

# eCoMove survey



## Analysis of results

## 1. Introduction and methodology

eCoMove – *Cooperative Mobility Systems and Services for Energy Efficiency* is an EC-funded project of the Seventh Framework Programme. It is aimed at developing a combination of cooperative systems and tools using V2V (Vehicle to Vehicle) and V2I (Vehicle to Infrastructure) communication to help sustainable drivers eliminate unnecessary fuel consumption, fleet managers to provide incentives to drivers to save fuel and most economical vehicle management, and road operators to manage traffic in the most energy efficient way. The overall target of the project is to reduce fuel consumption by 20% and therefore CO<sub>2</sub> emissions caused by traffic.

A first goal of the project was to evaluate drivers' needs and profiles across different European countries with regards to innovative eco solutions and services for mobility. This goal was accomplished by a survey that was deployed as an online questionnaire through some of the EuroTest partners' websites.

The questionnaire had three main parts. In the first one, the respondent was asked to provide some basic demographic information such as age, driving experience, driving style, most frequent trips and driving environments, i.e. urban, interurban. The second part was related to the respondents' driving behavior and her or his attitude towards eco-driving. The aim was to know how this correlates with respondents' attitude towards environmental issues. And finally, users' acceptance on future ITS applications was assessed by presenting some scenarios introducing applications and services for eco-mobility and describing their functionality, for example in-car or nomadic devices assisting the driver to reduce fuel consumption and drive eco-friendly.

For each country, a target number of responses was calculated taking into account its population and the percentage it represents in the European overall population. Some of the participating countries did not reach a representative number of responses and therefore have been excluded from this report (ACI Italy, ACL Luxembourg and AMSS Serbia). The final number of respondents was 6.147, distributed as follows:

<b>Automobile Club</b>	<b>Country</b>	<b>Target number of responses needed</b>	<b>Actually collected responses</b>	<b>Percentage collected responses</b>
ÖAMTC	Austria	166	287	4,67%
TCB	Belgium	192	324	5,27%
HAK	Croatia	88	216	3,51%
AL	Finland	97	125	2,03%
FFAC	France	1171	737	11,99%
ADAC	Germany	1855	2.928	47,63%
NAF	Norway	88	124	2,02%
ACP	Portugal	169	367	5,97%
AMZS	Slovenia	40	145	2,36%
RACC	Spain	830	652	10,61%
TCS	Switzerland	147	242	3,94%
TOTAL		6.039	6.147	100%

Figure 1: Overall survey numbers

Some countries had overrepresentation (specially Germany) in the overall results. To make the percentage of responses the same as the percentage of population equal, a correction factor was applied to calculate the European-wide results, and to be able to compare with national results as well.

<b>Country</b>	<b>Population</b>	<b>Population percentage</b>	<b>Correction factor</b>
Austria	6.382.550	3,42%	0,733
Belgium	7.958.842	4,27%	0,810
Croatia	3.423.023	1,84%	0,522
Finland	3.993.303	2,14%	1,053
France	46.725.195	25,07%	2,090
Germany	63.960.083	34,32%	0,720
Norway	3.473.916	1,86%	0,923
Portugal	8.143.052	4,37%	0,731
Slovenia	1.586.943	0,85%	0,360
Spain	34.920.050	18,74%	1,766
Switzerland	5.815.532	3,12%	0,522
<b>TOTAL</b>	<b>186.382.489</b>	<b>100%</b>	

Figure 2: Correction factor

## 2. Results

As a result of this study, the average European driver has been profiled as related with the use of new technologies in the car (navigation systems, ADAS related to eco-driving), environmental awareness and acceptance of future developments.

### 2.1. Availability and use of navigation systems

#### 2.1.1. Availability of navigation device

The availability of a navigation device is very common in the European fleet. In average, only one out of every three users don't have any navigation system in his vehicle.

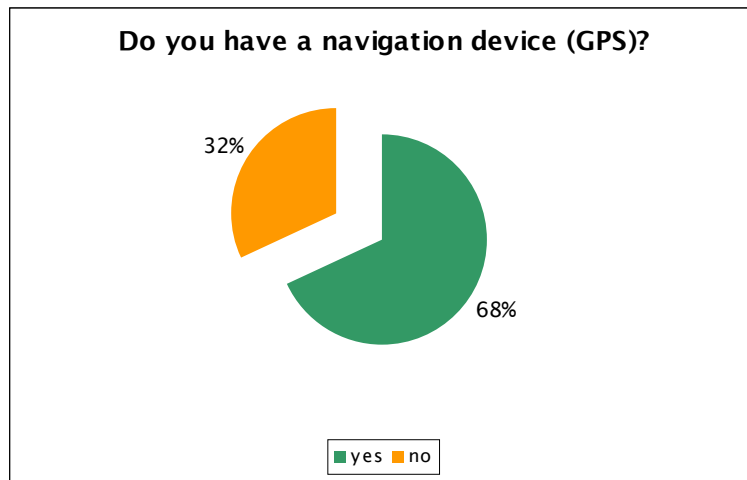


Figure 3: GPS navigation device availability

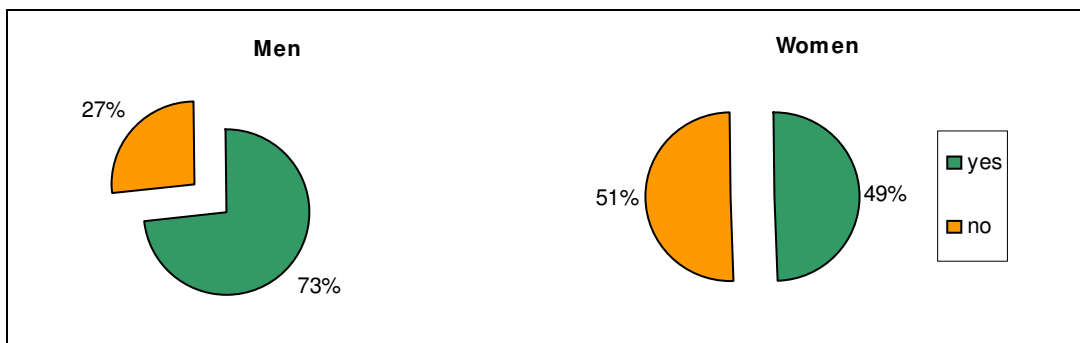


Figure 4: GPS navigation device availability, per gender

Distribution by age is:

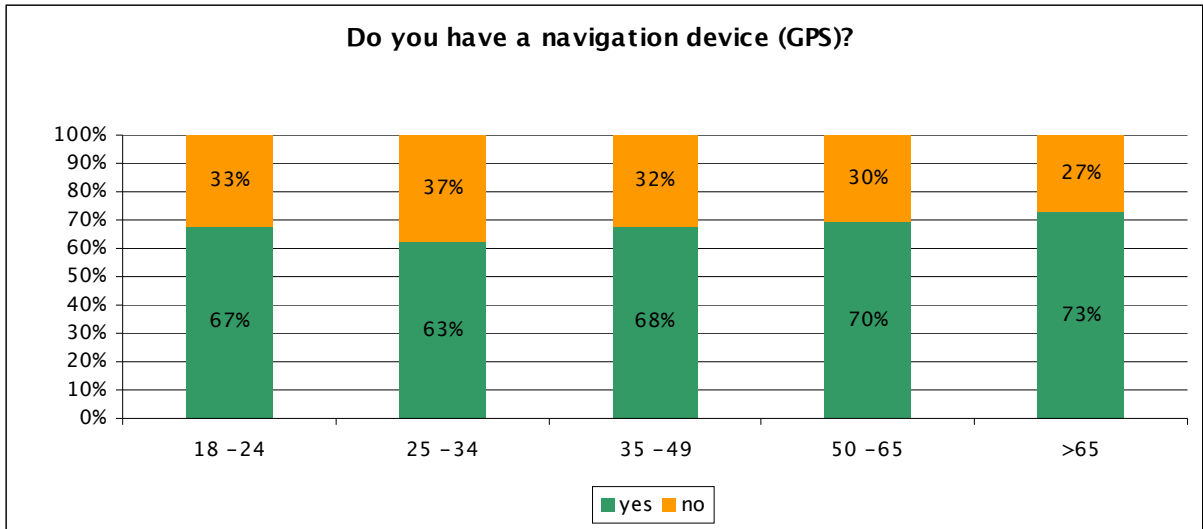


Figure 5: GPS navigation device availability, per age

By type of vehicle:

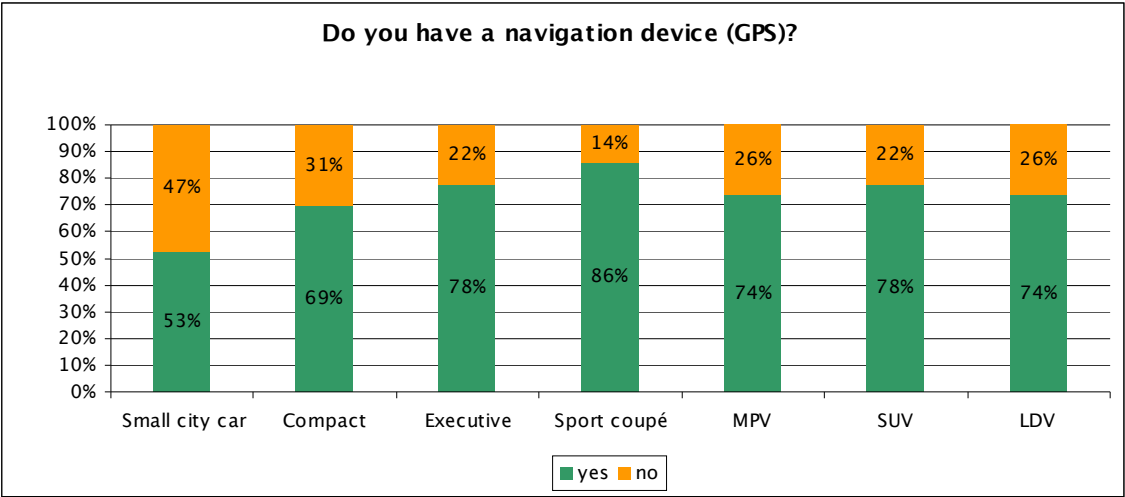


Figure 6: GPS navigation device availability, per type of vehicle

There are significant differences between car types (with 86% of Sport coupé having a much greater presence of GPS devices as compared to Small city cars, with 53%).

