.*

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<sup>1</sup> This is the summary of the full report which presents a more thorough analysis of the results, including detailed country-by-country and socio-demographic analyses (respondents' gender, age, education, occupation and people's position on the social ladder)

<sup>2</sup> [http://ec.europa.eu/public\\_opinion/index\\_en.htm](http://ec.europa.eu/public_opinion/index_en.htm)

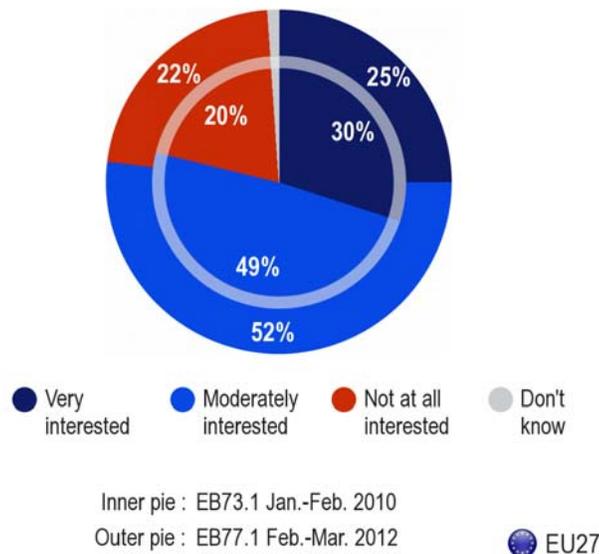
## 1. ATTITUDES TOWARDS ROBOTS

### INTRODUCTION/CONTEXT: Interest in scientific discoveries and technological developments

#### *– Interest in scientific discoveries and technological developments has decreased since 2010 –*

Interest in scientific discoveries has decreased since January-February 2010: a quarter of EU citizens now claim to be 'very interested' in scientific discoveries and technological developments (25%), a 5-point fall since the previous survey. Just over half are 'moderately' interested (52%; +3) and 22% are 'not at all interested' (+2).

QA1. Please tell me whether you are very interested, moderately interested or not at all interested in scientific discoveries and technological developments.



Some variations can be seen between countries: more than a third of respondents are 'very interested' in scientific discoveries and technological developments in Cyprus (43%), Sweden (41%), the Netherlands (36%), France (34%), and Luxembourg (34%), while around a third of respondents are 'not at all interested' in Portugal (37%), Malta (34%), Ireland (33%) and the Czech Republic (32%).

Since 2010, increases of at least five points in the proportion of respondents that are 'very interested' have been recorded in Bulgaria (+8), Romania (+7), Austria (+6) and Italy (+5). At the same time, 16 Member States have recorded notable decreases in the proportion of respondents that are 'very interested' since 2010, with the largest falls in Hungary (-19) and the UK (-18).

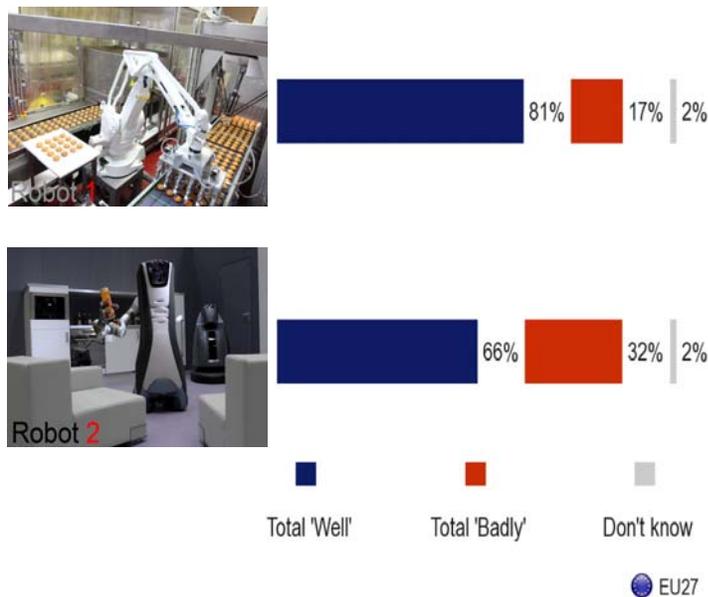
At the **socio-demographic level**, the data show that men are much more often 'very interested' in scientific discoveries and technological developments than women (33% vs. 18%). In terms of education, interest levels increase with the number of years people stayed in full-time education: 37% of respondents whose education ended at the age of 20 or older are 'very interested' in new scientific discoveries and technological developments for 23% of those who left school between 16 and 19, and just 13% of those whose studies ended before 16. Also 34% of EU citizens who use the Internet daily say that they are 'very interested' in scientific discoveries and technological developments compared to only 12% of those who never use the Internet.

