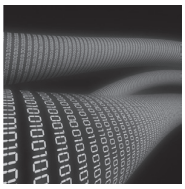

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# Results of Public Opinion Survey on Distracted Driving Behaviour and Attitudes

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## ABSTRACT

Results of public opinion survey related to drivers´ distraction is one of the most frequent causes of road traffic accidents and this problem is growing and escalating globally in recent years. The aim of the paper is present results of survey that was focused on finding out public opinion and attitudes toward selected activities and factors that reduce driver's attention during vehicle driving. First part of paper is defining the role of drivers´ distraction in road accidents and presenting current situation of this problematic in Slovakia. Second part of paper describes the methodology and procedure for implementing public opinion survey and presents its results with focus on activities that are the most often performed by drivers affecting their attention are performed and what is the public attitude towards this issue. In last part main outcomes and findings are summarized.

**KEYWORDS: public opinion survey, distracted driving, road safety**

## 1. Introduction

Road traffic safety is a global concern. It is estimated that around 1,3 million people are killed and 20 million to 50 million are injured on roads around the world each year, and that this level is rising [1]. The socio-economic and health impacts are substantial [2-4].

During recent years, the percentage of crashes involving some type of driver error or impairment before the crash was thought to be as high as 94% [5]. Factors such as vehicle failures, roadway design or condition, or environment composed lower crash percentages [6].

This problematic can be demonstrated in detail by Naturalistic Driving studies - research methods used to observe natural driving behavior of road users by means of devices which inconspicuously register vehicle movements, driver behavior (such as eye, head and hand movements) and external circumstances [7]. Naturalistic driving studies offer a unique opportunity to study driver performance and behavior experienced in the real world with actual consequences and risks. According to these studies drivers are engaged in distracting activities during 51.93 % of their driving time [8]. This number is alarming. It clearly shows importance and need for work on the problematic of distracted driving. That is why our research study was conducted.

In figure 1 we can see the increasing number of offenses related to the use of cell phone while driving. Although in 2016 there was a slight decline, in 2017 again the number grew. In 2012, when the number of offenses was at 6 569, in 2017 this figure is already 3.5 times higher. Unless there is a radical change, this number will continue to grow in the future.

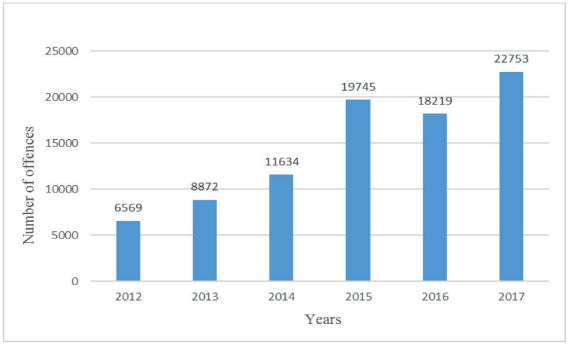


**Fig. 1. Number of offences related to the hand-held use of cell phone while driving in the Slovak Republic**

In relation to the evolution of the amount of offenses and imposed fines in individual regions of Slovakia for the use of cell phone while driving in recent years we can observe that in 2017, police officers reported 4 534 more offenses than they did in 2016. It is also reflected in the amount of fines selected, when in 2017 the amount of fines was about € 92,000 more than in the previous year. We can also observe that the most offenses in 2016 were recorded in the territory of the Bratislava region (3 634) and in 2017 in the territory of the Nitra region (5 543). On the contrary, the smallest infringements of this type were recorded in 2016 and 2017 in the territory of the Trnava region (1 279 and 1 336 respectively). However, this claim is only valid if we do not take into account the offenses recorded by the traffic police service. This data was obtained from the statistics of the Ministry of the Interior of the SR, from the Transport Police Department.

## 2. Results of public opinion survey

A survey about public knowledge, opinions and attitudes related to drivers´ distraction was carried out using an electronic questionnaire. This form was chosen for its financial advantages, for simple dissemination of the questionnaire by the respondent, electronic recording of information and its subsequent simpler evaluation.