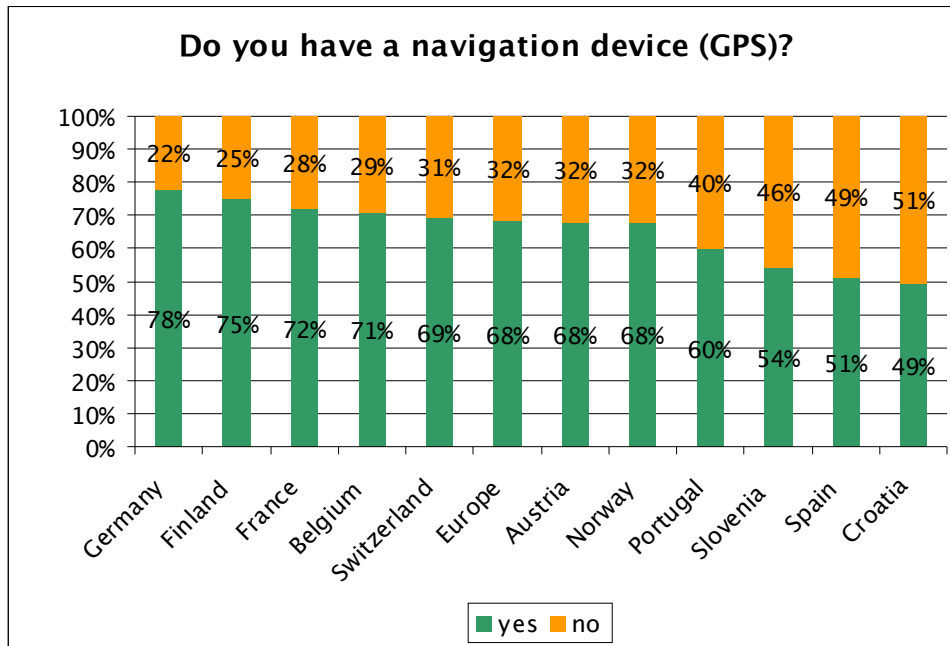


Figure 7: GPS navigation device availability, per country

There are also differences between countries. In some countries like Germany or Finland more than 75% of the cars have a navigation device, whereas in others like Slovenia, Spain or Croatia only around 50% of drivers use such systems.

### 2.1.2. Use of the navigation device

Among the drivers who have or use a GPS navigation device (whether onboard or PND) in his or her car, most of them (77%) answered they use it frequently. On the other hand, only the 8% of the respondents use navigation systems on every trip.

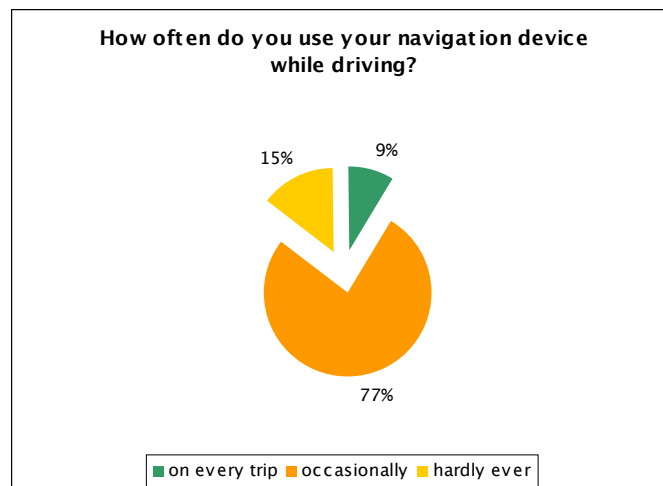


Figure 8: Frequency of use of GPS navigation

Values are quite homogeneous across different countries.

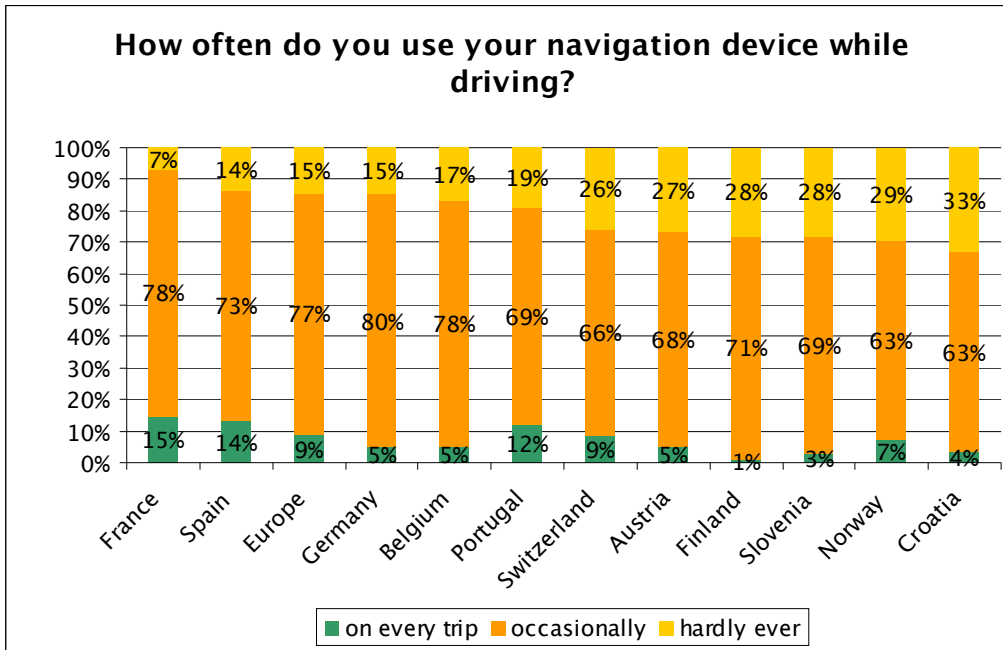


Figure 9: Frequency of use of GPS navigation, per country

With regards to the use of specific services, the address search is the most widely used service, with 54%. Brand specific services (e.g. TomTom's HD Traffic) are quite used, with 48%; about 39% of the drivers search for Points Of Interest (POIs) and TMC traffic information is used by 38% of those respondents with a GPS navigation system.

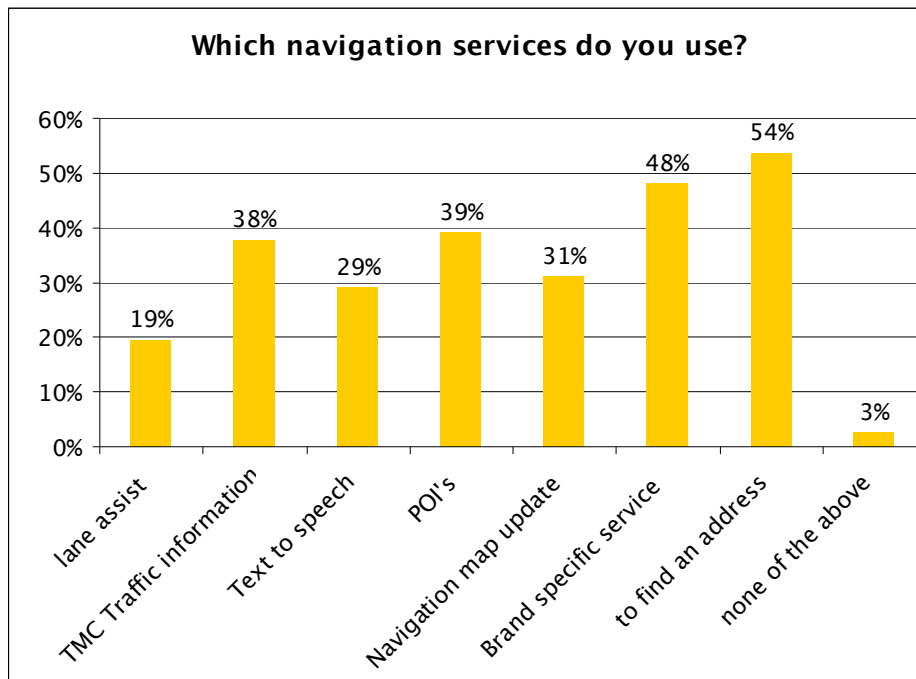
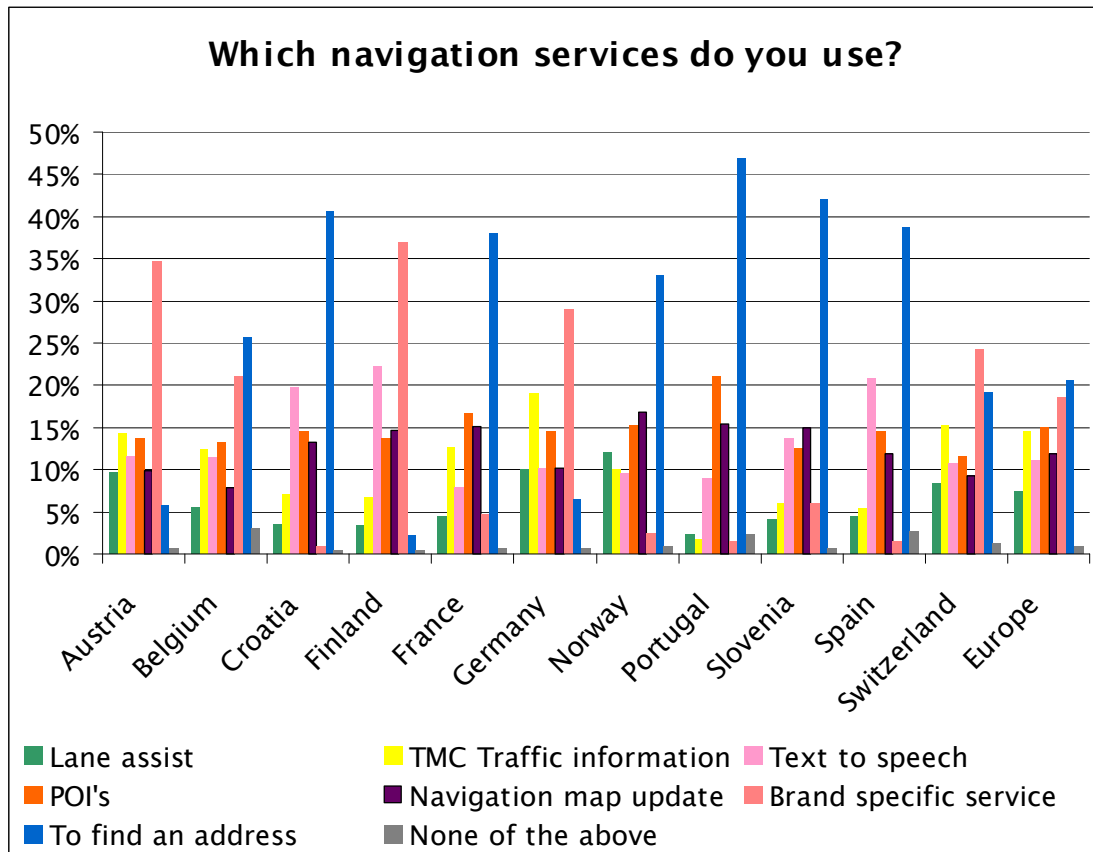


Figure 10: Use of specific services

The next figure shows the split per country:



Country	Lane assist	TMC Traffic information	Text to speech	POI's	Navigation map update	Brand specific service	To find an address	None
Austria	10%	14%	12%	14%	10%	35%	6%	1%
Belgium	6%	12%	11%	13%	8%	21%	26%	3%
Croatia	4%	7%	20%	15%	13%	1%	41%	0%
Finland	3%	7%	22%	14%	15%	37%	2%	0%
France	4%	13%	8%	17%	15%	5%	38%	1%
Germany	10%	19%	10%	14%	10%	29%	6%	1%
Norway	12%	10%	10%	15%	17%	2%	33%	1%
Portugal	2%	2%	9%	21%	15%	1%	47%	2%
Slovenia	4%	6%	14%	13%	15%	6%	42%	1%
Spain	5%	5%	21%	15%	12%	2%	39%	3%
Switzerland	8%	15%	11%	12%	9%	24%	19%	1%
Total	7%	14%	11%	15%	12%	18%	21%	1%

Figures 11, 12: Use of specific services, per country

The use of commercial assistance systems is more widespread in Finland, Austria, Germany and Switzerland as compared with other countries such as Spain, Portugal and Croatia. The use of traffic information via TMC follows the same downward trend in these countries.

