

In-depth accident research in the Czech Republic

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Abstract - Unfortunately, there has been a high number of accident fatalities reported in the Czech Republic in recent years. There are many causes which have led to a growth in the number of road traffic accidents. Since 1990, traffic density has demonstrated an upward moving tendency, daily traffic-jams are on the increase in many cities and traffic capacity on roads and streets is not able to satisfy this increasing density. Moreover, many road users lack experience in terms of driving modern cars. The National Accident Study of the Czech Republic is based on the assumption that the year 2010 is considered as a pilot project with the testing operation of collecting and evaluating data from traffic accidents. From the beginning of 2011, a fully-functional structure of the Traffic Accident Research will be created and solid data generated. Based on this assumption, we hope to begin meaningful cooperation with foreign countries.

NOTATION

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|-------------|----------------------------|
| <i>VSR</i> | Vehicle Safety Research |
| <i>NAS</i> | National Accident Study |
| <i>IDAA</i> | In-Depth Accident Analysis |
| <i>TRC</i> | Transport Research Centre |

INTRODUCTION

Accident research in the area of the Czech Republic dates back a long way. Already in 80s and 90s of the last century, several research projects had been carried out concerning real traffic accidents mainly in the area of the capital, Prague and around it. Compared with the conditions nowadays, in spite of lower traffic density at that time, back then methodology was on very high level. The main strengths were traffic psychology observation. In fact the consequences of traffic accidents were relatively high in 80s and 90s in relation to the low traffic density.

There were also research activities managed by the company TÜV SÜD Czech under former name Motor Vehicle Research Institute in the Czech Republic. This institute participated on particular activities concerning accident research which is still in scope of this company. Nowadays TÜV SÜD Czech is responsible for medical and psychological part of Skoda Vehicle Safety Research.

After the Velvet Revolution in 1989 the traffic density rapidly increased as did the number of accidents and consequences. It wasn't until as late as the past few years that the number of accidents and their consequences began to fall. [1] Trends are evident from the Figure 1, which shows the evolution of accidents and their consequences from 1980 to 2009, in relative comparison with the year 1980 (year 1980 =100%).

Figure 1 clearly shows the fact, namely that since 2004 there has been a significant decrease in the number of fatalities. In 2004 the Czech government approved The National Road Safety Strategy with the target of achieving a 50% decrease in terms of fatalities by 2010. Thanks to new legislative rules, police input and intensive awareness activities, this new approach led and continues to lead to a reduction in the number of fatalities and serious injuries. It is not very clear whether the intended strategic objectives will be reached however the current figures this year also indicate a positive trend. Development in terms of the total number of accidents is not only influenced by road safety improvement but also by statistics; slight injuries are not already reported. The police called only to accidents where the damage on the involved cars is higher than 4000 €, any damage on public property or any injury – since 1st January 2009.

Despite the positive trends mentioned above in the evolution of accidents, it should be pointed out that the results are still not satisfactory. The number of fatalities per population is much higher than the average in the EU, especially in the vulnerable road user's category.