The main objective of the questionnaire was to find out what activities causing the driver's distraction and inattention and also identify which ones are most often performed. Questions in the questionnaire were formulated in form that each respondent could understand them. This means that professional terminology was not used in the questionnaire. The questionnaire contained twenty-six questions. Of these, there were twenty mandatory and six optional questions. Optional questions either referred to previous mandatory questions or were focused on respondents' views. The questionnaire was divided into three parts. The first part focused on geographic and demographic data of respondents, e.g. gender, age, residence, etc. The second part of the questionnaire focused on the type and duration of ownership of the driver's license and on the subsequent driving experience of the respondents. The last part was dedicated to the activities that can cause distraction of drivers and how these activities can impact on the occurrence of traffic accidents. Respondents were also asked to present their opinion on how to minimize the use of a mobile phone while driving, as this activity is considered the most dangerous.

The questionnaire was completed by a total of 354 respondents, of which 172 were men, representing 48.59% and 182 women, representing 51.41%, that means the questionnaire was filled by approximately equal representation of both women and men.

By the question: "In what age do you belong?", we found that almost half the respondents ranged from 19 to 25 years (48.30%). Such a number may be due to the fact that the questionnaire could only be filled in electronically. On the contrary, the lowest number was formed by novice drivers from 15 to 17 years old. Such drivers may have driving license AM, A1, B1, and B and T after the law has been modified since 17 years, but they must only drive accompanied by an experienced supervisor. Other age categories were represented almost equally.

Next question was dedicated to found out where the respondent is living, to see the perceive issues in particular parts of Slovakia. Majority of respondents were from the region of Banska Bystrica.

Next question was focused on economic activity of the respondents. The most representatives were from the group of economically active persons (186; 52.54%) and the group of students (143; 40.40%). Other options had almost identical values. Under the choice of others, the respondents stated maternity leave and one respondent is the caregiver of a disabled child.

Another question was focused on investigating how the level of education can impact driver behaviour. Most respondents reported that they had attained secondary education with graduation (227; 64,12%), while the lowest number of respondents were from the group with basic education (14, 3,95%). Represented were also respondents with secondary education without graduation, as well as university educated persons.

The next question was dedicated to I found out what type of driving license the respondents own. The results are somewhat distorted, as respondents selected only one option in this question, with the holders of more than one driving license. For example, if the person own the B1, B driving license, he/she is also the holder of the AM group entitlements. It seems that some respondents answered the question correctly, others did not. But it is possible to conclude with certainty that most of the respondents hold a B1 and B driving license.

Question number 7 was focused on finding out how long are the respondents holding a driving license. Nearly 50% of responses represented drivers ranging from 3 to 9 years. The second most common answer was the group from 0 to 2 years (70; 19.77%). These drivers can be considered new and inexperienced. Another frequent response was years ranging from 10 to 20 years (69; 19.49%).

Next question was dedicated to find out if the respondents own motor vehicle, which could also affect whether respondents perform activities that cause the driver's distraction to be reduced while driving or not. From the answers we could find that the motor vehicle owns (208; 58.86%) and vice versa (146; 41.24%) of the respondents.

Following three questions deal with experience in driving a motor vehicle. Question number 9 reveled approximate number of

kilometres driven by the respondent. Most respondents (119; 33.62%) reported the smallest interval. At this time, novice and inexperienced drivers are likely to be present. Relatively high number included the largest interval, namely (63; 17,80%). These drivers are probably the most experienced and may also be professional drivers.

The next question was also related to driving experience of the respondents, specifically, how many times a week the respondents drive a motor vehicle. The responses were evenly distributed over time. Majority of respondents, however, answered that the motor vehicle are driving once or twice a week. Under the option "Other", respondents reported most often a couple of times a month or once a month. But there were also drivers who drive the motorcycle occasionally or once for a longer period of time.

