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Verkehrs- und Sozialanalysen  
A - 1 0 4 0 , Danhausergasse 6 / 4  
Fon: (+43 1) 504 15 46, Fax: (+43 1) 504 15 48  
e - mail: ralf.risser@factum.at

# Identification of the impact of social and mentality differences between different EU regions on driver needs

## Deliverable 6 of Task Force A

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## Content

Content .....	3
1 Executive Summary .....	4
2 Introduction.....	5
3 Objective.....	5
4 The methodological challenges in cross-cultural research .....	6
5 State of the art.....	7
5.1 EU-Projects .....	7
5.1.1 SARTRE3.....	7
5.1.2 ADVISORS.....	11
5.1.3 EUROBAROMETER, qualitative studies, May 2006 - Users' attitudes towards electronic active safety systems in vehicles.....	12
5.1.4 SPECIAL EUROBAROMETER 2006: Use of Intelligent Systems in Vehicles, Special Eurobarometer 267/Wave 65,4 – TNSA Opinion & Social, Directorate General (DG) Information Society and Media & DG Communication.....	13
5.2 International Project of other type .....	14
Personal navigation services, comparison of Finnish, German and Italian users .....	14
5.3 National Projects .....	14
5.3.1 Czech drivers and modern in-vehicle systems (Hanzlíková I., Marousková, L., Centrum dopravního výzkumu, 2005).....	15
5.3.2 INVENT (Nutzergerechte Technik = intelligent traffic and user-friendly technology) .....	16
6 Questions still to be asked .....	17
6.1 Traffic safety and mobility .....	17
6.2 IT systems.....	17
6.3 Social and Mentality aspects.....	17
6.4 Data acquisition.....	18
7 Conclusions .....	19
References .....	20
Annex: Workshop minutes from the Turku workshop.....	21

## 1 Executive Summary

The aim of deliverable A.6 is to identify the impact of social and mentality differences between different EU regions, with respect to driver needs. The deliverable should be built on already available data from various existing projects.

The work started with a workshop on 29<sup>th</sup> of September during the TFA conference in Turku where all partners were invited to provide their ideas about the structure and content of the deliverable. The results of the discussion in Turku are presented in the Annex of this document.

The next step was a work package meeting during the HUMANIST plenary meeting in December in Soesterberg. It was decided there, that the deliverable should include already existing projects such as SARTRE, ADVISORS and other international projects, as well as national projects, but also information about the challenge of cross-cultural research and research questions, which have not been thoroughly answered so far.

Summaries of the following EU-projects SARTRE, ADVISORS, EUROBAROMETER and Special EUROBAROMETER 2006 are presented in this deliverable. In addition, a few other studies are summarized. Those studies have focused on one or more European countries and are as follows: a study about a project involving Finnish, German and Italian end users, a German project – INVENT – focusing on the acceptance of ADA-systems developed during the project and a Czech study focusing on the opinions of Czech drivers on new telematics.

The projects mentioned within this deliverable show, that there exists at least some on-going research about differences between countries, which is always connected to challenges concerning validity, reliability, etc. of the collected data, but also inspires for discussion and future research.

## 2 Introduction

Culture is a very broad concept and includes many different aspects. Generally, it is at least challenging if possible at all to analyse relationships between, for instance, new ITS equipment and culture in an objective and empirically based way: In the view of this working group such identification tends to be more based on understanding and common-sense. This is especially true with respect to culture: It is difficult, if possible at all, to observe appropriately and by making use of quantifiable variables the many relevant characteristics of complex systems like, e.g., socio-technical ones, and how they interact. This is an obstacle for establishing relationships between new telematic systems and logically related aspects in an objective way. Culture consists of many details that cannot be observed well – they are mindsets of people, or happen off those areas where external observers can become active in a valid, reliable, and objective way. Thus in a paper like the present one we rely on rather simplified heuristics or ad-hoc theories.

## 3 Objective

The objective of this deliverable is to give some suggestions for how identify the impact of social and mentality differences between different EU regions, with respect to driver needs. The objective is presented in the technical annex of Humanist as follows:

*“Differences exist between the EU regions as concerns the usefulness of ITS technologies. For instance considering some rather "old" technologies, we know that opinions differ between north and south European countries about automatic gearbox. This Working paper will try to identify factors of differences such as social or cultural ones and also gender, and to determine possible consequences for the spreading of ITS technology. For instance, depending on the standard of living, a device could be considered as very useful in a given country, and only as an accessory in another one. Based on the existing studies (e.g. SARTRE) and data collected in the WP A.1 and WP A.2, the most important cultural differences will be listed. A joint survey could be launched in the various EU regions for comparison purpose on this topic.” (HUMANIST Annex, November 2003)*

## **4 The methodological challenges in cross-cultural research**

Although European cross-cultural studies on various topics (in behavioural and social sciences) are increasingly popular and easier to conduct due to the research funds granted by the European commission, there are certain methodological and theoretical challenges related. The challenges can be summarised as validity issues, sampling issues, epistemological issues and theoretical issues. All these issues contribute to the overall feasibility and applicability of the results and findings, yet to somewhat different aspects of it.

### **Validity issues**

The most obvious challenge in cross-cultural studies is related to the validity or the equivalence of the used research instrument (e.g., scale, questionnaire). For example, the questions formulated with different languages should still hold the same meaning and measure the same thing despite the language or the cultural context. A valid research instrument is based on a thorough conceptualisation of the studied phenomena, and the process of operationalising a given phenomenon should be well grounded. Also, the process of developing a valid measurement/instrument requires knowledge on societies and cultures, as the universal and the culture specific aspects have to be acknowledged in the process. Especially translation problems pose a significant validity challenge in cross-European research, as the translations are necessary, but the resources to be used can be scarce. Flaws in the translation can result in erroneous conclusions about substantial cultural differences when the differences in fact are just a result of linguistic and semantic inconsistency between the different language versions of an instrument.

### **Sampling issues**

In cross-cultural studies and comparisons, one of the challenges is to define "culture" i.e., the macro unit the study wants to operate with. Is it nationality, residence in a given country, is it a specific region of a country or something else that could capture the concept "culture". The next step is to sample participants, or the micro level units, from that context.

The macro level units can be derived from a theory/conceptual framework, but the procedures and methods of sampling are more challenging. In comparative research, the sampling is however of crucial importance, as the participants sampled should be, indeed, comparable. Thus, the sampling methods and principles should be the same in each country (culture).