### 1.1. Familiarity with representations of robots

***– The image of a robot is more likely to be that of an autonomous machine used in the workplace than a human-like machine that helps in the home –***

Respondents were shown two different pictures and were asked to what extent each picture corresponds with the idea they have of robots. The image that EU citizens have of a robot is more likely to be that of an instrument-like machine than that of a human-like machine (81% vs. 66% - Total 'Well').

QA2. I'm going to show you two pictures. For each of them, please tell me to what extent it corresponds with the idea you have of robots.



The **national analyses** show that the extent to which the instrument-like robot (Robot 1) corresponds well to image that respondents have ranges from 56% in Romania to 95% in Sweden. For the human-like robot (Robot 2), the figures range from 52% in Romania to 80% in Bulgaria. In Malta, Cyprus, Spain and Bulgaria both pictures correspond equally well to people's idea of robots. Overall, in every country more than half of the respondents said that both images correspond well with their idea of robots.

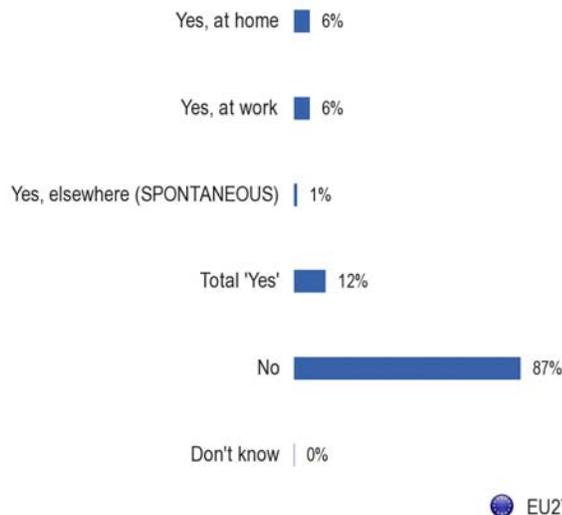
An examination of the **attitudinal variables** shows that 91% of respondents who are 'very interested' in science say that the picture of the instrument-like machine (Robot 1) corresponds well to their image of robots, compared to 63% of respondents who are 'not at all interested'. For the image of the human-like robot (Robot 2), the corresponding figures are 75% and 51%, respectively.

## 1.2. Personal experience of robots

### – Few EU citizens have experience of using robots –

Few EU citizens have experience of using robots: **in total, 12% have used or currently use a robot: six percent have experience of the use of a robot at home and six percent have used or currently use a robot at work.** Conversely, 87% of EU citizens have never used a robot in their lives.

QA3. Have you ever used, or are you currently using such robots at home or at work (e.g. a robotic vacuum cleaner at home or an industrial robot at work)?



The analyses at **national level** show that experience of robots (at home, at work or elsewhere) is most widespread in Slovakia (20%), followed by Poland (19%), Slovenia and Italy (both 18%), and Denmark and Finland (both 17%). For the use of robots in the home, Italy tops the list (14%), while Finland leads the ranking when it comes to personal experience of using robots at work (12%).

The countries where personal experience of robots is least widespread (lowest levels of Total 'Yes') are Greece, Bulgaria (both 2%), Cyprus (4%) and Malta (5%).

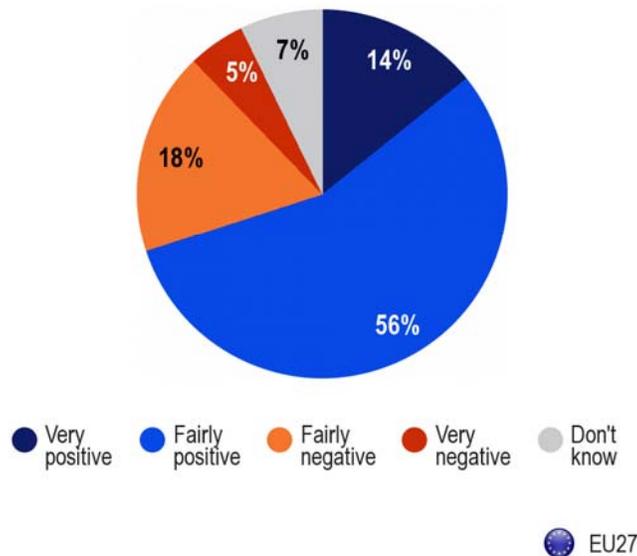
### 1.3. Views on robots

#### 1.3.1. Overall view

**– A majority of EU citizens have a positive view of robots –**

**More than two thirds of EU citizens have a positive view of robots (70%):** 56% have a 'fairly positive' view and 14% a 'very positive' view. Less than a quarter of Europeans have a negative view of robots (23%), with close to one EU citizen in five having a 'fairly negative' view (18%) and one in twenty having a 'very negative' view (5%).

QA4. Generally speaking, do you have a very positive, fairly positive, fairly negative or very negative view of robots?



An analysis between the EU15 and NMS12 countries reveals that EU citizens in the latter group tend to hold a more positive view of robots than those in the EU15 countries (75% vs. 68%).