## 2.2. Availability and use of ADAS for eco-driving



Only 14% of drivers have no ADAS system for eco-driving, but the penetration of each system is rather low:

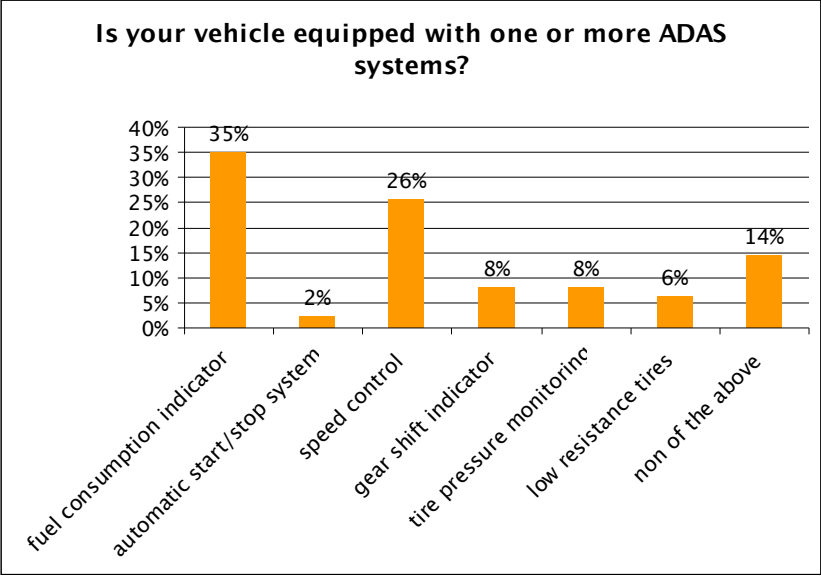
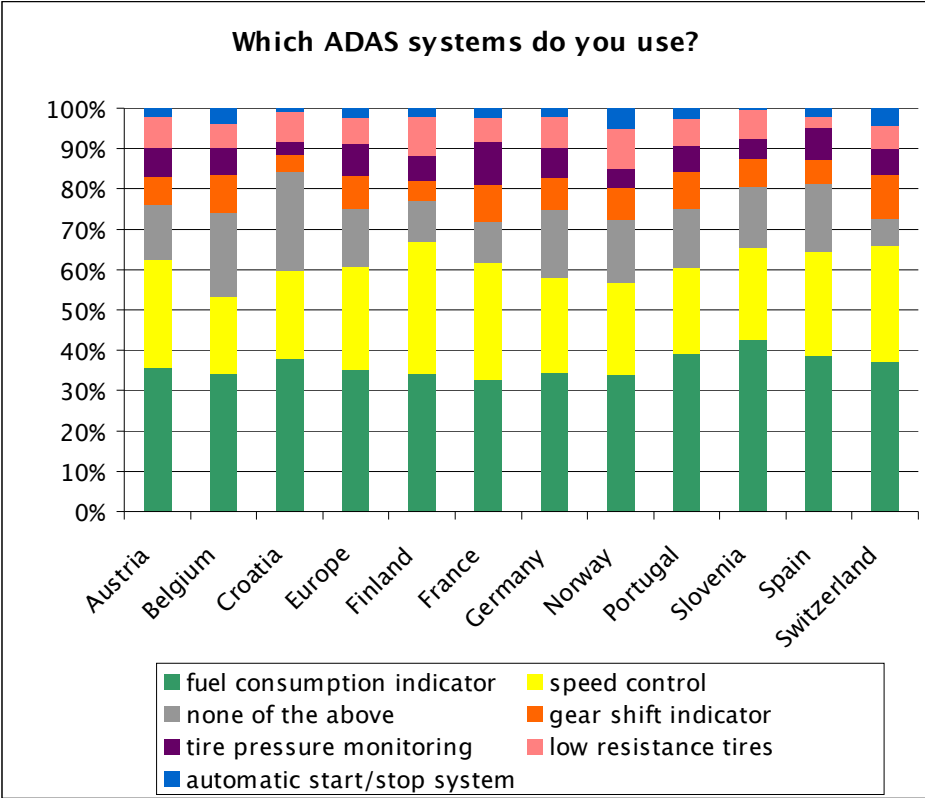


Figure 13: Availability of assistant systems

The most widespread service, with 35%, is the “fuel consumption indicator” along with the “speed control”, with 26%. The less common is the “automatic start/stop system” with a penetration of only 2%.



Country	fuel consumption indicator	speed control	gear shift indicator	tire pressure monitoring	low resistance tires	automatic start/stop system	non of the above
Austria	36%	27%	7%	7%	8%	2%	13%
Belgium	34%	19%	9%	7%	6%	4%	21%
Croatia	38%	22%	4%	3%	7%	1%	25%
Europe	35%	26%	8%	8%	6%	2%	14%
Finland	34%	33%	5%	6%	10%	2%	10%
France	33%	29%	9%	11%	6%	3%	10%
Germany	35%	24%	8%	7%	8%	2%	17%
Norway	34%	23%	8%	5%	10%	5%	15%
Portugal	39%	21%	9%	6%	6%	3%	15%
Slovenia	43%	22%	7%	5%	7%	0%	15%
Spain	39%	26%	6%	8%	3%	2%	17%
Switzerland	37%	29%	11%	7%	6%	4%	6%

Figures 14, 15: Availability of assistant systems, per country

Switzerland has the lowest percentage of drivers who have no support system in their cars while Croatia has the highest percentage.

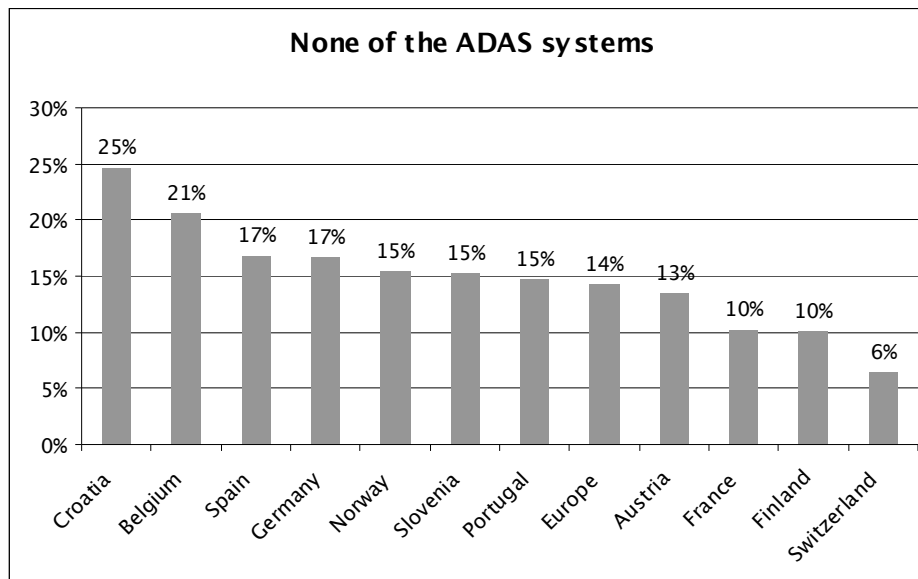


Figure 16: Non-availability of assistant systems, per country

### 2.3. Environmental awareness

The respondents were asked to evaluate the following two statements:

- "As the environment is important to me, I check my fuel consumption regularly"
- "I do not think that CO<sub>2</sub> emissions of vehicles have a big impact on climate compared with that of industries"

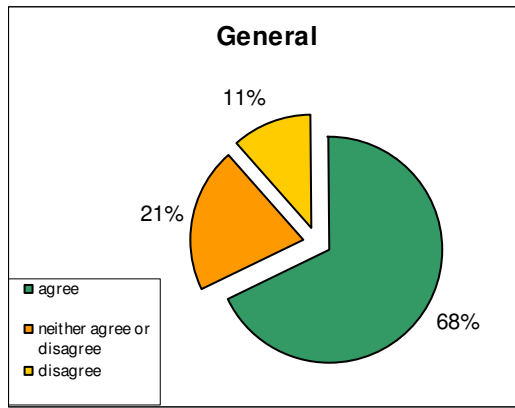


Figure 17: Environmental awareness

By gender, 71% of men agreed with the first statement while only 55% of women did so.

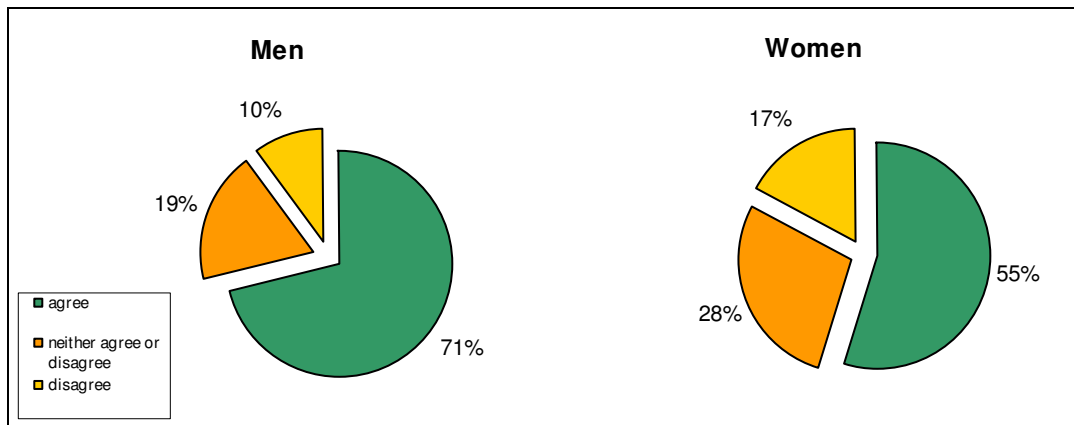


Figure 18: Environmental awareness, per gender

The fuel consumption concern increases with age:

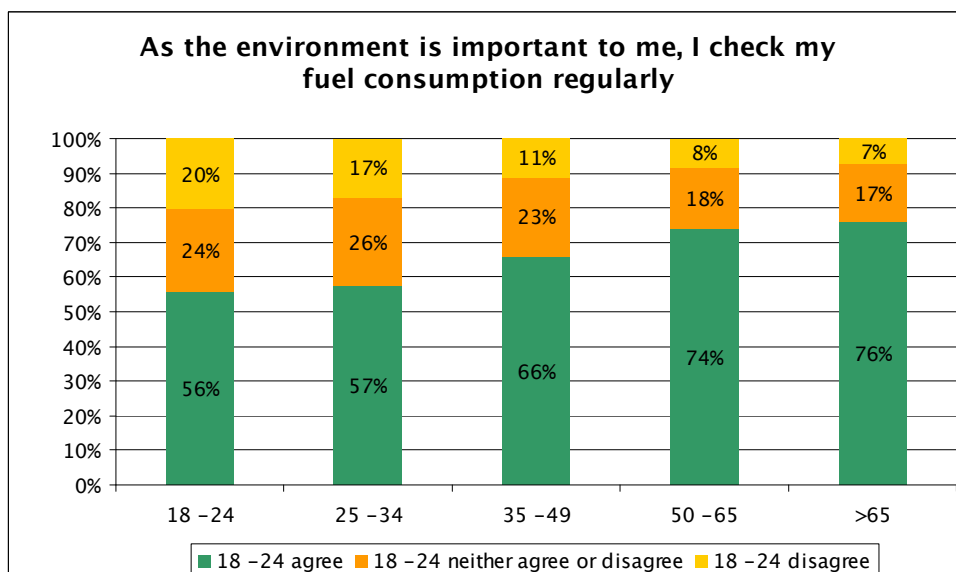


Figure 19: Environmental awareness, per age

Drivers of vehicles that consume less are not as concerned about consumption as drivers of vehicles with a high level of consumption:

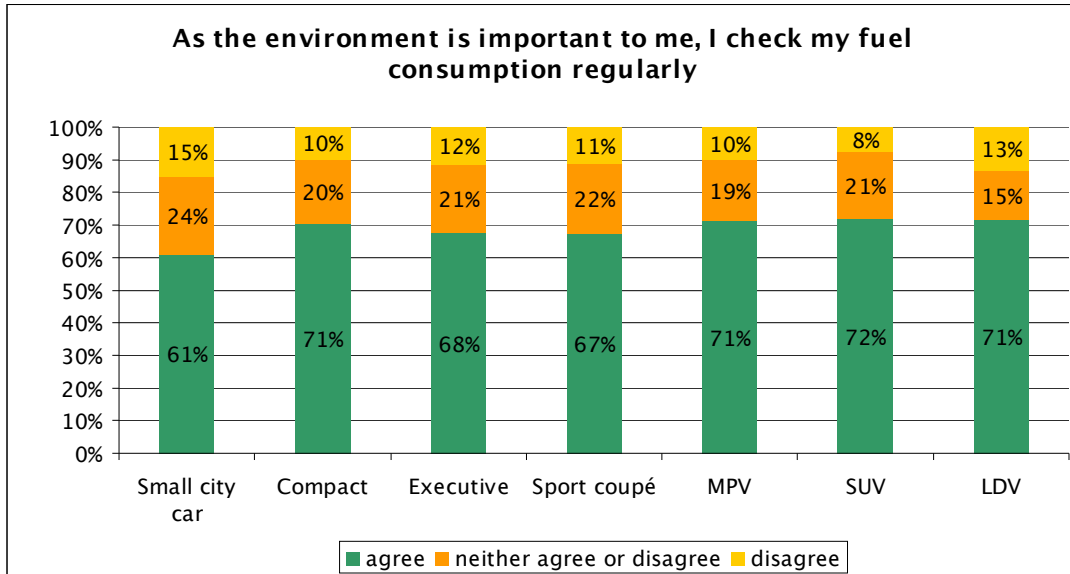


Figure 20: Environmental awareness, per type of vehicle

Regarding the second statement, 28% of the respondents believe that the impact of pollution caused by vehicles is not relevant compared with that of industries while 44% of those surveyed believe that this does have a big impact on climate.

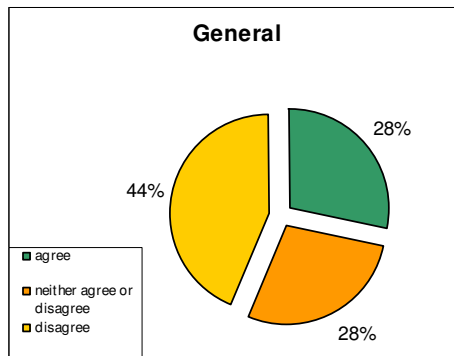


Figure 21: Impact on climate of vehicles emissions

The previous statement results, by gender:

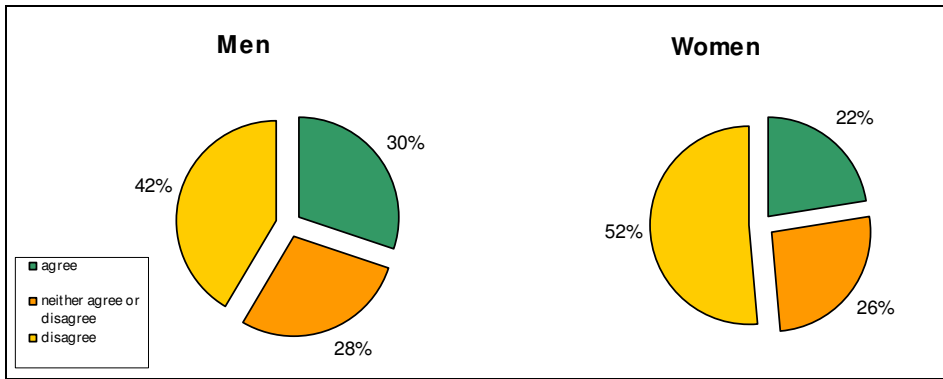


Figure 22: Impact on climate of vehicles emissions, per gender

By age, younger generations less agree with the previous statement so that we can sense a change in education and people's perspective regarding the effect of driving on the environment.

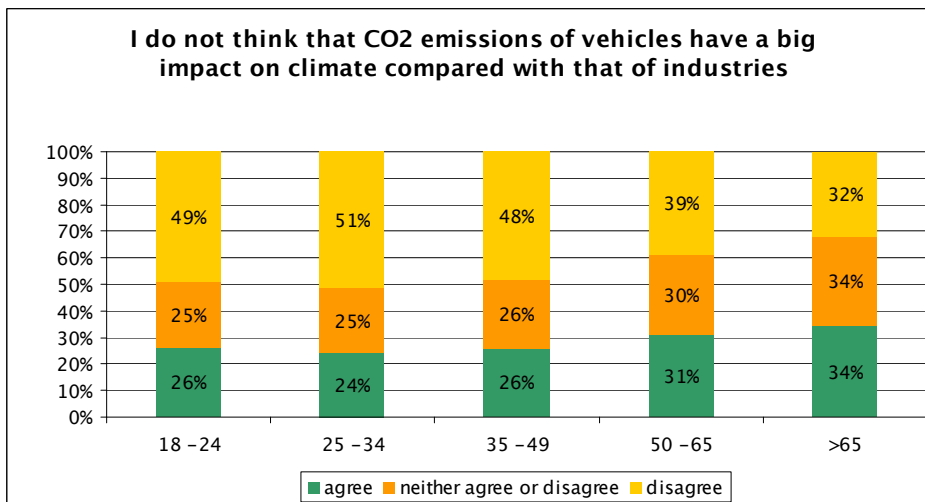


Figure 23: Impact on climate of vehicles emissions, per age

Distribution per type of vehicle is:

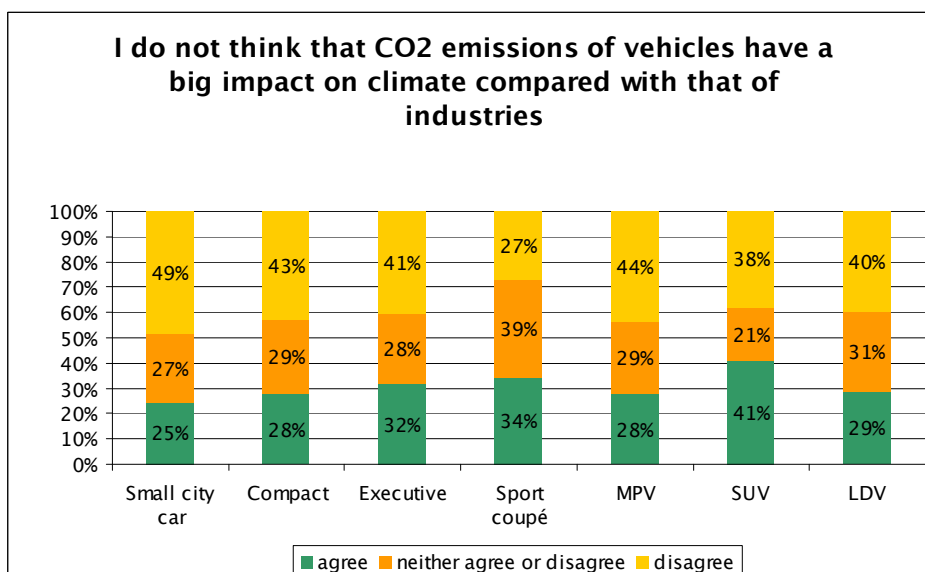


Figure 24: Impact on climate of vehicles emissions, per type of vehicle

Distribution by country is:

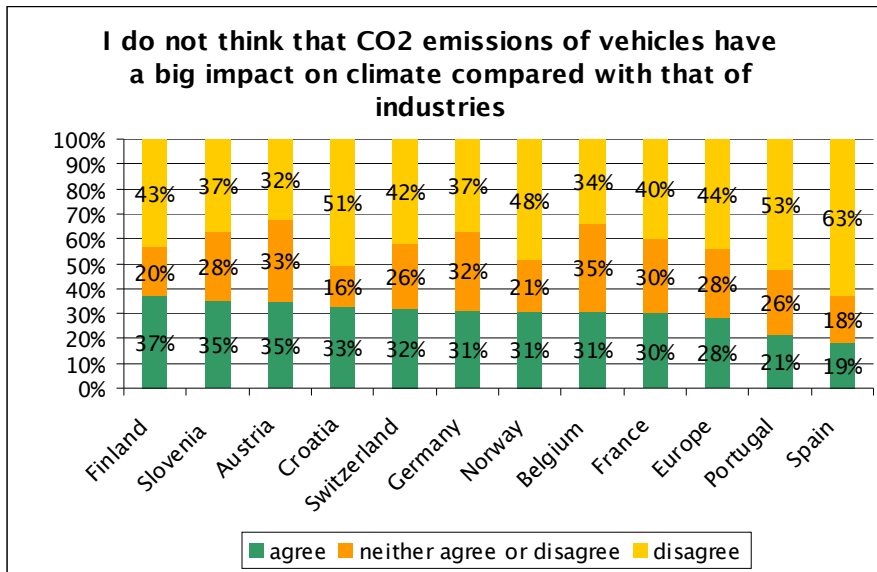


Figure 25: Impact on climate of vehicles emissions, per country

#### 2.4. Psychological aspects

To evaluate the attitude of drivers when driving, respondents were asked to evaluate the following statement: "Driving gives me a feeling of freedom".