### **Epistemological issues**

In the context of cross-cultural research and comparisons, the epistemological questions become relevant. There can be distinguished roughly two perspectives; the emic and the etic perspective. While the first focuses on the uniqueness of cultures and the constructs and concepts that are culture specific, the latter focuses on the universalities and the similarities and the constructs that are shared by different societies. Without adopting the etic perspective, cultural comparisons would not be possible (as there would not be common constructs to compare). However, without the emic perspective, the research has a risk of ethnocentric fallacy. That is, features of a certain culture or a society are explained without any deeper understanding of the specificity of that culture. It is thus crucial, that the researchers have knowledge not only on the most obvious socio-economic features of a certain culture/country but also on the cultural features specific for that community. Sometimes, a multi-cultural research team can be of help to overcome the epistemological problems related to cross-cultural research. HUMANIST NOE can be considered as such a team.

### **Theoretical issues**

The theoretical roots of any cross-cultural comparisons or studies are in the cultural anthropology, and some level of theoretical understanding is required when designing and carrying out a cross-cultural study. In order to be able to understand and explain the differences (or stability) between cultures/societies /communities, the research has to be theoretically anchored. The minimum requirement is to have a theoretical framework about whether (or why) there should be differences (or similarities). This theory driven base is reflected on the design related choices of the study; for example, the choice of macro-level units (i.e., the choice of countries or cultures) to be compared should be theory-driven and based on some (well-grounded) typology.

Further, if the assumption is that there are differences (idiographic perspective), there should be a theoretical framework/anchoring explicating the mechanisms that link the macro level (culture/society) to the micro level (individual's responses and behaviour) and cause the (cultural) variation. If the assumption on the other hand is that there are similarities to be found, there should be theoretical framework specifying the universal mechanisms that operate despite the cultural specificity.

Without a theoretical framework the findings of the study are likely to be difficult to explain, or the explanations tend to be created on an ad hoc basis. This means that there are no tools or models to predict the possible changes or to point out mechanisms that regulate the cultural differences or similarities. But it does not mean that, if no theories are available, yet, work based on an ad-hoc basis is useless for developing a theory and for pointing out research necessities.

### **Concluding remarks**

Cross-cultural studies and comparisons are methodologically and theoretically challenging type of research. However, if one strives for theoretical anchoring and for awareness of the methodological challenges, it is possible to achieve results that can enhance the understanding of cultural differences and contribute to further - empirical and non-empirical - research.

## **5 State of the art**

In the following, main results of a few chosen projects are presented. Projects have been conducted and summarized by the Humanist partners listed in the cover page.

### **5.1 EU-PROJECTS**

#### **5.1.1 SARTRE3**

SARTRE, is the acronym for "Social Attitudes to Road Traffic Risk in Europe", a European research project, which investigated the representations of different aspects of road risk with European car drivers. This research is based on a questionnaire survey conducted in each country participating to the project, with a representative sample of car drivers.

The main objectives of the SARTRE project are to describe the attitudes and reported behaviours of European drivers with regard to road traffic risk; to evaluate their approval of or opposition to regulations and safety measures; to search for underlying social or cultural factors leading to various types of behaviour with respect to risk; and lastly to recommend actions to be taken into consideration for improving road safety policies.

This survey was conducted for the third time, allowing for the identification of attitude and behaviour change over time. The first SARTRE survey was carried out in 15 European countries, from October 1991 to June 1992. The second one was carried out in 19 countries, from October 1996 to April 1997, using the same methods regarding the survey. At last, 23 European countries were involved in the third survey that was carried out from September 2002 to April 2003. With respect to the previous surveys, the questionnaire was improved by removing a few obsolete questions and by adding new ones in order to reflect the most recent concerns or developments in road safety in Europe. Especially new questions have permitted to investigate the attitudes of the European drivers towards new technologies, like driver assistance systems, driver communication and comfort systems, and also systems that prevent traffic violations and enforcement systems.

The participant countries were the following:

5 Southern countries: Cyprus, Greece, Italy, Portugal, Spain

3 Northern countries: Denmark, Finland, Sweden

7 Eastern countries: Czech Republic, Estonia, Hungary, Poland, Slovakia, Slovenia, Croatia

8 Western countries: Austria, Belgium, France, Germany, Ireland, Netherlands, United Kingdom, Switzerland

The results of SARTRE3 provide a snapshot of the attitudes, opinions and behaviours of European drivers. The data collected through the survey are unique due to the size of the sample (with over 24,000 drivers interviewed) and the length of the questionnaire (with over 100 questions asked).

A summary of some results of this project concerning attitudes and enforcement follows here:

### **Attitudes towards telematic systems**

Within the SARTRE framework, some analyses of the attitudes of drivers towards specific intelligent transport systems (ITS) took place. Two types of questions were asked: the first involved the usefulness of the systems and the second their popularity, trying to identify the need for these systems and the acceptance by drivers in the different countries. These attitudes may reflect several issues including the familiarity of drivers with new technologies, the attitudes towards road safety (for the related ITS only) and the scepticism towards installing specific features inside the vehicle (e.g. black box).

First, the question 'would you find it useful to have a device in your car like X?' was posed. The investigated systems were a navigation system, a congestion warning system, a speed limiter, an alco-lock device and a fatigue warning system. The general functionality of the systems was described to the respondents in broad terms and further technical details were not provided (HMI etc). The general trends illustrated that the first two systems were defined as more useful by the drivers regardless of their nationality.

For the navigation system the proportion of drivers that considered it fairly or very useful ranged from around 50% (in Denmark, Germany, Netherlands, Belgium and Finland) with a low peak of 44% in Austria to more than 70% (in Greece, Spain and Poland). The congestion warning device was considered to be more useful, and the respective percentages ranged from just over 50% (in Germany and Austria) to over 80% (in Poland, Croatia, Italy, Cyprus, Greece, Slovenia, the United Kingdom, Spain and Portugal). As these two systems are not considered to limit the freedom of the driver, the differences in the percentages may reflect that drivers get used to new technologies, and that they perceive them as reliable in the respective traffic situations.

As for the other three systems, the speed limiter was considered as the least useful one, with 26% of the drivers answering that it would be fairly or very useful. The alco-lock device and the fatigue warning system were considered to be more useful, with the respective portion being 32%. In particular, the portion of drivers considering the different systems useful ranged from 15% (in Austria) to 51% (in Ireland) for the speed limiter, from 12% (in Austria) to 64% (in Sweden) for the alco-lock device and from 15% (in Switzerland) to 55% (in Ireland) for the fatigue warning system. The attitudes of the drivers within the same country between the systems were consistent, with the exception of Sweden where only 19% (hence below average) would consider a speed limiter as useful, while 64% considered the alco-lock a useful system.