At **national level**, the proportion of EU citizens holding positive views about robots ranges from 54% in Greece and Malta to 88% in Denmark and Sweden. Negative views range from just 9% in Denmark to 44% in Greece. With a difference of just ten points between positive and negative views, public opinion on robots is most evenly divided in Greece.

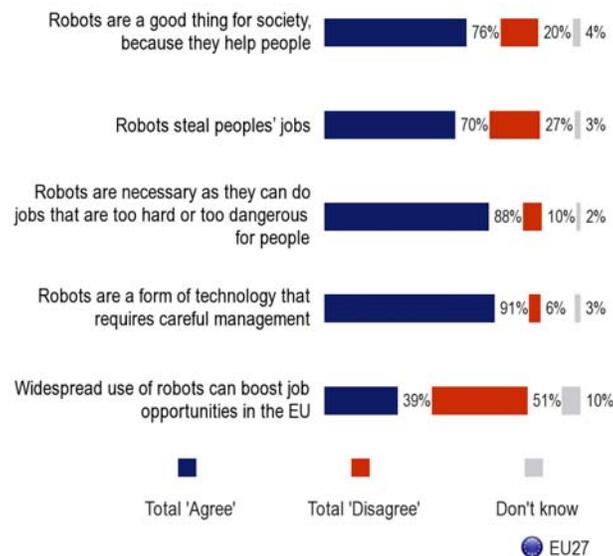
A **socio-demographic** analysis shows that 82% of managers have positive views of robots compared to 57% of house-persons. The **attitudinal analyses reveal that** 86% of the EU citizens who are 'very interested' in science and technology hold positive views about robots, compared to just 42% of those who are 'not at all interested'. Those EU citizens with personal experience of using robots are more likely to have a positive view of robots (88%) than the wide majority who lack this experience (68%).

### 1.3.2. Specific attitudes

#### – Robots are necessary and good but also require careful management –

Interviewed about their attitudes about robots, EU citizens confirm their positive views, but also express concerns. On the one hand, they express a utilitarian view with the majority agreeing that "robots are necessary as they can do jobs that are too hard or too dangerous for people" (88%) and that "robots are a good thing for society because they help people" (76%). On the other hand, the widespread agreement with the statement that "robots are a form of technology that requires careful management" suggests that people also see risks: 91% of respondents agree with this statement, while only 6% disagree and 3% 'don't know'. The finding that 70% of respondents agree that "robots could steal people's jobs" is a further expression of disquiet. There is less consensus about the view that the "widespread use of robots can boost job opportunities in the EU": 39% of respondents agree with this statement while 51% disagree (and 10% have no opinion).

QA5. Please tell me to what extent you agree or disagree with each of the following statements about robots.



**Statement 1: Robots are a good thing for society, because they help people**

The **national analyses** show that an absolute majority of EU citizens in all Member States agree that robots are a good thing for society, because they help people. Agreement levels range from 58% in Greece to over 90% in the Czech Republic (91%), Sweden (93%) and Slovakia (95%).

The **socio-demographic analyses** show that those who remained in full-time education the longest have the highest level of agreement (84%) while respondents who left full-time education aged 15 or younger (63%) are least likely to agree with the statement.

The **attitudinal analyses** reveal that 90% of EU citizens with a positive view of robots agree that robots are a good thing for society, because they help people, compared to 39% of EU citizens with a negative overall view of robots.

**Statement 2: Robots steal people's jobs**

The **national analyses** show that an absolute majority of EU citizens in all Member States also agree that robots steal people's jobs, but the ranking of countries is very different. There is some evidence of a North-South divide: there is least agreement in the Netherlands (51%) and Finland (55%) and most in Portugal (89%), followed by Spain (84%), Greece and Cyprus (both 83%) and Malta (82%).

The **socio-demographic analyses** show that while 57% of managers believe that robots steal people's jobs, this increases to 75% among manual workers.

The **attitudinal analyses** reveal that about a third of respondents who have a positive view on robots disagree with this statement.

**Statement 3: Robots are necessary as they can do jobs that are too hard or too dangerous for people**

The **national analyses** show that agreement with this statement ranges from 75% in Greece to 97% in Sweden. In 13 of the 27 EU Member States at least nine out of ten citizens agree with the statement. Apart from Greece, Portugal (78%) is the only Member State where less than eight out of ten citizens agree.

95% of EU citizens with a positive view of robots agree that robots can do jobs that are too hard or too dangerous for people, compared to 68% of EU citizens with a negative overall view of robots.

**Statement 4: Robots are a form of technology that requires careful management**

Agreement with this statement ranges from 82% in Hungary to 98% in Cyprus (for a European average of 91%). In 19 Member States at least nine out of ten citizens agree with the statement.