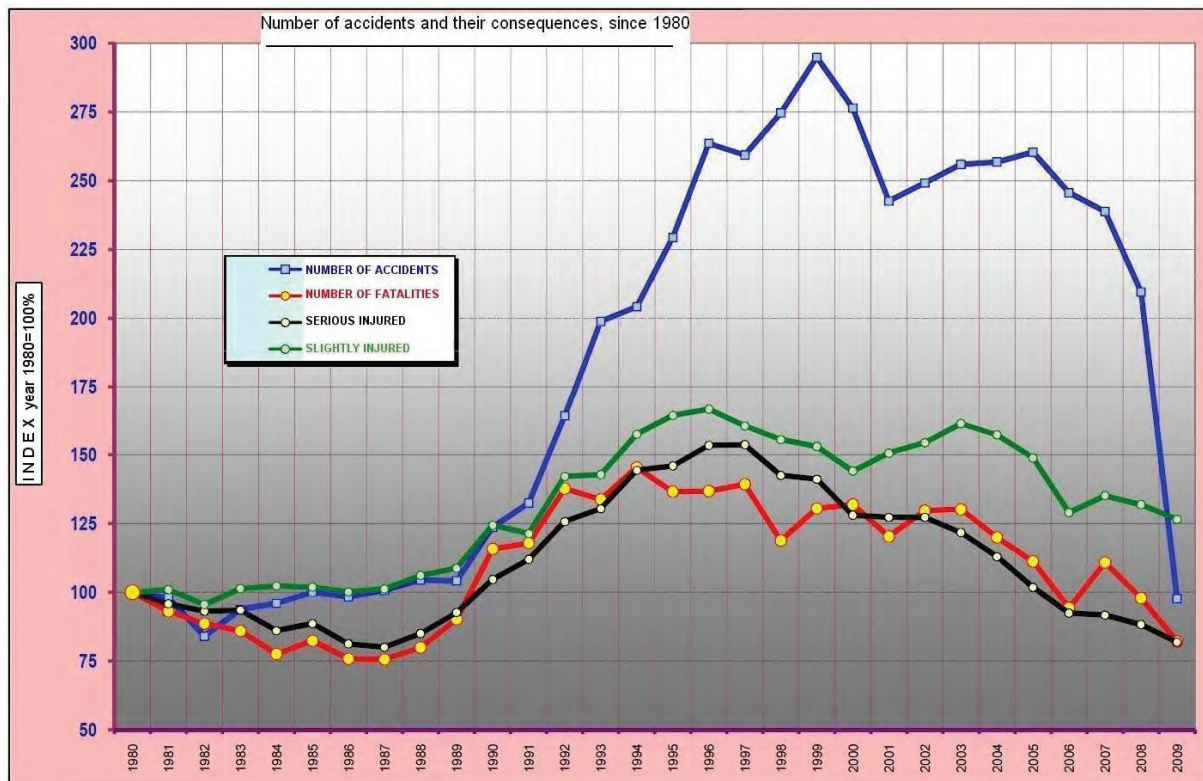


Figure 1 Shows the evolution of accidents and their consequences from 1980 to 2009, in relative comparison with the year 1980 (year 1980 =100%) [1]

Czech Police statistics

Statistics held by the Czech Police on traffic accidents published every year are crucial for the further investigation of traffic development. There are no doubts about the relevance; however, there is a lack of information concerning matters such as the circumstances surrounding the accident, influences, mechanism of potential injury. These limits could be overcome by carrying out an in-depth investigation of each serious accident. Detailed information about technical, medical and psychological accident aspects should be collected. At present, almost no in-depth studies are carried out in Central and Eastern Europe. This is the main reason why we need to promote the establishing of Czech national accident research. The data obtained by this investigation should prove the real causes for a high number of serious accidents, discover the severity of the driver's behaviour and the results present to other road users to prevent future accidents, to redesign dangerous stretches of traffic or intersections and to influence the safety level standards of vehicles run in the Czech Republic.

EXPERIMENTAL PROCEDURE

Skoda Vehicle Safety Research

Before embarking on the project

Skoda Auto accident research is a private project, but right from the start effort was made to establish cooperation with public authorities. This was necessary for its practical implementation as well as to further develop accident research in the Czech Republic in a detailed manner.

Naturally, the traffic police was going to be a crucial partner. We established cooperation on all-central (police headquarters), regional, and local. Fortunately, all important levels were involved with a positive response from police officers which enabled us to build a very beneficial and informal kind of partnership. Due to this fact, it was possible to discuss all important ideas with police partners and the project was able to get moving very quickly without any obstacles presented by the police. It was

a very good decision to cover up also ordinary policemen – it was worthwhile in terms of getting a practical image of accident research and we recommend to the others not only because it helps developing a high level of cooperation with police headquarters but also gives a clear sign to ordinary policemen that we very much appreciate their assistance and work they do.

The project was also presented to the Ministry of Transport and Ministry of Internal Affairs. These authorities are responsible for state policy on road safety and in-depth accident research was considered as an important tool for road safety improvement. Our will to exploit results was received very positively as was our prevention and awareness activities and our support of future national accident research.

Special negotiations were held with the office for personal data protection. Due to the support of the public authorities and public interest in the project we received a positive response. Of course we have to observe the personal data protection rules which limit us a great deal especially in terms of contacting those involved in accident.