The second question that was asked was: 'How much would you be in favour of system X?'. Driver acceptability was investigated for the following systems: speed limiter, electronic identification of enforcement and of services (considered as two separate systems) and black box, providing evidence for speed and dangerous driving behaviour, and for identifying accident causes (considered as two separate systems). The most popular system (in average) was considered to be the black box used for accident causation evidence (36%) being followed by the other black box application (28%), the speed limiter (28%), the e-identification of services (25%) and the least popular was the e-identification of enforcement (20%).

In the case of the speed limiter, both usefulness and acceptance were investigated. The pattern of acceptance was similar to that of usefulness between countries. Hence, in general in countries in which the system was considered to be useful drivers would also accept it. In addition, the 'favourability' index scored more than the usefulness one, which is somewhat an unexpected result. The system is least popular in the Czech Republic, Switzerland, Estonia and the Netherlands (scoring around 17%) and most popular in Ireland (58%) and Cyprus (41%). The differences between the different countries are greater for the favourability index than for the usefulness one.

The portion of drivers being 'very much' in favour of the two e-identification applications also varied between countries. For the application used to provide services to the users, the portions ranged from 10% (in Austria) to 48% (Italy and Slovenia). The respective portions for the application that would be used for enforcement ranged from 9% (in Italy, Germany and Switzerland) to 40% (in Ireland). In most of the countries the attitudes towards these two systems were consistent.

Last, the acceptance of black box systems was investigated. Drivers in favour of the black box which would be used to provide evidence for speeding or dangerous driving ranged from around 15% (in the Czech Republic, Austria and Switzerland) to over 40% (in Ireland, the United Kingdom and Italy). Drivers in favour of the black box which would provide evidence to help identify accident causes ranged from below 20% (in

the Czech Republic and Switzerland) to over 40% (in 9 countries – a substantially high proportion was observed in Ireland, 63%). Once again, in most countries the attitudes towards these two systems were consistent.

### **Attitudes towards road safety in general**

Next to the attitudes about telematic systems also relevant information about the European drivers' attitudes and behaviour towards road safety have been studied within the SARTRE3 project. More precisely, the project permits to identify the social and cultural differences regarding reported driving behaviour, acceptance of countermeasures, and attitudes towards the causes of road accidents. The differences are presented below according to drivers' demographic characteristics, such as gender and age, according to drivers' life situation and living conditions, such as occupation, income, personal situation, education, living area, and driving habits and according to the country characteristics, new member states and former member states.

There is a clear distinction regarding attitudes and behaviour towards road safety between on the one hand, males and younger drivers and on the other hand, females and older drivers. All age groups associated with females, excluding the youngest group (< 24 years old) tend to display reduced risk behaviour. In opposite, all age groups associated with males, excluding the oldest group (> 55 years old) tend to display increased risk behaviour. Thus, females and older drivers reveal more road safety commitment, than males and younger drivers. For example, males and young drivers more often say that they enjoy driving fast than females. There is also a slight tendency for females and older drivers to be more in favour of law enforcement and road safety campaigns.

The group of younger drivers appears as the more problematic group of drivers. Both male and female younger drivers report to engaging in more potentially risky behaviours than other drivers of the same gender, such as following the vehicle in front too closely, overtaking when they can just it, not giving way at pedestrian crossings and using a mobile phone while driving. Unsafe driving practices decreases for both genders as the age increases. Amongst the drivers, younger drivers recognize more the danger implied in their driving style: they report to driving more dangerously and faster than the others. But, based on this study, there is no significant difference concerning driving under the effects of alcohol between younger drivers and the other drivers. In general younger males tend to exhibit more risky behaviour than females. In opposite, young females have less experience of driving due to a lower annual mileage.

The analysis of drivers' life situation and living conditions permits to identify other groups that need special attention for their attitudes concerning road safety:

- “Singles enjoy driving fast more often than married people, are less concerned by road accidents and do not as much support governmental road safety measures. Less often they think that following too closely, using mobile phones while driving and driving when tired are causes of road accidents.”
- “People with high income report more often that they enjoy driving fast and less often that they are concerned by road accidents. They support enforcement of traffic laws slightly less than people with low income.”
- “Drivers with a high annual mileage enjoy driving fast more often than drivers with a lower exposure. They are not as much in favour of more enforcement of traffic laws as well. Furthermore they see the usage of mobile phones and driving fast less often as causes of road accidents”.
- “Drivers with elementary education mentioned more often that technical causes, such as bald tyres or poor brakes play a role in road accidents, than the people with higher education”.

There are not major differences between new member states and former member states regarding reported behaviour, governmental efforts and supposed causes leading to road accidents. The drivers from new member states report slightly less often to enjoy driving fast. They are more in favour of stricter enforcement of traffic regulations and less in favour of road safety campaigns. More people from new member states consider bad technical conditions of vehicle or poorly maintained roads to be a major cause of road accidents, whereas drivers' behaviour was less often seen as a cause of accidents. On the other hand, drivers from former member states see drugs, mobile phones, following too closely and driving when tired more often as causes of road accidents. There are no differences in the way the two groups report on driving too fast as a cause of road accidents.

### **Enforcement**

Enforcement of the highway-code and the traffic rules increase law abiding driving, and hence road safety. It is a rather cost-effective method, which however is considered not to be very popular amongst the driver populations. Still, the enforcement of specific offences is more accepted than that of others. For example, enforcement concerning intoxicated drivers is more accepted and approved of than concerning speeding, with the help of speed cameras. The way enforcement is applied in different countries and the attitudes of drivers of different nationalities towards it depends on various factors, including the road safety level of a country and, presumably, the mentality of its citizens. In the SARTRE project, several issues related to enforcement were investigated and this section reports the main findings related to the attitudes towards enforcement.

One general question that was posed involved whether more enforcement should be applied. The answers ranged from around (51% in Switzerland, 52% in Sweden, 54% in Germany) being in favour or strongly in favour of an increase in enforcement to more than 90% (94% in Croatia, 91% in the Czech Republic, 90% in Italy). The differences in answers may represent both the differences in road safety levels, difference in the current amount of enforcing of the different countries, and of the driver mentalities. For example, in Sweden where accident rates are quite low, less need for enforcement may be felt than in other countries.