**Statement 5: Widespread use of robots can boost job opportunities in the EU**

There are only five Member States where an absolute majority agrees that widespread use of robots can boost job opportunities in the EU: Denmark (65%), Finland (57%), Lithuania (52%), Sweden (51%) and Austria (50%). In all other Member States, the majority view is to disagree with the statement, with the highest levels of disagreement recorded in Hungary (73%), Slovenia (63%) and Luxembourg (62%). The **attitudinal analyses** show that 48% of respondents with a positive view of robots agree that widespread use of robots can boost job opportunities in the EU while 75% of those with a negative overall view of robots disagree with this statement.

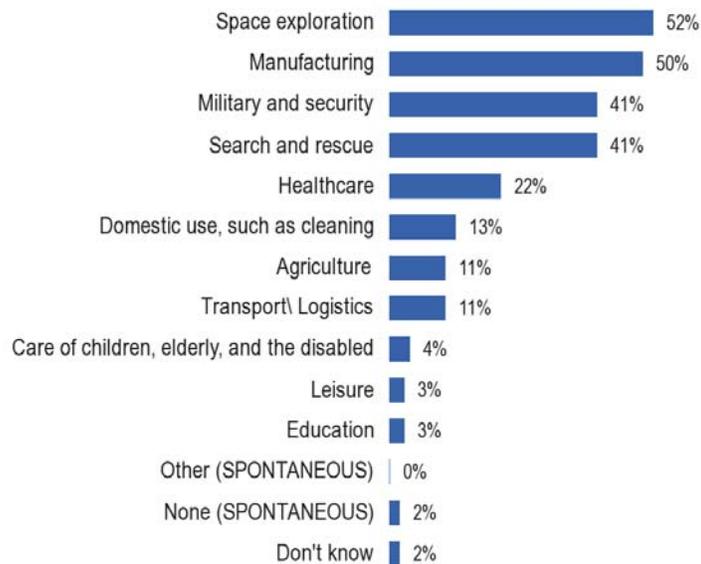
## 2. AREAS OF APPLICATION FOR ROBOTS

### 2.1. Areas where EU citizens believe robots should be used as a priority

**- Robots should be used as a priority for tasks that are too difficult or too dangerous for humans -**

EU citizens have well-defined views about the areas of application for robots: they should be used as a priority in areas that are too difficult or too dangerous for humans, like space exploration (52% priority), manufacturing (50%), military and security (41%) and search and rescue tasks (41%).

QA6. In which areas do you think that robots should be used as a priority?



 EU27

The **national analyses** indicate that the priority areas in which robots should be used vary from one Member State to another.

**Space exploration** is the most mentioned priority for robots use in 11 Member States: Bulgaria, the Czech Republic, Germany, Greece, Spain, France, Italy, Cyprus, Lithuania, Luxembourg and Hungary. The proportion of respondents for whom space exploration is a priority area for robot use ranges from 26% in Portugal to 70% in Cyprus.

In 13 Member States **manufacturing** is the most mentioned priority for the use of robots: Belgium, Denmark, Estonia, Ireland, Latvia, the Netherlands, Austria, Poland, Romania, Slovenia, Slovakia, Finland and Sweden. The proportion of respondents selecting manufacturing as a priority area for robot use ranges from 23% in Cyprus to 80% in Denmark.

The United Kingdom is the only country where **military and security** is the most frequently mentioned priority. 64% of UK respondents select this as a priority area for the use of robots, as do close to half in Germany (49%) and Cyprus (48%). The lowest score for this item was recorded in Greece (19%).

In Malta (46%) and Portugal (45%) **search and rescue** is the most mentioned priority. However, the proportion of respondents selecting this as a priority area for robot use is highest in Estonia (59%). Respondents in Romania mentioned search and rescue as a priority area least frequently (21%).

In none of the Member States are any of the other areas considered a priority for the use of robots. The proportion of respondents selecting **healthcare** as a priority area ranges from eight percent in Latvia to 38% in Belgium. The proportion of respondents selecting **domestic use** ranges from six percent in Sweden to 24% in Romania. **Agriculture** is seen as a priority area for robot use by just six percent of respondents in Greece; the highest proportion is noted in Romania (23%). Responses for **transport/logistics** range from just three percent in Malta to 25% in the Netherlands. Fewer than ten percent of respondents in all Member States prioritise the use of robots in **care, leisure** or **education**.