Field of action

At the beginning of 2008, the unique Vehicle Safety Research (thereinafter VSR) project within the Czech Republic was introduced by Skoda Auto Company. The specialists started to collect data of accident where currently produced Skoda cars are involved. The Skoda research team is member of the Volkswagen Accident Research Group which already collects accident data in the area of Wolfsburg, Ingolstadt and Shanghai; accident research in India and Brazil is currently being prepared. Skoda Vehicle Safety Research has its base in Mlada Boleslav, the Czech Republic, and may operate in the whole area of the Czech Republic. The aim of the Skoda project is to investigate dozens of accidents annually. This quite low number could be extended by setting up a nation-wide accident research project. Moreover, national in-depth accident research should investigate all types of traffic accidents in the Czech Republic and consequently find a solution in order to curb such a high number of road fatalities.

It should be noted that from the beginning VSR is supported by two external companies TÜV SÜD Czech and AZOS CZ. TÜV SÜD Czech is nowadays responsible for medical and psychological part in the project; special 3D digital scanning of the accident scene and damaged vehicles, public relations and public organization meetings are main domains for AZOS CZ.

Since Skoda started the project, there have been a great many legislative obstacles concerning personal data protection which have yet to be overcome. It is not easy to get hold of personal data on the person involved in the accident – for this approval for further accident investigation is required. The only possibility is to be present at the scene of the accident directly and, if possible, ask for approval immediately. Otherwise, if the involved person has been injured and has to be transferred to a hospital, the investigators may lose the chance to conduct further research. In our opinion, extending accident research to the national domain could help overcome legislative obstacles by pointing out the clear goal to save lives. Our research experience could also benefit other countries considering setting up a similar program.

Two years of experience

The Skoda Vehicle Safety Research Team has found that there is still a lack of information concerning traffic safety behaviour, information about how to use safety equipment in the car and cooperation available from associations, medical service and psycho-sociological support. That's why the work of the team not only has accident data collection liability but also focuses a large part of its work on preventive proceedings.

There is no doubt that the main job is about collecting the necessary information about the accident, a detailed inspection of the involved vehicles, medical and psychological data about those involved. The collected outputs are reported regularly in several departments of the car company technical development. Close cooperation with Volkswagen Accident Research Group shows already some differences in daily traffic. In contrast to Germany there is higher number of “car to truck accidents” and collisions of cars after serious damage (without specialized repair).

The next part of the team work is to create unique video crash tests for the public indicating dangerous behaviour or situations which are very common in daily traffic. Several topics have been produced; such as the demonstration of non-use or incorrect use of restrain systems among adults and also children, improper crew position, unsuitable transportation of loads etc. Figure 2 and Figure 3 demonstrate important sequences of the two video files.



Figure 2 Frontal crash test – child without use of child restraint system protection



Figure 3 Frontal crash test – unrestrained rear passenger is killing the driver after impact

The VSR team is part of the Skoda committee for supporting an educational web interface for children called Skoda playful. This interface is intended not only for children but also teachers in elementary schools. It is produced in a highly user-friendly form informing about road safety – traffic behaviour; car safety – deformation zones, type of restrain systems, child restrain protection systems, ABS, ESP programmes and also environmental responsibility – waste sorting and separation. There is one example in Figure 4.



Figure 4 Skoda playful interfaces in the internet

Team members frequently take part at preventive events in cooperation with the fire brigade, rescue-services and the police where every visitor can take away lots of useful information and advice from these experts. On this type of events every visitor can watch demonstration of airbag and safety belt pretensioner activation; deformation zones on special-purpose prepared car (see Figure 5). During the event every child or parents should be trained how to properly fix a child in the child seat and learn more about safety behaviour in everyday car use.



Figure 5 Special purpose prepared car – demonstration of deformation zones

Close cooperation was made with Czech traffic accident victim association which helps accident-affected people or survivors and their relatives with psychosocial first aid and also legal aid. The last VSR activity mentioned is cooperation with universities and health care institutions.