Another question that illustrates driver attitudes towards enforcement is how often drivers give signals to other drivers in order to warn them of speeding checks downstream. Once again, the results vary largely. Only 4% of the Finnish, 7% of the Irish, 11% of the Spanish and Danish participants answered that they warn other drivers (often, very often or always). On the other hand, the proportion of warning drivers was 51% in Cyprus, 46% in Croatia and 43% in Estonia and Hungary.

Participants were also asked whether the penalties for drink-driving or speeding should be more severe. Results showed that penalties for DUI (Driving Under the Influence) are more accepted than speeding penalties, in all countries. In addition, the range of answers is wider for speeding than DUI offences. In particular, only 40% (38% in Sweden, 40% in Switzerland) of the driving population believe that speeding penalties should be more severe, with this portion being double in other countries (80% in Finland and Portugal). For DUI the corresponding percentages range between 75% and 95%, with them being 90% or more in 13 out of the 23 countries. This shows that regardless of the number of accidents in each country and the different mentalities, certain aspects of the improper driving behaviour are strongly condemned everywhere.

An important measure of recording the efficiency of road safety enforcement is the driver perception of the possibility of them being monitored and checked for driving offences. The higher this possibility is considered to be, the more cautious the drivers are. In addition, this possibility is also dependant on the actual number of controls that the drivers have undergone. This measure serves as a more efficient representation of drivers following the highway-code rules, than the actual number of police/speed cameras etc controls. The portion of drivers who believe that they would be checked for speeding on a 'typical' journey ranges between around 8% (in Ireland, Finland, Italy and Denmark – with a single low of around 3% in Sweden) to over 35% (in the United Kingdom, Cyprus, Slovenia) with the majority of values being between 10%-20%. The portion of drivers who believe that they would be checked concerning DUI offences on a 'typical' journey is lower and ranges between 1-2% (in Ireland, United Kingdom, Poland, Denmark and Sweden) to around 15% (in Greece, Cyprus, Slovakia) and takes the high value of 28% in Slovenia. The differences in values between the controls for these two offences mainly result from the fact that in the first case controls can be manual (ie with police presence) as for DUI checks, but also automatic (e.g., speed enforcement cameras) and hence their frequency is also actually greater. In addition, the majority of DUI controls take place at night, when driver mobility decreases and hence the frequency of being checked is also lower.

Another attribute of enforcement involves the actual portion of drivers who have been caught committing highway-code offences. Respondents were asked whether they had been detected and punished for speeding, not wearing a seat-belt and drunk driving during the previous 3 years. This value is a measure of frequency of police checks and driving behaviour. For speeding offences, the portion of caught drivers ranges from around 7%-9% (in Portugal, France, Sweden and United Kingdom) up to 47% (Netherlands) with the majority of values being around 15%-20%. For seat-belt wearing the corresponding proportions were much lower, and ranged between 2%-3% (in 7 out of the 23 countries) to 14%-17% (in Slovenia, Slovakia, Croatia and Cyprus). In the United Kingdom the portion of drivers being caught without wearing seat-belts was only 0.7%. Last, the respective portions of drivers being caught for DUI were even lower, ranging from 0%-2% (in 16 out of the 23 countries) to around 4%-6% (in Greece, Croatia, Slovakia and Slovenia). A substantially higher portion of drivers being caught for DUI was observed in Cyprus with 12,7 %. In general,

higher portions of drivers committing these offences and being caught are observed in the new EU members. As pointed out before, this can be a result either actual improper behaviour or the extent of enforcement in each country.

Last, participants were asked for the most efficient way for enforcement in relation to the offences of speeding and DUI. Once again different perceptions were recorded for the different countries. The lowest portion of drivers who believe that technical systems should be fitted in their cars to prevent them from speeding was around 12%-15% (in the Czech Republic, Switzerland, Estonia, Austria and Germany) and the highest around 36%-40% (in Greece, France and Cyprus). In Ireland, the portion was higher, 50%. For DUI offences the respective portion ranged from around 12% (in the Czech Republic, Switzerland, Austria and Germany) to 48%-51% (in Ireland, France, Finland and Poland). In Sweden the portion was recorded to be as high as 64%. In general, respondents' attitudes towards introducing technical measures in order to target these two offences was quite similar between the two offences, with the exception of Sweden, where the portion was lower than the average in relation to speeding, but substantially higher for DUI. As this similarity – except for Sweden – was not so obvious in previous issues, one can assume that the predominant factor in drivers' responses was their attitudes towards in-vehicle technologies rather than road safety issues.

In the light of enforcement using ITS, further analyses were conducted and participants were asked whether they would be in favour of specific devices. For speeding the devices that were used in the questionnaire were the speed limiter, speed cameras and the black box, and for DUI the drive ignition lock. As an average, the favourite device was the drive ignition lock (average 34%) being followed by the speed cameras (average 29%), the black box (average 28%) and the speed limiter (average 26%). The portion of drivers that chose the different systems varied between countries, with drivers from Germany, Switzerland and Austria being the ones that would be in favour of such devices least and those from Ireland, France, Cyprus and the United Kingdom most.

### **Summary**

The SARTRE results emphasise the different attitudes of drivers towards traffic safety, enforcement, and intelligent transport systems. These differences may result from a number of factors including driver mentality and prevailing conditions such as economic factors, road safety and/or traffic conditions, and familiarity with new technologies. Based on the results one cannot define the exact influence of each of these parameters on the formation of driver attitudes. For this, much further analysis on a more microscopic level is required.

### **5.1.2 ADVISORS**

Overall objective of the 5<sup>th</sup> Framework project ADVISORS (Action for Advanced Driver Assistance and Vehicle Control Systems Implementation, Standardisation, Optimum Use of the Road Network and Safety) was to develop a comprehensive framework to analyse, assess and predict the implications of a range of ADA systems and combinations of different functions/systems. Workpackage 2: "Actor interests, acceptance, responsibilities and users' awareness enhancement" was specifically designed to investigate interests of different actors, user acceptance and ADAS implementation priorities. In addition, the national differences in user opinions were to be listed.

The main questions of the "user acceptance" task were as follows:

1. Which ADA-functions do different driver groups, e.g. private and professional drivers, find most attractive?
2. How does the level of intervention affect user opinions?
3. How important a factor is the expected price of the ADA-system?

To find the user preferences, a methodology called "conjoint-analysis" was used. Conjoint-analysis is a specific multivariate tool which allows the respondent to give an opinion on each system or product overall. The conjoint-analysis then enables the researcher to investigate which individual parts or attributes of the systems affect user opinions positively and which negatively. Therefore, the overall result is proportional acceptance/preference of each system (part of the system) compared to other studied systems.