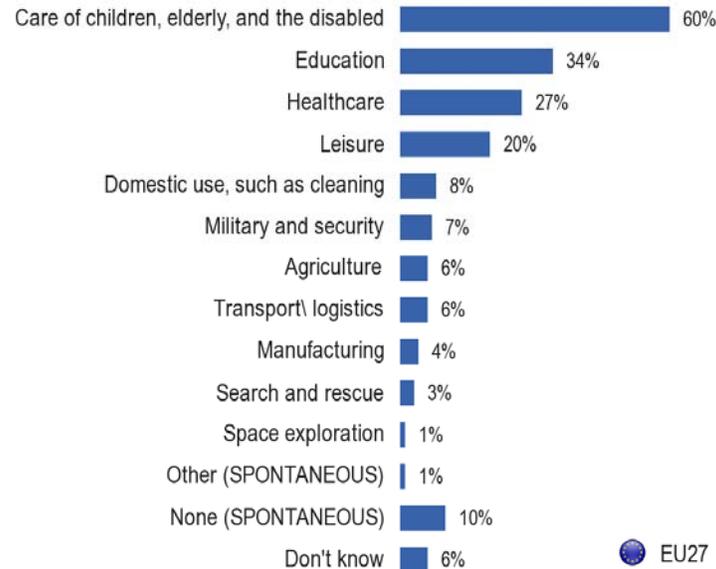
The attitudinal analyses show large differences between EU citizens with a positive view of robots and those with a negative view, especially with regard to the use of robots in manufacturing: 56% of EU citizens with a positive view of robots consider this a priority area, compared to 32% of those with a negative view.

## 2.2. Areas where EU citizens believe robots should not be used

### *- Robots should not be used to care for people –*

EU citizens also have well-defined views about the areas where robots should be banned. Views are most emphatic when it comes to the care of children, elderly people and people with disabilities, 60% of EU citizens saying that this is an area where robots should be banned. There is also considerable opposition to the use of robots in the other more 'human' areas included in the survey: 34% of respondents believe robots should be banned in education, 27% are against the use of robots in healthcare and 20% oppose their use for leisure purposes. Less than ten percent oppose the use of robots in any of the other areas. Overall, ten percent of respondents *spontaneously* said that robots should not be banned in any of the areas listed.

QA7. And on the other hand, in which areas do you think that the use of robots should be banned?



The **national analyses** show that, throughout the EU, the **care of children, elderly people and people with disabilities** tops the list of areas where the use of robots should be banned. In 24 Member States, an absolute majority holds this view. Portugal (35%), Bulgaria (40%) and Malta (49%) are the only exceptions. Public opinion is most emphatic in Cyprus (85%), followed by Luxembourg (78%).

In Luxembourg (58%), France (56%), Belgium (51%) and the Netherlands (50%) an absolute majority of EU citizens believe that robots should be banned from **education**. This view is least widely expressed in Finland (14%), Slovenia (17%) and Slovakia (19%). The national analyses also show that a considerable minority of respondents in Finland (27%) and Denmark (23%) *spontaneously* indicated that robots should not be banned in any of the 11 areas included in the survey.

An absolute majority of respondents in Lithuania (53%) say that robots should be banned in **healthcare** and more than two out of five respondents in Latvia (48%), Malta (44%) and Estonia (42%) share this view. The Czech Republic (14%) is the only country where less than one-fifth of respondents say that robots should be banned from healthcare.

The use of robots should be banned in **leisure**, according to more than three out of ten respondents in Belgium (37%), France and Slovenia (both 31%). In the Czech Republic (26%) more than a quarter of respondents share this view, which is least widespread in Portugal (4%).

The view that the **domestic use of** robots should be banned is far more widespread in Cyprus (25%) than in other Member States. It is also above average in Greece (17%) and Belgium (16%). The view that robots should be banned in the **military and security** sphere is most often mentioned in Greece (19%), followed by Cyprus (16%).

Comparing the results of these two questions (where the use of robots should be a priority and where their use should be banned) shows that **support for robot use is most widespread in space exploration** (+51 point difference between the proportion of respondents who believe robots should be used as a priority and the proportion who believe robots should not be used).

**The areas where opposition to the use of robots outstrips support are, in order of magnitude: care (-56), education (-31), leisure (-17) and healthcare (-5).**

 EU27	QA6 In which areas do you think that robots should be used as a priority?	QA7 And on the other hand, in which areas do you think that the use of robots should be banned?	Areas of robots usage index (Q6-Q7)
Space exploration	52%	1%	+51
Manufacturing	50%	4%	+46
Search and rescue	41%	3%	+38
Military and security	41%	7%	+34
Domestic use, such as cleaning	13%	8%	+5
Agriculture	11%	6%	+5
Transport/ Logistics	11%	6%	+5
Healthcare	22%	27%	-5
Leisure	3%	20%	-17
Education	3%	34%	-31
Care of children, elderly, and the disabled	4%	60%	-56

### 3. ROBOTS IN THE EU: FUTURE PERSPECTIVES

#### 3.1. Acceptance of tasks done by a robot

*– EU citizens are willing to accept help from a robot at work  
but oppose having their children or elderly parents  
minded by a robot -*

Europeans were then asked whether they would feel comfortable or not with different tasks that could be carried out by robots. For this, they were asked to use a scale from 1 to 10, where '1' means that they would feel 'totally uncomfortable', and 10 that they would feel 'totally comfortable'.