50% of respondents agree with the statement meaning that driving for them is more than just a means of transport.

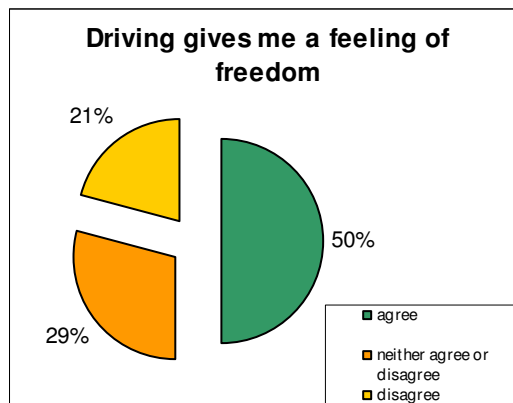


Figure 26: Driver attitude

54% of women agreed with 49% of men.

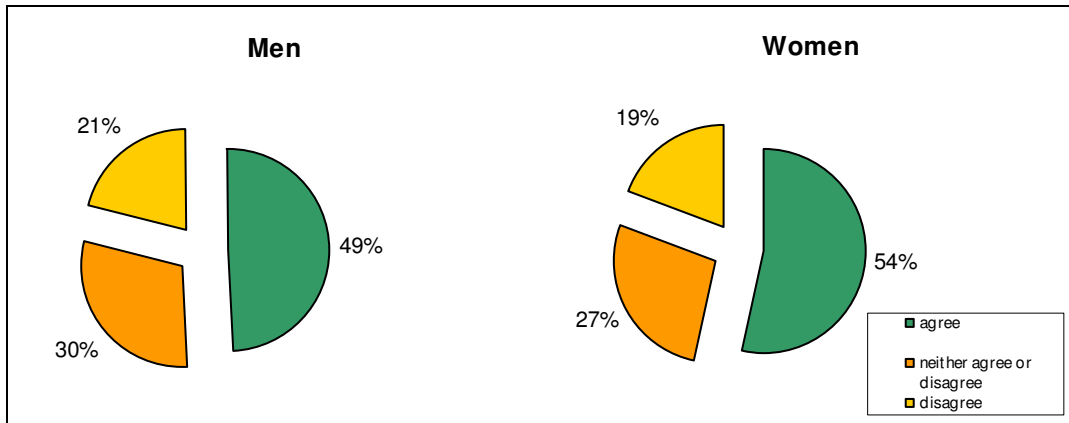


Figure 27: Driver attitude, per gender

By age, young people are who most feel this sense of freedom:

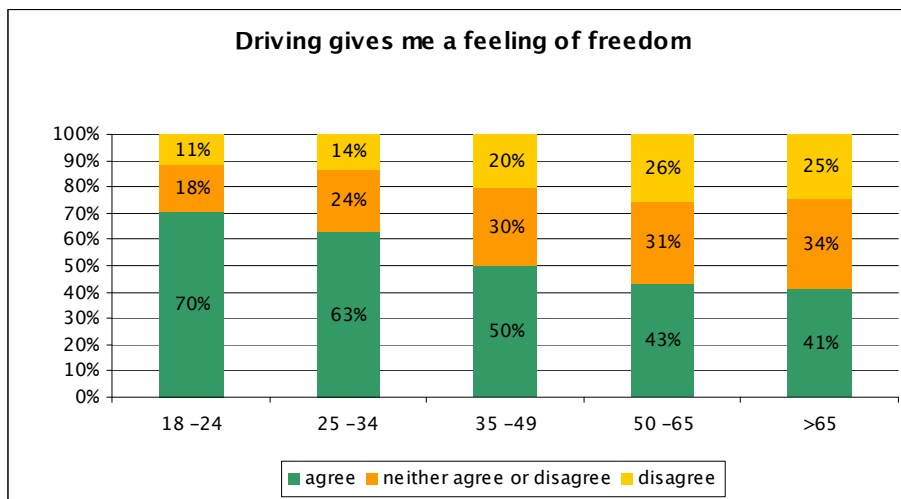


Figure 28: Driver attitude, per age

As for the type of vehicle, the sport cars owners are who most have this feeling when driving:

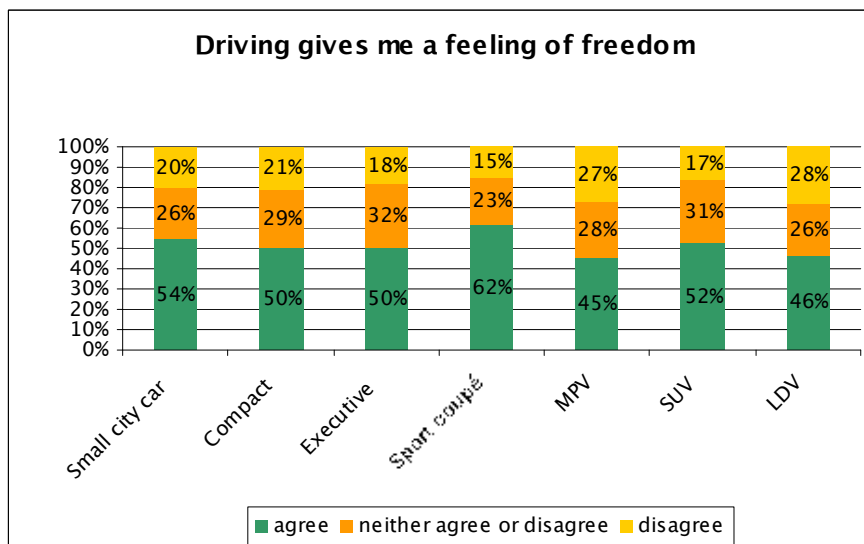


Figure 29: Driver attitude, per type of vehicle

Distribution by country is:

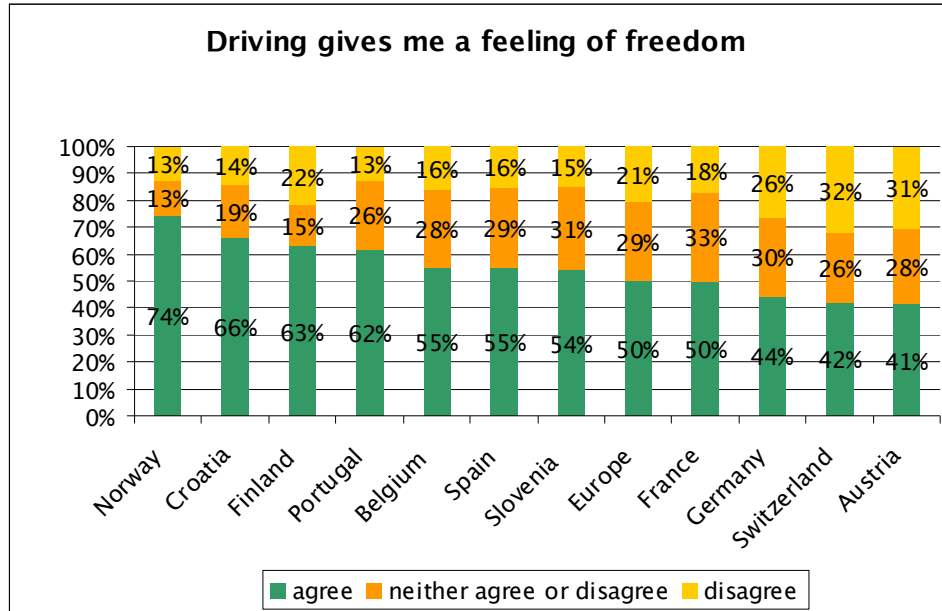


Figure 30: Driver attitude, per country

## 2.5. Perception and acceptance of future assistance systems for more efficient driving

For this part of the study several scenarios of possible future services were presented to the respondents. These services are meant to help improve driving efficiency such as dynamic routing depending on traffic conditions, discounts or benefits for implementing an efficient driving or definition of efficient route that can result in increased travel time but also a reduction in consumption and CO<sub>2</sub> emissions.

The overall parameters studied were:

- Privacy issues
- Ability to disconnect
- Usefulness
- Willingness to pay

### 2.5.1. Privacy issues

The different scenarios show situations where the vehicle sends information to the infrastructure. One example is the reduction in toll rates depending on the driver eco-performance; in this scenario, the vehicle must send driver performance parameters to the infrastructure for it to determine whether discount should be applied or not.

Respondents were asked to assess the following statement: "Uses too much personal information". The overall results were the following:



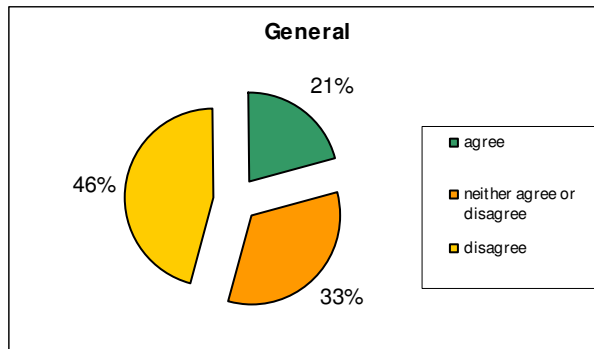


Figure 31: Privacy

Only 21% of respondents think this service uses too much information. The valuation of men and women is quite similar at this point:

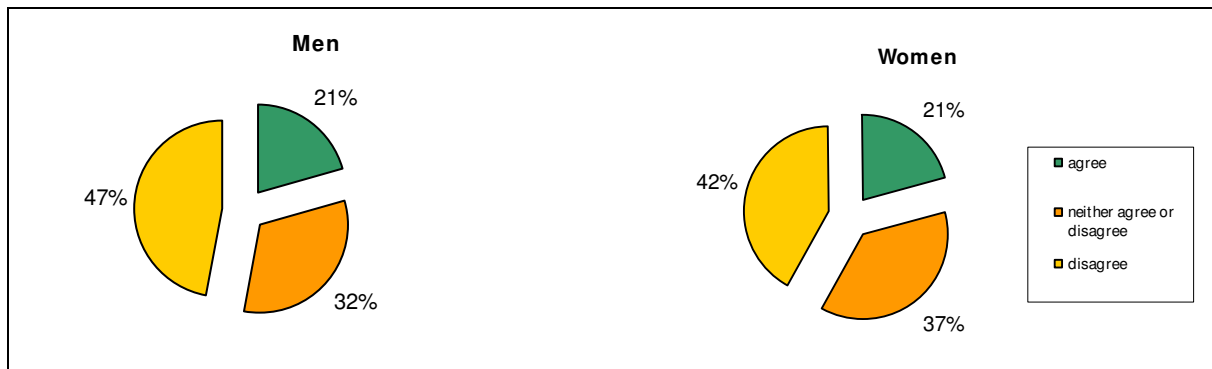


Figure 32: Privacy, per gender

By age, there are no significant differences. It must be noticed that young people are more receptive to the sharing of personal information because more than 50% in the range of 18-24 do not think too much information is used.