Altogether three ADA-systems: ACC, ISA, and navigation, were included into the questionnaire. Each of the systems was given different attributes, i.e. price, level of intervention and "intelligence" of the system. For instance, ACC "intelligence" attributes were: "distance warning", "vehicle following" and "stop&go". Different price-levels were 500€, 1500€ and 2500€.

Data was collected with similar questionnaires in the Czech Republic, Finland, Germany, Greece, Italy, and the Netherlands. The Questionnaire was translated to each national language. In total, over 900 drivers participated in the study. The number of respondents per country varied between 90 and 195. The results give quite a good overview of the differences between the countries in the time of the study (2000).

The most relevant country-specific results reflecting mentality differences are listed below:

- In Greece, private drivers have quite negative opinions on ISA, especially the intervening system. Drivers of heavy vehicles were less negative to ISA.
- In the Czech Republic, both private and professional drivers considered navigation to be the most important function. In addition, professional drivers found ISA (intervening) to be highly important, too.
- In Italy, the participating drivers were mostly concerned about the price of the systems. Professional drivers found ACC to be most important, whereas private drivers preferred navigation.
- In Germany, navigation with real time traffic information was the most preferred one of the studied functions. German drivers had quite negative opinions of intervening ISA.
- In the Netherlands navigation was found to be the most important ADAS function. In addition, especially private drivers indicated the price to be an important factor. Professional drivers also found ACC to be important, especially on the highways.
- In Finland, drivers indicated the price to be a major factor affecting the attractiveness of each system and ACC being the most important function. In addition, Finnish drivers were less willing to have real-time navigation – just static route information. Moreover, Finnish drivers were not willing to have intervening ISA, either.

The most important differences in the country specific results are a) the importance of the price and b) the need for real-time navigation. In addition, there seemed to be some differences in the acceptance of ISA. The acceptance of the intervening system was quite low among all the participant countries. The local circumstances, specifically the amount of congestions, are probably the most important background factor affecting the importance of real-time navigation. On the other hand, one could also claim that the less technology drivers have in their cars currently (the older the cars they are driving), the more important a factor is the price of the systems. The clearest difference was the one between the drivers in Germany and the rest of the participant countries.

### **5.1.3 EUROBAROMETER, qualitative studies, May 2006 - Users' attitudes towards electronic active safety systems in vehicles**

This study was conducted in 6 different European countries in March and April 2006. Based on group discussions and personal in depth interviews, the assessment of the present situation of existing systems, or systems being developed, was analysed as well as the expectations connected to these safety systems, the role of professional actors as influencers and the orientations resp. means of information that can be envisaged regarding electronic safety systems.

#### **Results:**

First of all, no remarkable differences between the attitudes of drivers in the different countries were found in this study. Similarly, the attitudes of professional motorists like lorry drivers, fleet managers etc. do not differ significantly from those of private car drivers.

Today, there is a high level of perceived safety within modern cars. Drivers do not want to pay for safety equipment offered as optional extra, but they prefer electronic safety equipment (the one which is assessed to be useful and necessary) to be included in the price of the car. Besides safety, image and price play an important role regarding the purchase of a car.

The study showed a contradictory attitude of drivers towards electronic active safety systems:

1. safety systems are valued as driver assistance and aid in dangerous situations and there are a number of electronic safety accessories that are assessed as essential
2. safety systems generate a feeling of dispossession and are perceived as interfering with the driver's responsibility – therefore the drivers want to disable the electronic equipment in normal driving situations.

According to the study, the potential opinion formers like car salesmen, driving-school instructors etc. do not seem to have active influence on the current state of electronic safety devices. Nevertheless, public bodies,

car manufacturers, specialist media and automobile clubs are judged as credible sources regarding the (technical) information on safety equipment. Word of mouth stills seems to be very important when it comes to cars. Finally, the authors of the study state that substantial financial incentives could encourage the use of safety systems.

#### **5.1.4 SPECIAL EUROBAROMETER 2006: Use of Intelligent Systems in Vehicles, Special Eurobarometer 267/Wave 65,4 – TNSA Opinion & Social, Directorate General (DG) Information Society and Media & DG Communication**

##### **General Information**

The Special Eurobarometer Study “Use of Intelligent Systems in Vehicles” was carried out in 2006 upon request of DG Information Society and Media, in order to get more detailed information about the perception of intelligent vehicle systems and their usefulness in different European Countries.

The study covered all 25 Member States. 24815 citizens of the European Union Member States aged 15 years and over were interviewed. The interviews took place face to face between 7 June and 12 July 2006.

##### **Main Results**

In general there are significant differences between the various European Countries with respect to the preconditions of using IVS.

- 53% of all participants had their second and third car at the time of the study, whereas 47% have had the same car since their first registration. Citizens of the New Member States (NMS), however, buy less frequently a new car than citizens from the old EU 15 (31%:48%). In addition 65% of the cars in the NMS are older than six years, whereas in the old EU15 only 45% are older than six years.  
With respect to socio-economic factors, unemployed, manual workers, students and young respondents, and pensioners are more likely to have an old car than self-employed, managers, well-educated respondents.
- A majority of the Europeans have either a medium sized car (48%) or a small car (27%). IVS (Intelligent Vehicle Systems) are at present, however, mainly installed in the high-end range of vehicles. This means that at the moment IVS are not at a large disposal to European citizens.
- Males with a high level education, in a managerial position or self-employed are more likely to accept intelligent systems in their car.
- People, who drive more often appreciate IVS more than respondents with low experience of driving → people with limited access to these systems also appreciate them less
- Citizens of the NMS slightly less accept IVS than citizens of the old EU15. Germans are more reluctant to use IVS than citizens from France, Italy or Britain. Citizens of Greece and Cyprus, countries with a high number of fatalities, support the instalment of IVS the most.
- A majority of the Europeans consider IVS in principle as useful.
- More than half of all Europeans consider safety aspects as a very important issue, if they were to buy a car. Above all, female drivers who have small children, and those who drive less than 10 000km/year are slightly more concerned about safety.
- Systems, which are directly related to safety are therefore more likely to be accepted than other systems.
- Fuel consumption is considered almost equally important in the countries which were involved in this study. Above all people with a small car or second hand car are more worried about fuel consumption. This means that systems which make driving more economic and efficient are more likely to be accepted.
- IVS are regarded as expensive. The prices of these systems play a major role concerning the purchase of IVS, where men are slightly more concerned about the price than women. In Greece, the Czech Republic and Belgium citizens are especially worried about the price, Finnish, Danish and Estonian drivers are less concerned.
- Approximately a quarter of all respondents, however, do not trust in these systems. Especially in Finland and Denmark people are concerned that IVS might create a false security feeling.