Close to half of EU citizens (48%) would feel 'comfortable' (points 7 to 10 on the scale) accepting assistance from a robot at work (e.g. in **manufacturing**), one in five (21%) would feel 'fairly comfortable' in this situation (points 5-6 on the scale) and over a quarter (27%) would feel 'uncomfortable' (points 1 to 4 on the scale). In the other three scenarios presented, the majority would feel 'uncomfortable': on average, 86% would feel 'uncomfortable' about **having their children or elderly parents minded by a robot** (in fact, 66% chose point 1 on the scale, 'totally uncomfortable'), 69% would feel 'uncomfortable' about **having their dog walked by a robot** (47% 'totally uncomfortable') and 57% would feel 'uncomfortable' about **having a medical operation performed on them by a robot** (37% 'totally uncomfortable').

QA8. Here is a list of things that could be done by robots. For each of them, please tell me, using a scale from 1 to 10, how you would personally feel about it. On this scale, '1' means that you would feel "totally uncomfortable" and '10' means that you would feel "totally comfortable" with this situation.

Having a robot assist you at work  
(e.g.: in manufacturing) 48% 21% 27% 3% 2%

Having your dog walked by a robot 14% 12% 69% 4% 1%

Having a medical operation  
performed on you by a robot 23% 18% 57% 0% 2%

Having your children or elderly  
parents minded by a robot 5% 7% 86% 1% 1%


  
 Total 'Comfortable' (7-10)    Total 'Fairly comfortable' (5-6)    Total 'Uncomfortable' (1-4)    Not applicable (SPONTANEOUS)    Don't know

 EU27

**Generally speaking**, it should be noted that there are considerable difference between EU15 countries and NMS12 countries in the level of acceptance of jobs done by robots. For all tasks, **EU citizens living in the NMS12 countries would be more comfortable accepting the use of robots.**

#### **Task 1: Having a medical operation performed on you by a robot**

The **national analyses** show that there are only four Member States where more than a third of citizens would feel comfortable (points 7 to 10 on the scale) if a robot performed a medical operation on them: Poland (39%), the Netherlands (37%), and Finland and the Czech Republic (both 35%). At the other extreme, around eight in ten citizens in Malta (81%), Lithuania (80%) and Latvia (79%) would feel uncomfortable (points 1 to 4 on the scale) in this situation. In Cyprus, Spain (both 75%) and Portugal (74%), this applies to around three-quarters of respondents.

The **socio-demographic analyses** show that respondents who remained in education the longest are more likely than those who left school aged 15 or younger to feel comfortable in this situation (30% vs. 14%), and managers are more likely to be comfortable than house-persons (32% vs. 15%).

#### **Task 2: Having your dog walked by a robot**

In just three Member States, more than a quarter of citizens would feel comfortable (points 7 to 10 on the scale) if a robot walked their dog: Poland (28%), Bulgaria (27%), and Denmark (25%). Conversely, the survey shows that around eight in ten citizens in Slovenia (82%), Luxembourg (81%), Sweden (80%) and Germany (79%) would feel uncomfortable (points 1 to 4 on the scale) in this situation.

The **socio-demographic analyses** show that education produces large variations, with just eight percent of respondents who left full-time education aged 15 or younger saying that they would feel comfortable (points 7 to 10 on the scale), compared to 25% of students.

#### **Task 3: Having a robot assist you at work (e.g.: in manufacturing)**

In 12 Member States more than half of respondents say that they would feel comfortable (points 7 to 10 on the scale) if a robot assisted them at work, ranging from 52% in Belgium to 81% in Sweden. Close to half share this opinion in Lithuania (49%), Germany and the UK (both 48%). At the opposite end of the scale, the survey shows that 54% of respondents in Romania would feel uncomfortable (points 1 to 4 on the scale) in this situation, as would nearly half the respondents in Cyprus (48%) and just above two-fifths in Portugal and Malta (both 42%) and Greece (41%).

The **socio-demographic analyses** show that 32% of respondents who left full-time education aged 15 or younger say that they would feel comfortable (points 7 to 10), compared to 60% of students and those who left full-time education aged 20 or older.

The largest difference, however, is found between managers (63% feel comfortable) and people who look after the home (34% of house-persons feel comfortable).

#### **Task 4: Having your children or elderly parents minded by a robot**

Bulgaria (where 68% choose points 1 to 4 on the scale) and Poland (73%) are the only Member States where less than three-quarters would feel uncomfortable if a robot minded their children or elderly parents. However, more than nine out of ten respondents would feel uncomfortable in Luxembourg (96%), France (95%), Germany and Sweden (both 93%), and Cyprus and Slovenia (both 92%).

#### **From a socio-demographic point of view, general trends valid for all four tasks can be highlighted:**

Overall, acceptance levels are higher among men than women. Education accounts for wide differences in acceptance levels, with a higher level of acceptance for respondents who stayed in full-time education until the age of 20 or older than for those who left full-time education aged 15 and younger. High acceptance levels are also noted among students and managers.