The last question in the questionnaire related to the driver's experience was question 11. In this question we asked the respondents whether they were considered to be experienced. Experienced drivers are considered to be 211 respondents, representing 59.60%, and 143 respondents considered as inexperienced, representing 40.40%. The group of experienced drivers is likely to include drivers who questioned number 9 that they have driven more than 10,000 km. On the other hand, all novice drivers and a certain number of drivers who ranked the second smallest interval in question number 9 are among the inexperienced group.

Next part of the questionnaire was focused on activities that cause drivers´ distraction. In question number 12, we found out if the respondents were using the cell phone while driving. This question was one of the most important questions. The answers are alarming. On a relatively small sample was revealed that up to half of the respondents is using their cell phone while driving. Specifically, there were 173 respondents (48.87%).

The next question has relation to the previous one (number 12). It concerned the respondents who stated in question number 12 that they used their cell phone while driving. If was related to The frequency. Majority of respondents answered that they are using the cell phone while driving very little (68; 39.31%): This answer was related to the answers on question number 5, which indicated very frequent use of cell phone while driving.

Question 14 also concerned respondents who answered in question number 12 that they are using the cell phone while driving. This time they were asked for the reason why they do that. Respondents had the possibility to select one or more options. The majority of respondents (157) declared that they used the phone to make a phone call while driving. On the other hand, at least the responses were recorded for other (18). Here the respondents mentioned options such as phone navigation, traffic service, time tracking, music downloads, and one respondent said he used the phone to play games.

Another important question was focused on found out what activities affecting respondents´ attention while driving. Also in this case respondents could select more options. Most of the responses were recorded in the options of setting the radio (245) and setting the air conditioning (191). It was surprising that a large number of respondents declared that they did not do anything while driving, which could affect their attention. Specifically, 90 respondents. The smallest response was recorded with the option of another (10). Here were presented options for rear-seat children, adjusting the lights and mirrors, and turning on the safety belt.

In the next question respondents were asked whether they were listening very loud radio or music while driving. Most respondents declared that they sometimes perform this activity (200; 56.50%). At least those who perform this activity often (60; 16.95%).

Another activity limiting the driver's attention is eating and drinking while driving. There were two questions focused on these activities (questions 17 and 18). In the first of them respondents were asked whether such activity was being carried out and the second was aimed at the respondents who answered in the previous question that they are eating or drinking while driving. In the first question there was the same number of answers yes and no. These responses were (177; 50%) . In the second question, we asked respondents how often they do this. They could choose from the scale from 1 to 5, where the one represented the option of very little and the five the option very often.

The next question was focused on drivers that are smoking while driving. This activity is performed by only 42 respondents, representing 11.86%. In contrast, 312 people (88.14%) do not smoke while driving.

Another activity that can significantly affect driver's attention is communication with passengers. In question number 20, we focused on whether respondents had ever communicated with their co-driver so that their attention was affected. Responses to this question were relatively evenly distributed, as 155 (43.79%) of respondents said that they had already been affected and 199 (56.21%) said that communication with the co-driver had not affected their attention.

In next question, we asked the respondents whether they have ever threatened traffic because they were attentive because it is one thing to carry out activities that affect the driver's attention and the other to threaten someone else when doing so. The 30, 69 (19.49%) of respondents declared had already experiences inattention while driving vehicle. On the other hand, 285 (80.51%) of respondents said they were not threatened by anyone else because of their inattention. These drivers, however, certainly include those who act while influencing their attention, but they have not yet been threatened by this activity.

In the following two questions, we asked the respondents whether the attention-paying activities were sometimes fined and, if so, what they were fined for. On this issue, we listed the respondent's activities as offenses in the legislation and for which they could be fined. Specifically, it involved activities such as eating and drinking, smoking and the use of cell phone while driving. Only 21 (5.93%) of the respondents received a fine for some offense affecting attention. This is because we do not pay enough attention to the activities of the Police Force, but also because the drivers conducting these activities are cautious. If the drivers were fined for these offenses, most of the respondents stated that it was just for the use of cell phone, but one respondent who was fined for smoking while driving was found.