- EU citizens trust most automobile clubs and car manufactures to inform about IVS appropriately, followed by consumer associations and specialised media.
- The respondents would appreciate financial incentive measures and awareness raising campaigns from public authorities in order to promote broad use of IVS.

## **5.2 INTERNATIONAL PROJECT OF OTHER TYPE**

### **Personal navigation services, comparison of Finnish, German and Italian users**

The Personal Navigation (NAVI) programme was launched in May 2000 by the Ministry of Transport and Communications in Finland. NAVI was a research, development and co-operation programme and it continued for three years (2000–2002). The aim of the programme was to develop and to test infrastructure, devices, software, and services within the framework of consumer demand and the possibilities of technology. (Anttila et. al., 2001)

One part of the NAVI programme was called “Navitarve”, or in English “User needs in personal navigation”. The aim of the user needs part was to supply authorities, content providers as well as manufacturers with relevant information on user needs in the area of personal navigation, users’ doubts and expectations related to personal navigation, and potential market segments for the new services. (Anttila, 2002)

User needs were investigated by several methods. The comparison of three countries, Finland, Germany and Italy, was based on telephone interviews conducted in each country during the winter 2001–2002. The study started with Finnish interviews, altogether with almost 1200 respondents. Based on the experiences and findings of the Finnish study, a little fewer questions were used for the interviews in Germany and Italy. In both Germany and Italy, 500 users were interviewed by phone. Samples in each country were representative. (Anttila, 2002)

Even though the area of personal navigation covers more than just car navigation, the results of each country indicate that users still appreciated most the location-based services related to driving or travelling. Automatic emergency call (currently called eCall in Europe) was indicated as being the most important service/feature in all three countries. In addition, there were a few differences between the opinions of the users in each country. The most important ones related to traffic and driving are listed below (Anttila, 2002).

- In Germany and Italy respondents appreciated existing (mostly printed) information of timetables, routes etc. more than in Finland. Finnish respondents were more often willing to have personalized new-technology enabled information.
- German respondents were more interested in car navigation and real-time information on delays in traffic than Finnish and Italian participants.
- Italians and Germans were more often willing to pay for driving-related real-time information than Finnish respondents, especially for information related to traffic incidents and to optimising the shortest or fastest route.
- Respondents in all three countries have some reservations towards new technology, especially regarding to the benefits of the technology compared to its cost. Italian participants were less concerned with the misuse of the information (statement: “information used in location-based services might end up in the hands of criminals”) than Finns and Germans.
- Finnish respondents were on one hand more convinced about the reliability of location-based services in general, but on the other hand also more concerned about the usability of the new services and devices than German or Italian participants.
- When it comes to the willingness to buy a new navigation device, a general “technology-orientation” seems to be a good predictive factor. In each of the studied countries, those users who indicated to renew their mobile phones most often seemed to be the ones willing to adopt personal navigation enabling “gadgets”, too.

## **5.3 NATIONAL PROJECTS**

### 5.3.1 Czech drivers and modern in-vehicle systems (Hanzlíková I., Marousková, L., Centrum dopravního výzkumu, 2005)

The questionnaire survey on attitudes of Czech drivers towards modern in-vehicle systems has been made in 2005.

The main goals of the survey were:

1. To explore the a share of drivers in the population of the Czech Republic
2. To explore the ways of car use among active drivers
3. To explore use of selected modern systems in vehicles

The study included 1662 participants from the basic sample of the Czech population, selected on basis of the quota selection principle.

Active drivers (drivers that drove at least 1000 kilometers during the last 12 months) use the car for travelling to work (30%) or they use the car within their profession (21%). 3% of respondents were professional drivers.

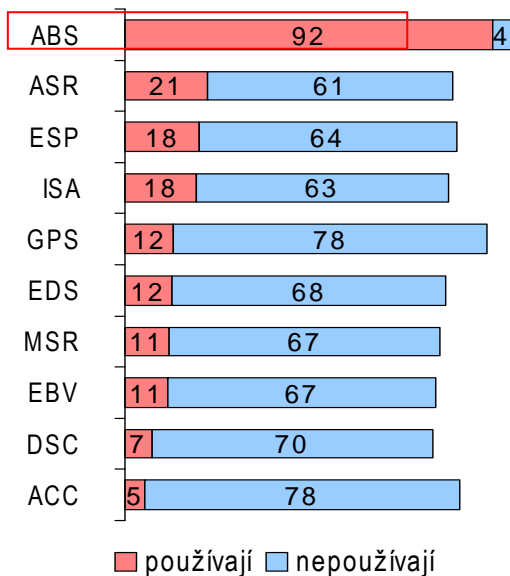
The majority of the respondents drove 2000-5000 kilometers during the last 12 months.

The selected modern technologies were:

ABS, GPS, ACC, ASR, ESP, ISA, EDS, EBV, MSR, DSC.

Some of these modern systems, 22% of Czech drivers use in their vehicle, mostly in the frame of their profession. The most frequently used one is ABS (92% of the drivers). Other systems are used much more rarely.

Graph 1: Systems used among Czech drivers. (používají: use, nepoužívají – not use)



The group of modern systems' users has the following socio-demographical characteristics:

- 75% are males
- 27% were 24 years old
- There was a majority of people with high education in the sample
- 21% of respondents were from households with high salaries

The majority (69%) of the drivers that do not use any modern technology have no knowledge about the systems and how they work. They also have concerns if they are able to manage to operate such a system.

The average age of Czech automobiles is 13,57 years, so that it is not efficient for Czech drivers to equip their vehicles with modern technologies.

The results of the study can be interpreted in terms of a low trust of Czech drivers towards new systems. These results are confirmed also by the European project SARTRE, in which drivers have been asked on the usefulness of ITS in their vehicles.

### **5.3.2 INVENT (Nutzergerechte Technik = intelligent traffic and user-friendly technology)**

INVENT was established to improve traffic safety, to keep traffic flowing in the face of growing demands on our roadway networks, and to avoid accidents by making traffic itself intelligent. Within the German federal program "Mobility and Transport", the INVENT consortium united the talents of 24 partners, including automobile and electronics manufacturers, information technology and software companies, and research institutes.