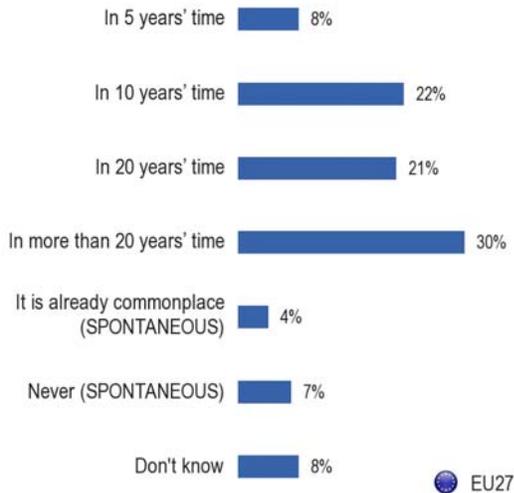
Finally, the level of acceptance of EU citizens who have a positive view of robots is generally far above those of respondents with a negative view of robots; the same can be said about Europeans who are 'very interested' compared with those who are 'not at all interested'; and about respondents with personal experience of robots compared with those without such experience.

### **3.2. When will it become commonplace for robots to do housework?**

#### ***– It will not be commonplace for robots to do the housework in the near future –***

Europeans do not think that robots will be part of their household life in the years to come: only eight percent believe that it will be commonplace for robots to do housework in 5 years' time, while four percent *spontaneously* say that it is already commonplace. At the other extreme, seven percent *spontaneously* say that it will never become commonplace. The majority view is that robots will do the housework in more than 20 years' time (30%), while around two in five EU citizens believe it will be 20 years (21%) or 10 years (22%) before it will be commonplace for robots to do housework.

QA9. In your opinion, in Europe, when it will become commonplace for robots to do house work?



The **national analyses** demonstrate that opinions vary considerably between the Member States. The most widely held view is that it will be more than 20 years before it is commonplace for robots to do the housework. **This is the most widespread perception in 17 of the 27 Member States.** In the 10 remaining Member States the most common view is that it will be 10 years before it becomes commonplace for robots to do housework.

The perception that it is already commonplace for robots to do the housework is not widespread in the EU: most *spontaneous* mentions of this answer are seen in Austria and Portugal (8%), and in Slovakia (7%), compared with 4% at EU level.

While 7% of Europeans *spontaneously* answer that it will never become commonplace for robots to do the housework, this opinion is most widespread in Germany (15%), Hungary (12%), and Lithuania, Austria and Romania (all 10%).

## CONCLUSIONS

Robots are generally well perceived in the EU, but they evoke mixed feelings: Europeans recognize their benefits especially in the work place, but they also express concerns in stating that robots should be managed carefully. The fact that they would feel comfortable having a robots assisting them at work, but uncomfortable having a robot minding their children or their elderly relatives illustrates well these mixed feelings.

The survey shows that a quarter of EU citizens are 'very interested' in new scientific discoveries and technological developments. This is an important driver on attitudes towards robots: the more interested in science people are, the more positive people are towards robots.

The majority of Europeans say that the image of an instrument-like machine used in the workplace and the image of a human-like machine helping in the home both correspond well to their idea of robots. However, they are more likely to think of robots as instrument-like machines than as human-like machines.

While EU citizens have ideas about what robots look like, not many have direct personal experience of them; the survey shows that six percent of respondents have used or currently use robots in the home and an equal proportion have used or currently use a robot at work.

Overall, more than two-thirds of EU citizens have a positive view of robots. However, further analyses show that the public believe that, while robots serve a utilitarian purpose and are useful for tasks that are too dangerous or difficult for humans, their use nevertheless requires careful management. EU citizens express widespread concern that robots could steal people's jobs; however, a sizeable minority thinks that robots could boost job opportunities in the EU.

In this context, it is not surprising to find that EU citizens have a clear set of preferences about the areas in which robots should be used. While there is strong support for the use of robots in space exploration and manufacturing, there is outright opposition to their use to take care of people. The survey shows that support for the use of robots is greatest in areas where the tasks are too difficult or too dangerous for humans, but that robots should not be used to carry out 'human' tasks.

For example, EU citizens would feel very uncomfortable if a robot were used to look after their children or elderly parents or even to walk their dog. At the same time, more than half can accept the idea of a robot assisting them at work.

However, all of this is future talk to most Europeans, as very few imagine that it will soon become commonplace for robots to do housework.

## **SPECIAL EUROBAROMETER 382**

### **Public Attitudes towards Robots**

### **TECHNICAL SPECIFICATIONS**

Between the 25th of February and the 11th of March 2012, TNS Opinion & Social, a consortium created between TNS plc and TNS opinion, carried out the wave 77.1 of the EUROBAROMETER, on request of the EUROPEAN COMMISSION, Directorate-General for Communication, "Research and Speechwriting".