In two other questions, we focused on how many respondents were already involved in traffic accident. Consequently, if someone was involved in a traffic accident, we asked him about the cause. The answer was not surprising at all, as a large number of respondents cited their cause as a cause of the accident, or a strange inattention. Thus, the fact that the factor of inattention is behind a massive number of traffic accidents has been confirmed. However, other

factors such as speed, slippery road, alcohol, bad technical condition of vehicle and others were mentioned in this response.

The last question in our questionnaire was the opinion of the questioned how to minimize the use of a mobile phone while driving, as this activity is considered the most dangerous and most frequent. This question was optional, but most of the respondents expressed their opinion on the issue. There were countless solutions. A large number of respondents would refer to hands-free calls, or would change the law when this offense would be considered more serious and increased and tighter police patrol patrols on the road, would then choose higher fines. Some would introduce a signal jammer, or a mandatory installation of applications to phones that would operate on a similar principle as airplane mode. There were also those who said that this issue should be addressed more in schools and driving schools. However, we were most interested in answering the respondent who would take a driving license for a short time (stated a month). One would not only have to pay a fine, but for a time it would be impossible to drive a motor vehicle. For those who really need it, it would be a sort of punishment for not realizing what they could do with their irresponsible behaviour, and they would definitely think that they would do the same thing in the future. However, a few respondents think that minimizing use of cell phones while driving is not possible at the moment.

# 3. Practical measurement of selected activities that are causing distracted driving

We conducted two measurements focused on selected activities causing the driver's attention to be reduced. These two measurements were focused specifically on cell phone use, smoking, eating and drinking while driving. We have done both surveys on the First Class road sections. One section of the road was located on the territory of the Žilina Region, the other on the territory of the Region of Banská Bystrica. In the Žilina Region it was a section between the towns of Žilina and Rajec, and in the region of Banská Bystrica it was a section between the village of Heľpa and the town of Brezno. We chose two sections in different regions so that we can compare the number of offenses but also how individual actions can actually affect the occurrence of a traffic accident in these two territories. Next, we chose the sections mainly because of their easy accessibility and timelessness. Other reasons were that road sections were of the same category, comparable traffic intensity and traffic density, approximately the same kilometre distance, and approximately the same time of passage through sections. We conducted surveys at two seasons. The first survey, namely in Zilina-Rajec, we performed in winter, a few days before Christmas. The second survey was performed in Heľpa-Brezno in spring. This time the survey was done a few days before Easter. We assumed that the traffic would be about very similar at these seasons. The individual measurements were carried out in such a way that the co-driver monitored the activities of the drivers in comparison with the next cars and then recorded everything in the score sheet. After the completion of all measurements, we collected the sheets and then calculated the values that are presented in the following charts and tables. The measurement is certainly not absolutely accurate, since it has not been seen perfectly in all vehicles, but we can say with certainty that this measurement method is most effective.

## 3.1 Practical measurement on the road section Zilina-Rajec

We practiced the first practical measurement on the territory of the Žilina Region, namely on the section between the towns of Žilina and Rajec. This stretch of road is part of the I-class 64 (I / 64). It is road of first class, which passes from the south to the north and connects the towns of Komárno and Žilina. The total length of this trip is 203.71 km. Our measurement covered area of 19.1 km on this road. With the ideal traffic, the time of the crossing was approximately 25 minutes. All practical measurements were performed from the Hliny boarding house in Žilina to the Tesco hypermarket in Rajec. The monitored offenses were recorded in the census sheets. The data was recorded on the way back and forth. The measured section from Zilina to Rajca is shown in Fig. 2.