Goals of the INVENT consortium were to develop new driver assistance systems and to investigate their acceptance by the users. In 2005 the INVENT initiative, supported by the Federal Ministry for Research and Education (BMBF), completed its four-year research program, with the following results regarding users' attitudes towards the new systems Congestion assistant (stop-and-go) and Lateral control assistant:

Participants of a driving study gave both systems, the congestion assistant and the lateral control assistant, a general positive rating. It appeared to them, that both systems increase traffic safety and driving comfort. Driving with the systems was described as pleasant and relaxing. The main reasons to buy the systems would be the reduction of accident risk, followed by a gain in driving comfort resulting from the reduced workload of the drivers.

One important outcome regarding the congestion assistant were the users' preferences for system modalities which keep large distances to the car ahead (thus, the driver is able to take over control in critical situations) and which have fully automated drive-away function after standing still.

Concerning the lateral control assistant, participants liked the warning lights on the exterior mirror, which give a signal when the neighbour lane is occupied: If the driver plans to change lane, this signal is red. If the driver is not planning a lane change, the signal is yellow. In particular the yellow signal was regarded as very helpful, even when a lane change was not planned. Two kinds of warning when leaving the lane were evaluated: (1) vibration of the steering wheel, (2) counter torque steer. Although the vibration system was estimated as easier to perceive, both variations were preferred by the same number of participants.

In general it was essential for the drivers that they can deactivate the system manually even if the system is activated automatically.

In addition, a cost-benefit-analysis was done to define the benefit for the single user as well as for the general public. The implementation of ADAS can provide the following advantages:

- Benefits for the general public and other road users due to traffic related effects (time savings, reduced contaminants and CO2 emissions, reduced fuel consumptions, accident avoidance).
- Benefits for the buyer due to traffic related effects (reduced fuel consumptions of the own vehicle and accident avoidance)
- Benefits for the buyer due to effects that are not traffic related (gains in comfort and prestige).

## 6 Questions still to be asked

The discussions between TFA partners showed that, although there already exists some knowledge about differences and similarities between EU-countries or EU-regions, some questions have still not been asked, yet, or at least have not been answered satisfactorily, so far.

As the earlier reported projects show, most often only part of the EU-countries are involved in studies, and therefore no comprehensive knowledge is available, except in the area which was covered by SARTRE-studies. Cultural comparisons in traffic field are not very usually investigated in Europe. Below, some aspects and topics considered to be relevant for further analysis, are listed and discussed as a sketch:

### 6.1 TRAFFIC SAFETY AND MOBILITY

Information about traffic safety and the mobility in each EU-country can be found in the EUROSTAT database: [http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=1090,30070682,1090\\_33076576&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL). On this homepage data about the amount of vehicles per capita, the annual kilometers driven, the annual re-admission of vehicles, the volume of traffic, the amount of traffic accidents, etc. are available.

Important questions to be asked in relation to this topic are how the road infrastructure in EU-countries looks like, how the structure of traffic and mobility looks like and how the personal and work mobility looks like. An answer to this question would help to understand the opinions and behaviour of inhabitants concerning IT systems.

There is no common information available about different promotion strategies of countries concerning road safety. The same holds true with enforcement strategies, about which only a few sources exist. Within the SARTRE3 project it was found, that in different EU-countries the frequency of enforcement is quite different. Moreover, the behaviour of drivers strongly depends on their estimation whether they will be punished or not.

The public awareness on road safety issues and available technologies is quite an important issue, since a new system will only be bought and used if people know about it. Questions about knowledge of IT systems might be asked quite often, as it was done in the Czech study reported above.

### 6.2 IT SYSTEMS

Currently, no source is known, where the penetration rate of different ITS systems in all EU-countries is stored. The Czech study mentioned in this deliverable gives an impression about how the situation looks like in one country. It has been shown that in Czech Republic ABS is used frequently, but that other systems are used much less frequently. It can be assumed that the situation in different EU-countries is similar but there is no evidence for this assumption. There is also no information available about the general state of the society with regard to ITS.

Probably such information exists for each country itself, but definitely not on a general European level.

### 6.3 SOCIAL AND MENTALITY ASPECTS

#### Attitudes (towards)

Most of the studies summarized in this deliverable are dealing with attitudes of people. Within the SARTRE3 project for instance it was shown, that drivers are quite positively tuned towards navigation systems and congestion warning systems. But on the other hand they do not like systems that interfere with their own freedom of decision, like the decision to speed, to drink and drive, etc., if they like to. Therefore, systems such as the speed limiter, alco-lock or fatigue warning systems are not that popular. It also could be stated that, at least according to the ADVISORS project, there are differences in the attitudes in different EU countries.

Nevertheless, still questions about the following issues have to be answered: For instance how people think about

- Technical equipment in general
- New technological developments
- IST (IVIS and ADAS)
- Traffic safety and other criteria
- Attitudes towards people using these devices

#### **Willingness to buy**

The Eurobarometer but also the Finnish study NAVI showed that most of the people are not willing to pay extra for ITS systems; it depends on the costs of a system whether it will be bought by the mass or only by the first adaptors who are willing to buy any technical innovation regardless of the prize. Therefore the following questions have to be answered carefully:

- How much would people spend for a car
- How much would people spend for an IVIS
- How much would people spend for an ADAS
- They would pay in order to get what?
- How easy is it to get a device: How much efforts would people make?)
- What Safety Benefits are wished for, what SB are expected?

#### **Driving behaviour**

Among laymen, but also among researchers – not least in the breaks of meetings – what is often discussed is "driving culture" in different countries. In order to discuss this issue somewhat more in a scientific frame, more has to be learned about the following issues:

- Communication patterns of road users
- Quality of and approach to driver's training and education
- Legislation, enforcement, risk of penalty, demerit or other penalty-point systems (which are known mainly how they work and on what theoretical basis (which is not well known), incentive programs etc.
- Lifestyle factors

## **6.4 DATA ACQUISITION**

One last point, that has to be attributed special importance, is data acquisition. This refers to the question, what methods have to be used in order to learn more about cultural similarities and differences in Europe. This would allow to adjust all types of marketing processes – from selling traffic safety ideas to new ITS – much better by considering relevant segmentations among European road users, and by concentrating on unified and broadly "shot" measures where there are clear similarities between most or all of the countries, or groups of road users.

## 7 Conclusions

Within this deliverable A.6 it is shown that there exists some information about cultural specificities. However, limitations still exist and can be listed as follows:

- a conceptual framework/theory for analysing such issues is missing, and
- in the available data usually only part of the EU-countries are considered (except SARTRE3). Four EU-projects (SARTRE3, ADVISORS, Eurobarometer and Special Eurobarometer) but also one smaller international project and two national projects have been reported, and some interesting results can be found there.