The SPECIAL EUROBAROMETER 382 is part of wave 77.1 and covers the population of the respective nationalities of the European Union Member States, resident in each of the Member States and aged 15 years and over. The basic sample design applied in all states is a multi-stage, random (probability) one. In each country, a number of sampling points was drawn with probability proportional to population size (for a total coverage of the country) and to population density.

In order to do so, the sampling points were drawn systematically from each of the "administrative regional units", after stratification by individual unit and type of area. They thus represent the whole territory of the countries surveyed according to the EUROSTAT NUTS II (or equivalent) and according to the distribution of the resident population of the respective nationalities in terms of metropolitan, urban and rural areas. In each of the selected sampling points, a starting address was drawn, at random. Further addresses (every Nth address) were selected by standard "random route" procedures, from the initial address. In each household, the respondent was drawn, at random (following the "closest birthday rule"). All interviews were conducted face-to-face in people's homes and in the appropriate national language. As far as the data capture is concerned, CAPI (*Computer Assisted Personal Interview*) was used in those countries where this technique was available.

ABBR.	COUNTRIES	INSTITUTES	N° INTERVIEWS	FIELDWORK DATES		POPULATION 15+
BE	Belgium	TNS Dimarso	1.051	25/02/2012	11/03/2012	8.939.546
BG	Bulgaria	TNS BBSS	1.006	25/02/2012	05/03/2012	6.537.510
CZ	Czech Rep.	TNS Aisa	1.003	25/02/2012	07/03/2012	9.012.443
DK	Denmark	TNS Gallup DK	1.019	25/02/2012	11/03/2012	4.561.264
DE	Germany	TNS Infratest	1.552	25/02/2012	11/03/2012	64.409.146
EE	Estonia	Emor	1.000	25/02/2012	11/03/2012	945.733
IE	Ireland	Ipsos MRBI	1.008	25/02/2012	09/03/2012	3.522.000
EL	Greece	TNS ICAP	999	25/02/2012	10/03/2012	8.693.566
ES	Spain	TNS Demoscopia	1.004	25/02/2012	11/03/2012	39.127.930
FR	France	TNS Sofres	1.059	25/02/2012	07/03/2012	47.756.439
IT	Italy	TNS Infratest	1.036	25/02/2012	11/03/2012	51.862.391
CY	Rep. of Cyprus	Synovate	506	25/02/2012	11/03/2012	660.400
LV	Latvia	TNS Latvia	1.024	25/02/2012	11/03/2012	1.447.866
LT	Lithuania	TNS Gallup Lithuania	1.021	25/02/2012	11/03/2012	2.829.740
LU	Luxembourg	TNS ILReS	501	25/02/2012	10/03/2012	404.907
HU	Hungary	TNS Hoffmann Kft	1.021	25/02/2012	11/03/2012	8.320.614
MT	Malta	MISCO	500	25/02/2012	09/03/2012	335.476
NL	Netherlands	TNS NIPO	1.014	25/02/2012	08/03/2012	13.371.980
AT	Austria	Österreichisches Gallup-Institut	1.031	25/02/2012	11/03/2012	7.009.827
PL	Poland	TNS OBOP	1.000	25/02/2012	11/03/2012	32.413.735
PT	Portugal	TNS EUROTESTE	1.009	25/02/2012	11/03/2012	8.080.915
RO	Romania	TNS CSOP	1.020	25/02/2012	07/03/2012	18.246.731
SI	Slovenia	RM PLUS	1.017	25/02/2012	09/03/2012	1.759.701
SK	Slovakia	TNS Slovakia	1.000	25/02/2012	11/03/2012	4.549.955
FI	Finland	TNS Gallup Oy	1.003	25/02/2012	11/03/2012	4.440.004
SE	Sweden	TNS GALLUP	1.016	25/02/2012	11/03/2012	7.791.240
UK	United Kingdom	TNS UK	1.331	25/02/2012	11/03/2012	51.848.010
<b>TOTAL EU27</b>			<b>26.751</b>	<b>25/02/2012</b>	<b>11/03/2012</b>	<b>408.879.069</b>

For each country a comparison between the sample and the universe was carried out. The Universe description was derived from Eurostat population data or from national statistics offices. For all countries surveyed, a national weighting procedure, using marginal and intercellular weighting, was carried out based on this Universe description. In all countries, gender, age, region and size of locality were introduced in the iteration procedure. For international weighting (i.e. EU averages), TNS Opinion & Social applies the official population figures as provided by EUROSTAT or national statistic offices. The total population figures for input in this post-weighting procedure are listed above.

Readers are reminded that survey results are estimations, the accuracy of which, everything being equal, rests upon the sample size and upon the observed percentage. With samples of about 1,000 interviews, the real percentages vary within the following confidence limits:

<b>Observed percentages</b>	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
<b>Confidence limits</b>	± 1.9 points	± 2.5 points	± 2.7 points	± 3.0 points	± 3.1 points