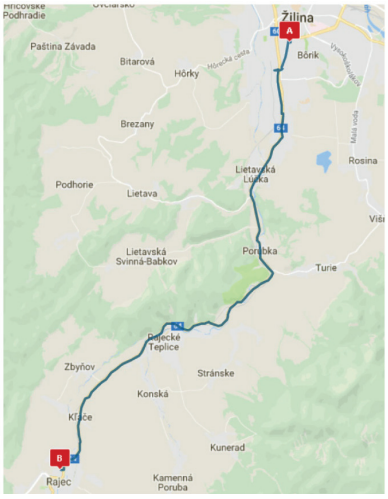


**Fig. 2. The measured section between Zilina and Rajec [googlemaps]**

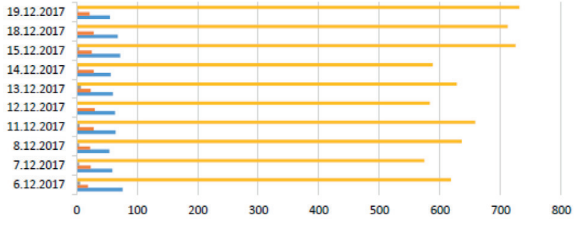


**Fig. 3. Data processed from the first measurement sheet; x – date of measurement, y - number of vehicles (orange = vehicles observed, grey = driver eating and drinking, red = driver smoking, blue = driver using cell phone) [own study]**

Table 1 shows the total number of vehicles crossing the section and also the number of violations observed by the drivers on this section. All numbers are expressed on the individual days

when the measurements were made. The total sums, whether the number of vehicles or individual offenses, are also displayed. It can also be seen that the traffic density increased with the coming holidays.

From 6 453 vehicles during the period of realization of measurement, of which 5 542 (86%) are drivers who did not carry out any activity that we tracked during the measurement. The number 627 (10%) represents the drivers who used the cell phone while crossing the section. Furthermore, 247 (4%) of drivers smoked while driving, and the lowest number only 37 (1%) is showing the drivers who were eating or drinking while driving.

**Table 1. Results of measurements on the Zilina-Rajec road for individual days [own study]**

| Date | Number of vehicles observed | Drivers smoking | Drivers eating and drinking | Driver using cell phone |
|---|---|---|---|---|
| 6.12.2017 (Wednesday) | 618 | 76 | 19 | 6 |
| 7.12.2017 (Thursday) | 574 | 59 | 23 | 4 |
| 8.12.2017 (Friday) | 636 | 54 | 22 | 4 |
| 11.12.2017 (Monday) | 658 | 64 | 28 | 5 |
| 12.12.2017 (Tuesday) | 583 | 63 | 30 | 1 |
| 13.12.2017 (Wednesday) | 628 | 60 | 23 | 7 |
| 14.12.2017 (Thursday) | 588 | 56 | 28 | 3 |
| 15.12.2017 (Friday) | 725 | 72 | 25 | 4 |
| 18.12.2017 (Monday) | 712 | 68 | 28 | 1 |
| 19.12.2017 (Tuesday) | 731 | 55 | 21 | 2 |
| Suma | 6453 | 627 | 247 | 37 |

## 3.2 Practical measurement on the road section Heľpa-Brezno

Second practical measurement we carried out on the territory of Banská Bystrica region, in the road section between Heľpa and Brezno. This road section is part of the I. class road no. 66 (I / 66). It is the first class road that connects Šaha border crossing with Zvolen, Banská Bystrica and gradually crosses through Brezno and Poprad to the border crossing in Tatranská Javorina. The total length of this measurement was 246.75 km. The section of road on which the measurement was performed was 27.4 km long and, with the ideal traffic the passage time was approximately 25 minutes. All ten practical measurements were made from Heľpa Hotel in Heľpa to General Štefánik Square in Brezno. Tracking offenses have been recorded in the census sheets, back and forth. Practical measurement took place this time in March, during ten business days following, as was the case in the first case. Measured section from Heľpy to Brezno is shown in Fig 4.

Figure 5 shows the total number of vehicles crossing the section, as well as the number of offenses tracked by the drivers on the section. All numbers are expressed on the individual days the measurements were made. The total sums are displayed, whether the number of vehicles or individual offenses. It can also be seen that the traffic density on Friday was somewhat higher than on other days.