It was mentioned that people in all countries may tend to like or dislike the same specific systems, but still there are big differences in the specification of their attitudes. What can be stated is that most of the drivers are not willing to pay a lot for specific devices. This has to be taken into account, on one hand by the manufacturers and on the other hand by decision makers willing to support the implementation of such systems.

By making this statement it has to be kept in mind that next to challenges connected with cross-cultural studies, another "simple psychological" phenomena might happen in any country. As soon as the study is investigating attitudes, especially towards behaviour that is either illegal or at least not widely accepted, so called socially desirable responses are to be expected and we do not know if this effect is similar or equally represented in each country.

It can be concluded that already some implications of cultural and social similarities or differences between EU-countries exist but still a lot of work has to be done in order to get an overall view.

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## Annex: Workshop minutes from the Turku workshop

### 29<sup>th</sup> September 2006

#### Workshop on identification of the impact of social and mentality differences between different EU regions on driver needs

Chair: Christine Turetschek, FACTUM

The aim of this workshop was to discuss the realisation of WP A.4. "Identification of the impact of social and mentality differences between different EU regions on driver needs"

As a preparatory work for this workshop a short questionnaire was sent to all TFA members. The questionnaire included questions about the existing car fleet in each country, about the opinions of the workshop participants on preferred ITS which is already in use and ITS which should be implemented in their countries as well as Europe-wide. Further more questions on "mentality" in general and social aspects were included as well.

The main results about **car fleet** were the following:

- The average age of the **car fleet** in each country is close to 10 years.
- The age within the countries varies from 5 to 14 years.
- The average price of a new car range between 10.000 and 20.000 €.

The main results about **ITS in use**:

- Roadside technology (VMS) is used quite widely in many countries.
- ABS is implemented in all new cars.
- ESP is not as common as ABS and is still handled as an optional equipment.
- Nomadic devices are frequently used, especially navigators.

The main results about preferred **ITS which should be implemented**:

- Firstly safety-related ITS (ISA, ESP, eCall, Night vision, etc.) should be implemented in the country and Europe-wide.
- But the implementation of comfort/congestion avoidance ITS such as ACC, enhanced navigation or on-line traffic information (radio, internet) are recommended as well.
- Advantages of an Europe-wide implementation would be enhanced traffic safety, traffic fluency, more comfort and a better harmonisation between countries but also economical interests.
- Problems would be the different languages but also different financial budgets of the countries for ITS implementations, as well as a range of willingness to buy such systems.

The main results on the **mentality** questions:

- Mentality is a set of attitudes, beliefs, opinions and habits from a society.
- Relevant aspects which concerning mentality are attitudes towards safety and laws (for instance: alcohol, speed limits), interaction with vulnerable road users, communication with other road users in general, compliance with regulations but also self-assessment of the driver.

**Social aspects** includes

- age
- gender
- social standing
- exposure
- financial resources
- overall awareness of the benefits people can have
- different tendencies to show off
- the interest on technology and electronic devices

**Procedure:**

The participants of the workshop were divided into three small-groups. Each small group discussed one of the following topics based on the results stated above:

The first group discussed the necessity of knowledge on basic data about car fleets in each country and why **expert opinion** is important in this case. Furthermore they discussed whether all relevant questions have been asked already, what is still missing and in the case of missing data who should be asked.

The outcome of this group was, that there are definition problems on technical information, expert "guesses" and expert opinions. Important information such as accident statistics, enforcement level and risk for sanctions, current status of implemented technology (vehicle vs. other mobile technology), the acceptance (needs vs. wants) and privacy can be assigned to one of the sources mentioned before.

The suggestion of this group was that first it would be necessary to clarify from which stakeholders the information should be gathered. Afterwards a limited number of experts should be asked about their ideas on relevant aspects. Information which is already available or which can be found quite easily within HUMANIST should not be questioned again.

The second group was asked to discuss whether an internet-survey is an appropriate method to gather information about **mentality** differences within the EU-countries. Depending on their decision, they should suggest which questions might be asked or which method would fit better.

The suggestion of the group was not to think about differences between countries but maybe about differences between regions (e.g. Northern, Middle, Southern and Central area of Europe). Furthermore the problems of an internet survey have been mentioned. For example problems of different languages but also the self-selection and sampling rate, the anonymity and the external validity. It was also worried if the needed target group could be reached with this method and if the topic might be too complex for an internet survey. It was suggested to use existing geodemographic data about accident rates of already existing research. Possible sources to receive such data are:

- European projects: e.g. Sunflower Plus project, AIDE, ADVISORS
- EC Statistical Data
- OECD Sources
- Nomadic Devices survey across Europe by Internet
- Cross-European mobility studies
- Vehicle Manufacturers

The conclusion was to do a "meta-analysis", a literature review based on existing research.

The third group was asked to discuss whether an internet-survey is an appropriate method to gather information about differences related to **social aspects** within the EU-countries. The participants of this group should suggest which questions might be asked or which method would fit better to gather the information.

Within this group many aspects have been risen. For example how to define mentality of risk in different countries, punishment or enforcement, and the issue of privacy etc.. According to an internet survey the participants think that it might be difficult to get a representative range and that, because of the topic, a "cultural misunderstanding" could result. A literature review with an additional internet survey and other methods (statistical or qualitative analysis) was suggested.

Thanks to the fruitful impact of all workshop attendees it could be concluded that the work of WP A.4. should be based on a meta analysis on existing data and maybe completed by an expert questionnaire. Therefore following proceeding is suggested:

<b>Who?</b>	<b>What?</b>	<b>Until when?</b>
TFA members	Comments to the minutes send to Factum	Friday 27 <sup>th</sup> of October 2006
Factum	Dissemination of the final workshop minutes	Monday 5 <sup>th</sup> of November 2006
TFA members but also interested persons	Announcement about the amount and content of contribution	Friday 17 <sup>th</sup> of November 2006
TFA members	Clarification of the procedure of the expert questionnaire during the TFA meeting in Soesterberg	Tuesday 12 <sup>th</sup> of December 2006
TFA members	Provide summarised information about existing data in regard to mentality differences and differences of social aspects	Friday 15 <sup>th</sup> of December 2006
Factum	Prepare a first version of the Del. A.6. based on the provided information	Monday 15 <sup>th</sup> of January 2007
TFA members	Comment on Del. A.6.	Monday 5 <sup>th</sup> of February 2007
Factum	Finalise Del A.6.	Friday 24 <sup>th</sup> of February 2007