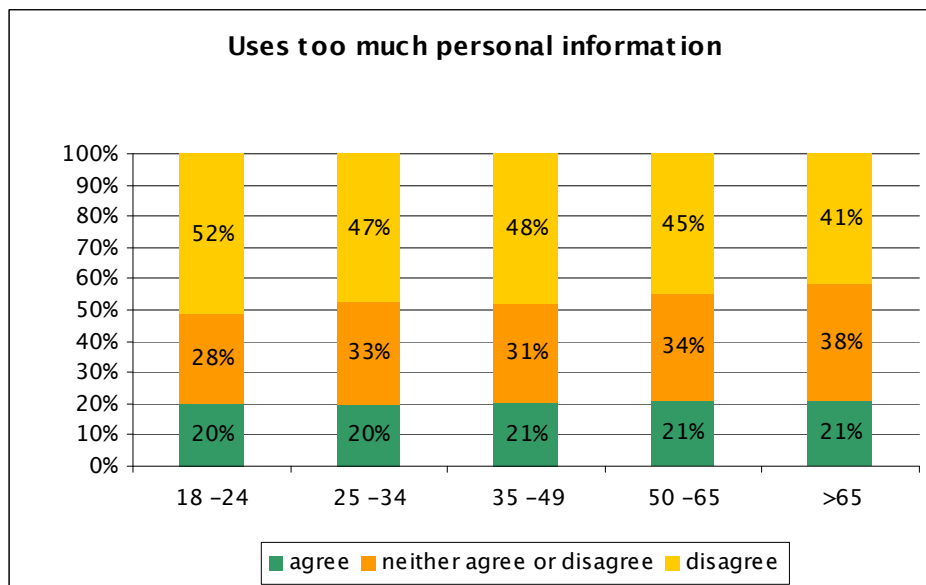


Figure 33: Privacy, per age

Distribution by type of vehicle is:

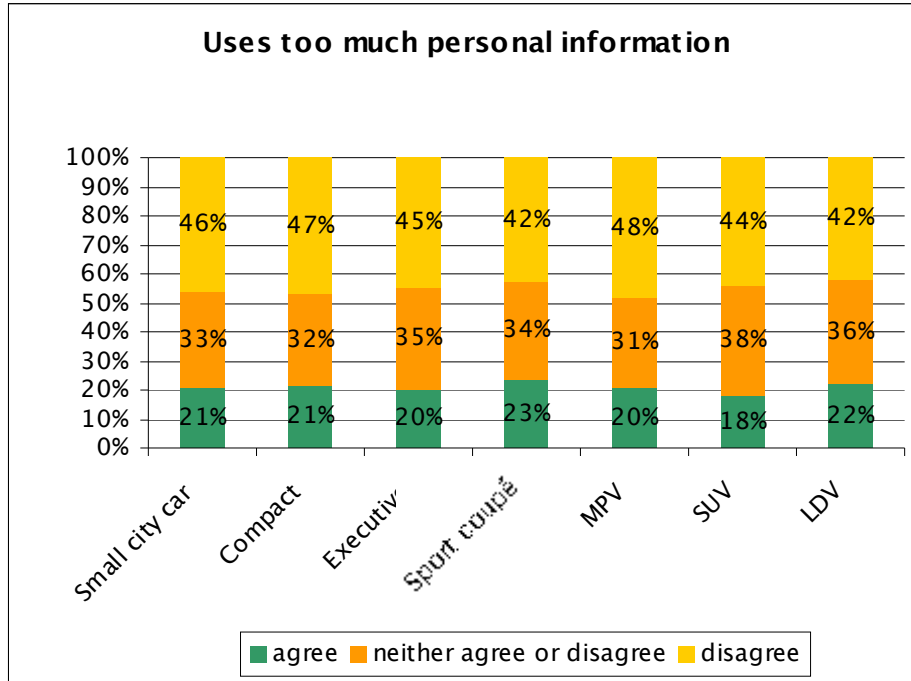


Figure 34: Privacy, per type of vehicle

Distribution by country is:

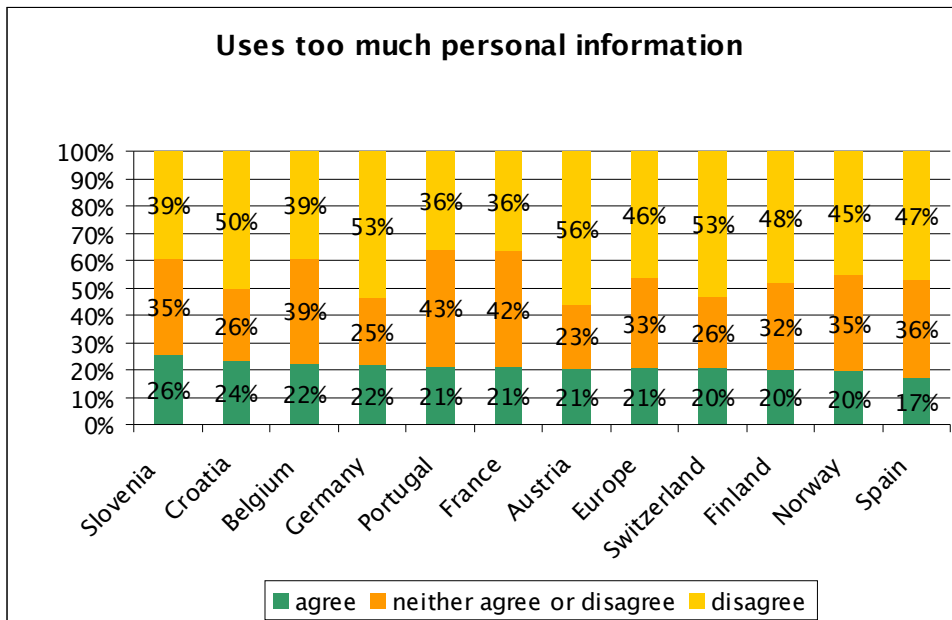


Figure 35: Privacy, per country

2.5.2. Ability to disconnect

Many of the scenarios show how the system gives advice or recommendations to the driver and this may cause rejection due to excessive interventionism. For this reason, respondents were asked to assess the following statement: "Should be turned off if I want".

Overall, 74% thought that assistance systems should be turned off if they want.

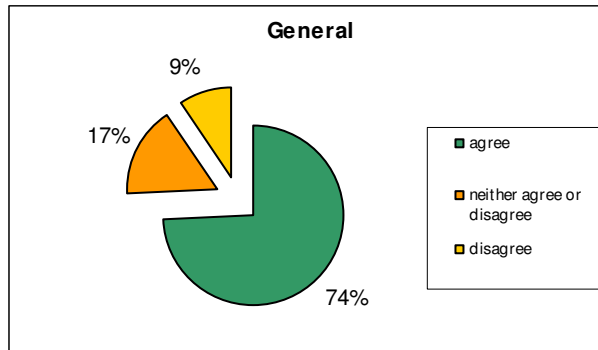


Figure 36: Ability to disconnect

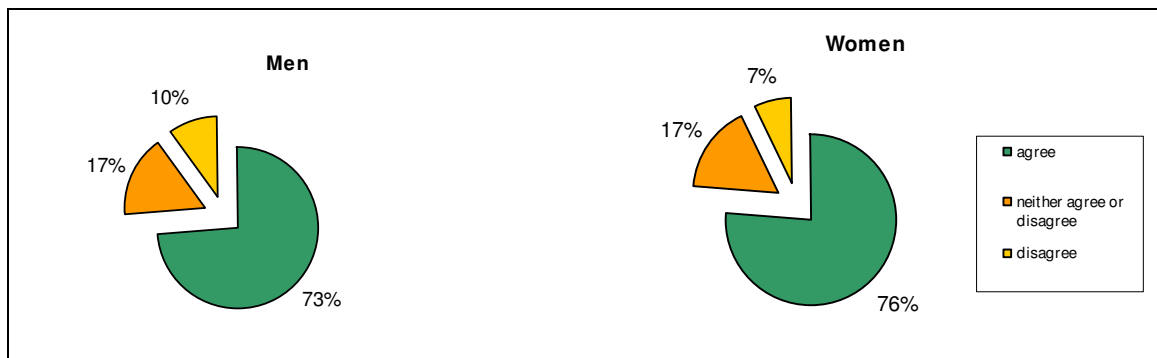


Figure 37: Ability to disconnect, per gender

Distribution per age is:

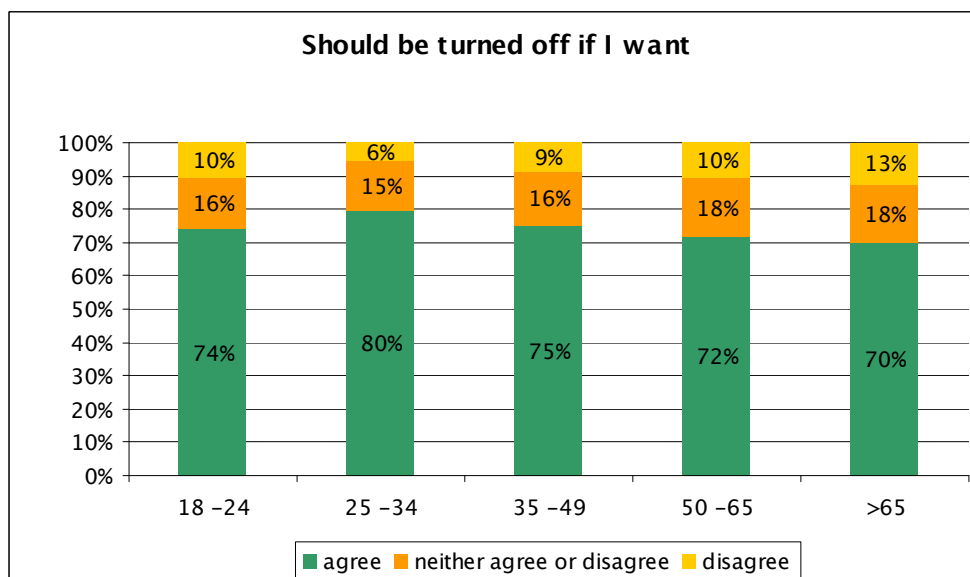


Figure 38: Ability to disconnect, per age

The drivers of higher-end vehicles are most in favor of turning off assistance systems but the differences are not significant.