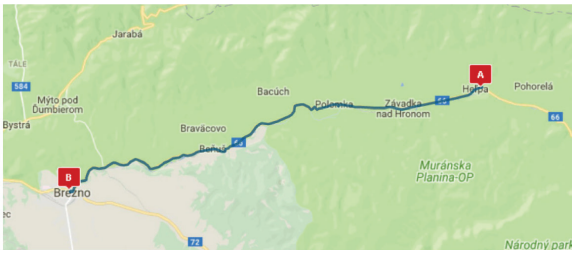


**Fig. 4. The measured section between the village of Heľpa and the town of Brezno [own study]**

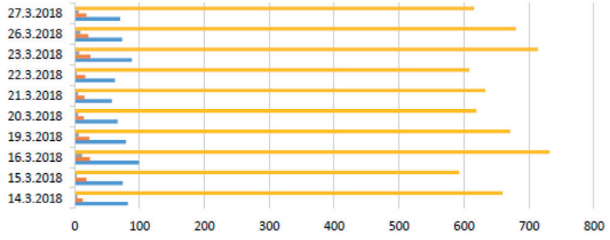


**Fig. 5. Data processed from the second measurement sheet; x – date of measurement, y - number of vehicles (orange = vehicles observed, grey = driver eating and drinking, red = driver smoking, blue = driver using cell phone) [own study]**

**Table 2. Results of measurement on the Heľpa-Brezno route for individual days [own study]**

| Date | Number of vehicles observed | Drivers smoking | Drivers eating and drinking | Driver using cell phone |
|---|---|---|---|---|
| 14.3.2018 (Wednesday) | 659 | 82 | 12 | 4 |
| 15.3.2018 (Thursday) | 593 | 74 | 18 | 3 |
| 16.3.2018 (Friday) | 732 | 99 | 23 | 11 |
| 19.3.2018 (Monday) | 671 | 79 | 22 | 6 |
| 20.3.2018 (Tuesday) | 619 | 66 | 14 | 5 |
| 21.3.2018 (Wednesday) | 633 | 57 | 15 | 5 |
| 22.3.2018 (Thursday) | 608 | 62 | 16 | 3 |
| 23.3.2018 (Friday) | 714 | 88 | 24 | 7 |
| 26.3.2018 (Monday) | 680 | 73 | 21 | 9 |
| 27.3.2018 (Tuesday) | 616 | 70 | 18 | 6 |
| Suma | 6525 | 750 | 183 | 59 |

We can observe that 6 525 vehicles passed through the section during the period under review, of which 5 533 (85%) represents drivers who did not carry out any activity that we tracked during the measurement. The number 750 (11%) represents the drivers who used the cell phone while passing observed section. Furthermore, 183 (3%) of the drivers smoked while driving, while the lowest number was only 59 (1%), showing the drivers who were eating or drinking while driving.

### 3.3 Evaluation of results of practical measurement and recommendations

We made practical measurements concerning two sections of road communications. These two sections were located in two different territories. In these measurements, we found out how many drivers use a cell phone smoked and consumed while driving.

By practical measurements, we found that the number of vehicles crossed in the first measuring area between the towns of Žilina and Rajec was smaller compared to that in the Banská Bystrica region. Since this difference was not significant one and the first stretch is approximately 8 km shorter, it shows that the traffic density was somewhat denser in this section. We also found that the number of drivers who did not carry out the monitored activities ranged from 85-86% of the total number of vehicles crossed. The number of drivers who violated the law while driving, was approximately the same in both sections, and ranged around 10%. Other activities did not differ significantly. For smoking while driving, numbers on both sections was around 3%. When eating and drinking, the number of offenses ranged around 1%. This offense led drivers at least during the ride.

This number of offenses is quite alarming, since these are activities which, according to statistics, most often cause the occurrence of traffic accidents. When counting all three types of offenses, the numbers move around 15%. These numbers are quite high, not to mention other activities that drivers perform while driving, distracting their attention, that can may also have an impact on the occurrence of a traffic accident. This quite large numbers should be reduced as quickly as possible. This is possible in several ways. In the following section, we suggest several ways to reduce these offenses.

## 4. Conclusion

Based on our research we are providing some recommendations to reduce the risk of drivers´ distraction related to public awareness campaigns, education programs, drivers´ training, legislation and control. With these recommendations are covered the three traditional areas of intervention in road safety: driver, vehicle and environment [9, 10].

Public awareness campaigns, driver education and training programs can differ a lot in terms of purpose and approach. However, at the same time they can be complementary. In fact, in the literature, basic guidelines have been established to consider when planning activities for both purposes - awareness and education [11, 12]. The first recommended step is to promote greater awareness regarding distracted driving, and, simultaneously, to disseminate information about the magnitude of the problem, and its potential adverse consequences, with the main purpose of modifying practices and habits of the driver. It is recommended to avoid general messages such as 'must pay attention while driving', since the driver usually interprets that they are not directed to him/her. On the contrary, it is indicated as convenient to address specific risk groups (young and novice drivers, older drivers, and also parents, educators and people with social influence). Regarding the messages, they should be clear, concise, easy to memorize and should refer to specific behaviours. Also educational programs that include direct contact with the victims of traffic accidents has been shown to be very effective.

The literature places special emphasis on the need to educate novice drivers, for example, by updating and including specific information in driver's license manuals, or implementation of programs as Graduated Driver Licensing, where new drivers acquire experience gradually. It is important to focus on young drivers because they are at higher risk in general and they are representing the beginning of a new generation of drivers who engage in a full range of distracting behaviors (e.g., browsing on a cell phone). The use of non-traditional methods as social networks to promote anti-distraction messages, discuss road safety issues and disseminate prevention programs can be also very effective for this target group [3]. As was already mentioned, aaccording to the Naturalistic driving study observed drivers were engaged in distracting activities in average during 51.93 % of their driving time. This is resulting in a crash risk that is 2.0 times higher than model driving. These estimates could represent the near road safety future if decisive actions to reduce distraction-related crashes are not taken.

New technologies are developing faster than the capacity to establish laws that regulate their use and application. For this reason, it highlights the need for permanent revisions and updates of the road safety laws, as well as to include regulations on specific behaviours (use of cell phones and other electronic devices).

Currently the automotive industry has a central role in the management of drivers' distraction and inattention while driving. In relation to the new technologies incorporated in vehicle, a series of recommendations have been created for the design of electronic devices, in order to reduce the workload that they generate on the driver [13]. Although, as mentioned, the technologies incorporated in the vehicle can be an important source of distraction, in recent years there has been developed also devices that can help the driver to detect the moments in which he/she is inattentive or distracted and which are of potential risk [15-19]. So it is recommended to put effort in developing new shock avoidance technologies. However, a fundamental aspect, and object of controversy for its possible distracting effect, is the way in which these systems communicate with the driver and the workload or stress that involves so many technological systems sending messages simultaneously. On the other hand, given that less effort and controlled attention is required by the driver, such systems can reduce the perception of risk and, paradoxically, facilitate what they want to prevent [20]. At this point it is important to remember that the lower is the demand for driving, the higher is the residual attention available to perform a secondary task [21, 22]. Overcoming this problem is one of the main challenges that is currently facing the automotive

industry with objective of reducing driving risks derived from new technologies. Another aspect that is important to take into account is that technology-based solutions can be difficult to implement due to the high costs involved, market resistances and their not completely proven.

As a part of the measures aimed at the road environment, the first recommended aspect is the improvement of infrastructure. In relation to this aspect it is suggested the installation of systems in the roads that allow reducing or correcting distractions (for example the rough rumble strips in side rails that warn drivers when they are deviating from the traffic lane) [13]. It is also suggested to provide enough spaces on the road to stop and rest [23]. Regarding road signs, it is recommended that they are simple, unambiguous, and quick to interpret. When designing road signs it is important to consider that the driver does not always act as a conscious and rational agent who pays attention to all signals and makes deliberate decisions based on the information. On the contrary, driver often attends signals in a selective manner, as he/she pays attention only to a small proportion of the existing signs according to the circumstances and his/her own experience [24].

Drivers´ distraction and inattention is a multidimensional problem that requires multiple solutions and the coordinated efforts of numerous actors at the private and public levels. Interventions based on a single type of methodology do not seem to be sufficient or effective [25]. The recommendations on road safety should definitely revolve around several axes and involve different social actors.

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