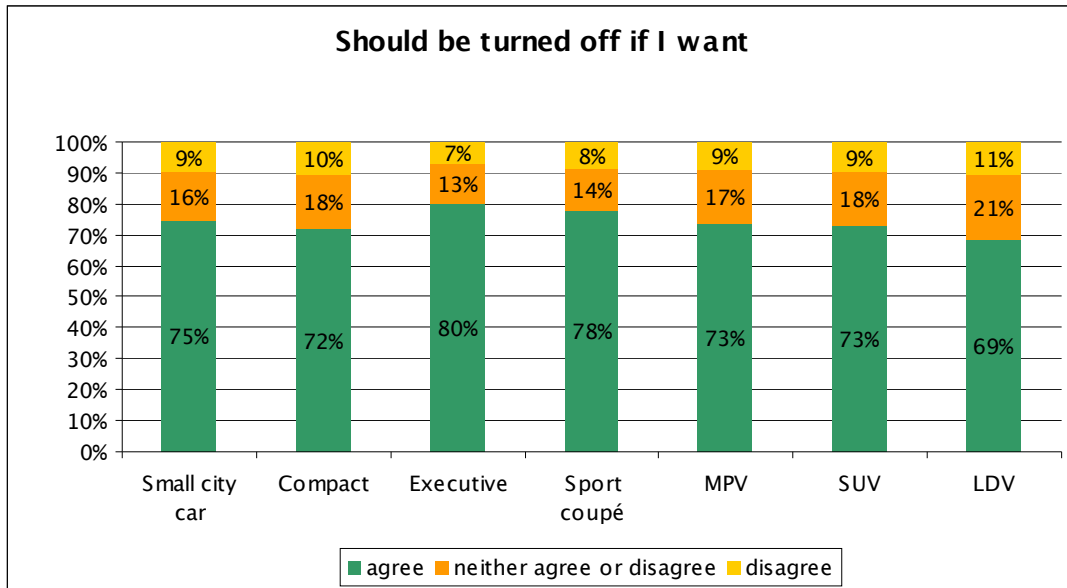


Figure 39: Ability to disconnect, per type of vehicle

Distribution by country is:

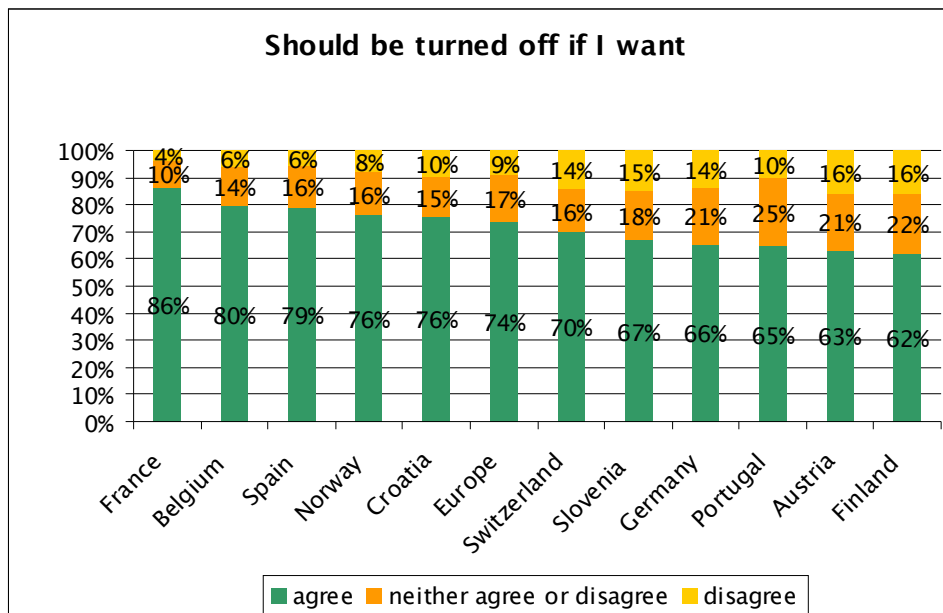


Figure 40: Ability to disconnect, per country

### 2.5.3. Usefulness

One of the most important issues is whether users believe that these assistance systems can be helpful. 68% think these may be useful while only 11% believe not.

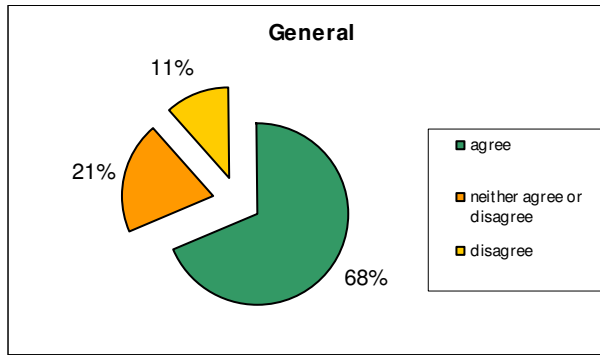


Figure 41: Usefulness

By gender, results are very similar:

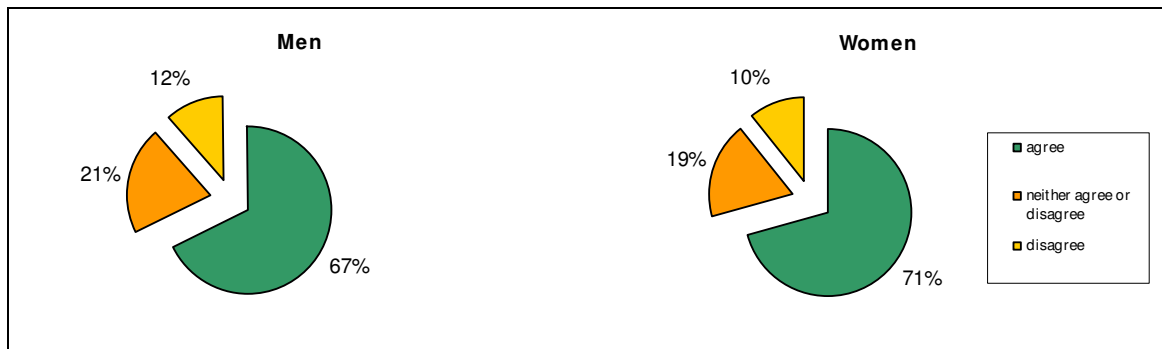


Figure 42: Usefulness, per gender

Age group observed no significant differences:

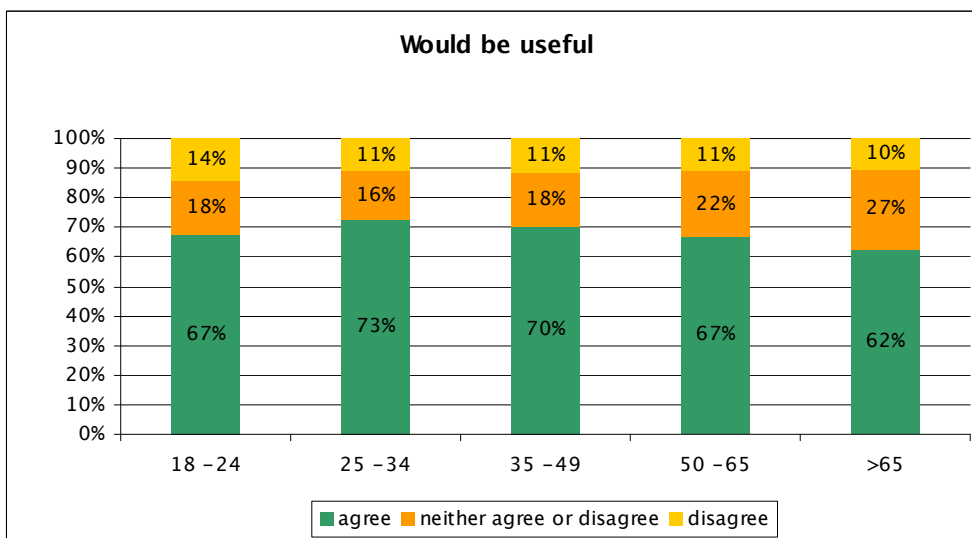


Figure 43: Usefulness, per age

Drivers of high-end vehicles along with drivers of LDV are the most skeptical about these systems. In turn, these groups were who most valued the option to disconnect them while driving if desired.

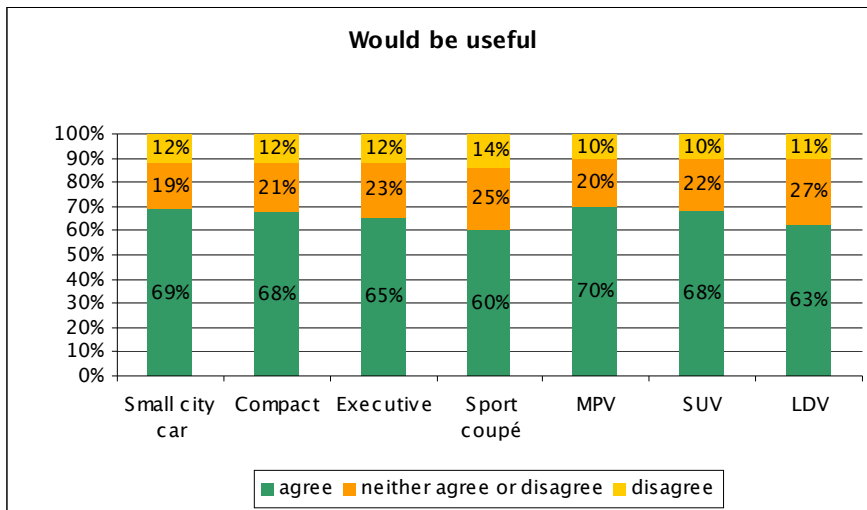


Figure 44: Usefulness, per type of vehicle

Distribution by country is:

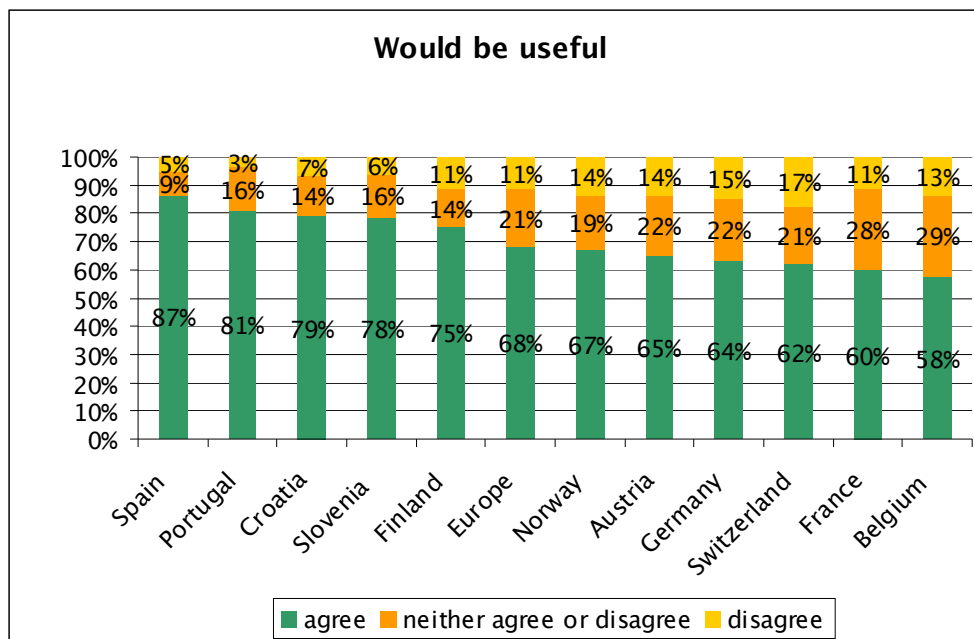


Figure 45: Usefulness, per country

#### 2.5.4. Willingness to pay

Finally, willingness to pay for assistance systems that would help reduce fuel consumption and thus pollutant emissions and save fuel costs has been assessed. Only 17% were willing to pay for such services, versus 59% who would not:

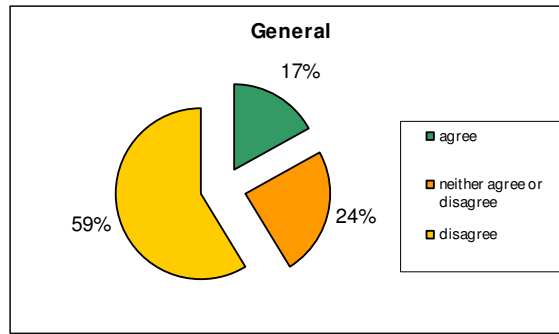


Figure 46: Willingness to pay

By gender:

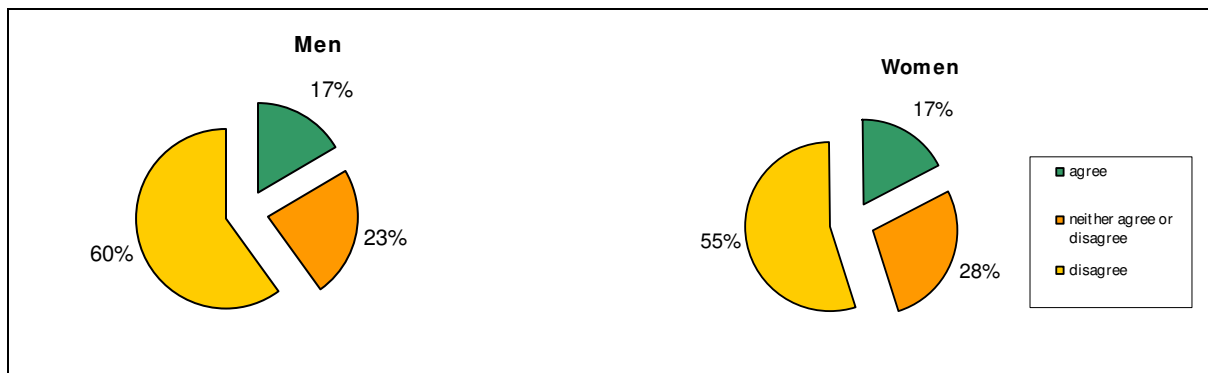


Figure 47: Willingness to pay, per gender

By age, no significant differences were observed and the trend continues in all ranges:

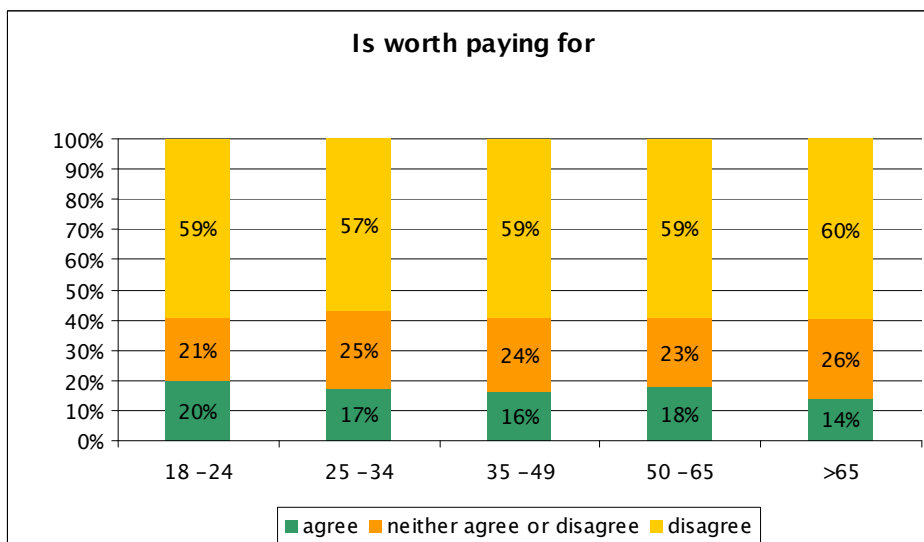


Figure 48: Willingness to pay, per age

Depending on the vehicle type there are also no significant differences, although the drivers of sport and commercial vehicles are less willing to pay. These groups were who less valued the usefulness of the presented systems.

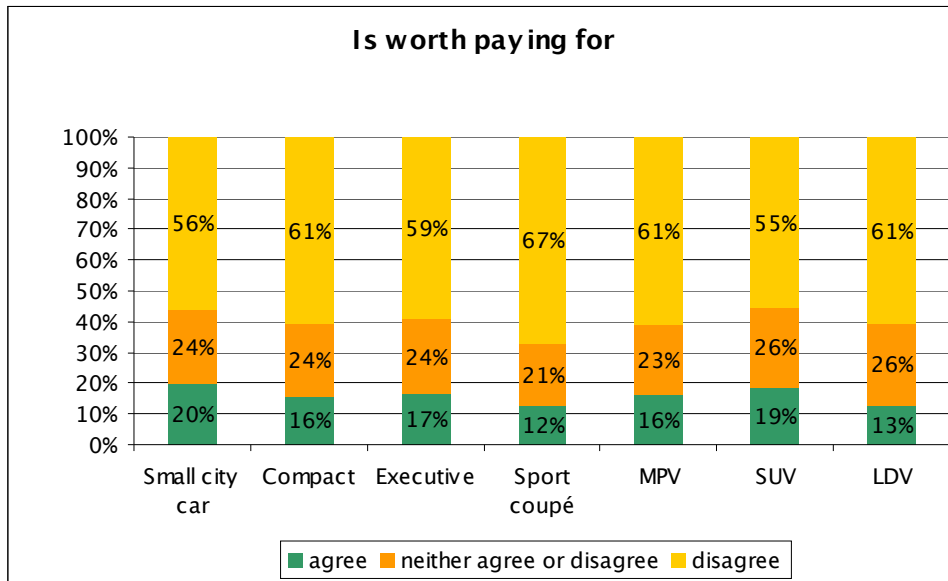


Figure 49: Willingness to pay, per type of vehicle

Differences between countries are significant. While Slovenia and Portugal reach or exceed 50% payment predisposition, France and Germany were only around 10%:

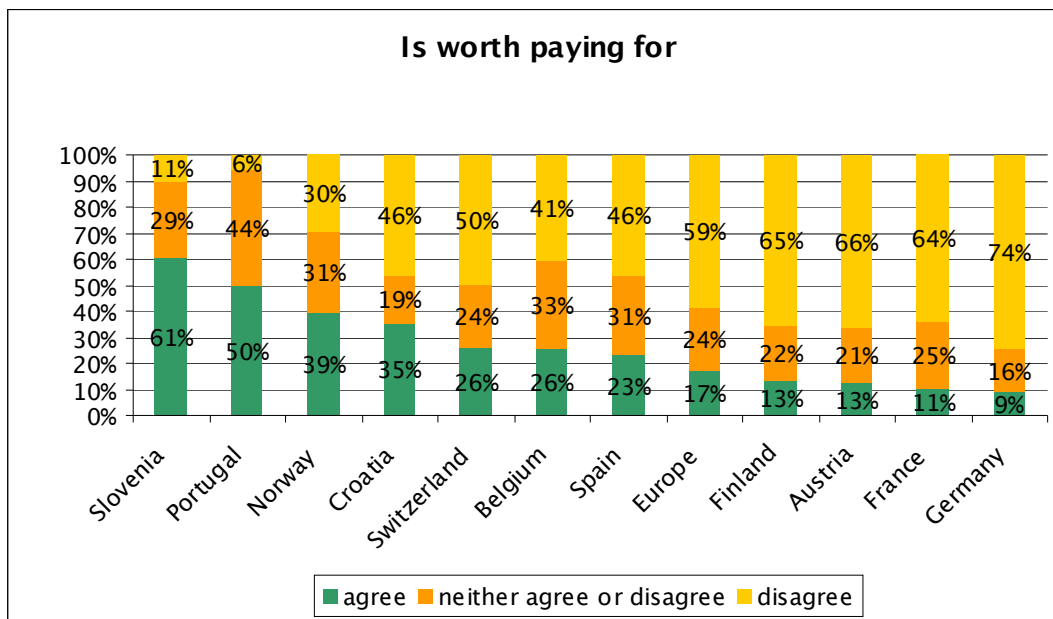


Figure 50: Willingness to pay, per country



### 3. Conclusions

The survey carried out by EuroTEST to more than 6,000 drivers across 11 countries in Europe has shown the following conclusions regarding the drivers' use and acceptance of eco-friendly systems, as well as their awareness on the environmental impact of mobility:

#### *Navigation systems and ADAS for eco-driving:*

- 68% of respondents have a navigation system, either onboard or portable, although 15% of those who have one hardly ever make use of it.
- Navigation systems ownership is significantly more widespread among males (75%) than females (49%), but there are no significant differences across ages.
- As regard to countries, Northern and Central European countries such as Germany, Finland or France have market penetrations over 70%, whereas Eastern and Southern European countries such as Croatia, Spain or Slovenia have market penetrations around 50%.
- Advanced driver assistance systems can help drivers do a better eco-performance when driving, although these systems are not widespread among vehicles, yet. The most common systems (fuel consumption indicators and speed control) have market penetrations of 35% or below, and 14% of respondents declared not to have any.

#### *Environmental awareness and psychological attitude:*

- The awareness for the environment is increasingly present among the drivers (68% of drivers declare to check their fuel consumption while driving). Again, the differences between males and females are significant (71% of males vs. 55% of female drivers).
- The younger generations show a lower concern for their fuel consumption (56%) as compared to older generations (76%).
- 50% of respondents declared that driving provides them a feeling of freedom, being the younger drivers the most favourable to this idea (70%) as compared with drivers over 65 years (41%). The differences can also be important when comparing drivers of sport cars (62%) with drivers of MPV (45%).

#### *Acceptance of assistance systems for a more efficient driving:*

- 74% European drivers think that new systems that help them achieve a more eco-friendly driving performance should always have the ability to be disconnected, although 68% of the respondents recognised the positive usefulness of those systems.
- A low proportion of European drivers (17%), irrespective of their gender, age and vehicle type, would agree to pay money for eco-friendly systems.
- Up to 21% of European drivers think that future eco-friendly systems may be using personal information in excess.

#### Line to take (to be discussed):

- Road users take-up rate of driving assistance systems, such as navigation devices, can become relatively high (68%) if they see a good use of them.
- Currently there is still a low penetration of in-vehicle systems that help road users to perform a more eco-friendly driving (e.g. less than 35% of vehicles equipped with fuel consumption indicators), although 68% European drivers recognise the usefulness of those systems.
- For future applications, drivers are quite open to provide information for eco-friendly systems (only 21% concern for privacy), but are quite reluctant to pay additional fees for them (only 17%).