National in-depth accident research in the Czech Republic

The modern history of traffic accident research is based on the activities of three entities. The first entity is a company called Transport Research Centre in Brno (thereinafter TRC), a research institution established by the Ministry of Transport. For a long time already TRC has been focusing on traffic accident research from the perspective of transport infrastructure and partially from the perspective of traffic psychology.

The second part is led by IDIADA CZ, a subsidiary of IDIADA Spain, the research and homologation authority of Spain which is significantly involved in European research in the areas of active and passive safety. In the Czech Republic IDIADA CZ focuses on the construction of vehicles and increasingly participates as its parent company in research.

The third company involved is Skoda Auto Company. Skoda Auto has been introduced in the ranking order here as third however its significance is currently fully dominant for two reasons. The first reason is that Skoda Auto is currently the only entity in the Czech Republic, which actively carries out research on traffic accidents. The second reason is that Skoda Auto is the main motivator of independent research in traffic accidents in the Czech Republic - in fact it is not only Skoda Auto but also the Volkswagen Accident Research Group concern which support this in-depth accident study within the Czech Republic.

At the turn of 2007 initial discussions began regarding the idea of the National Accident Study of the Czech Republic. All three above-mentioned subjects have worked in conjunction with one another in the last two years and very intensively since the beginning of 2010.

In June 2010 a basic agreement between the above parties was finally reached in terms of the definition of the National Accident Study of the Czech Republic (thereinafter NAS).

National accident study of the Czech Republic

The basic framework of the NAS was contractually defined between IDIADA CZ, TRC Brno and Skoda Auto. The reason for creating the basic framework in a limited group of the main organizers was the need to define very strict conditions of behaviour for all participants of today's and future research. It was necessary to define these rules in advance and preferably in the closest group of

participants. Basic rules also have to be formed in agreement with the requirements of the Ministry of Transport, Ministry of Internal Affairs and the Police Headquarter. Traffic Accident Research processes has to be validated by the National Office for personal data protection.

National research is designed as independent accident research including the evaluation of three basic parts: the vehicle - the driver - the infrastructure. The basic tool for evaluation and sorting of accidents is the Volkswagen accident research approach methodology.

The equivalent relationship between TRC and IDIADA CZ Brno is defined in terms of the national research organization. The share of Skoda Auto is slightly lower and derives from the fact that at this time Skoda Auto supports the national research team with methodology used in Volkswagen accident research. In the near future the Skoda Auto will transform from one of the main organizers to the position of the customer of this research. The reason is that in the framework of national research, the major organizers have to guarantee the role of independence. This means that the leading position of Skoda Auto in the national accident research in the future will be reduced so as not to affect the requirement of independence of research.

The relationship of the main organizers in the initial phase of the national research is suggested in Figure 6.

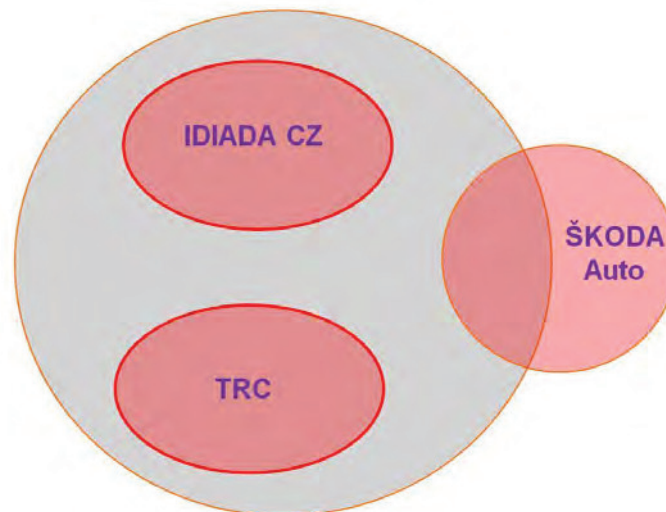


Figure 6 Relationship of the main organizers for the national research

The positions of Skoda Auto in the nation-wide research will be replaced by other subjects that will participate in the research by sub-activities. The process of involvement of other actors in national research is suggested in Figure 7.

In a future establishment, it will be necessary to mention the position of universities, which have to be significantly involved in national research.

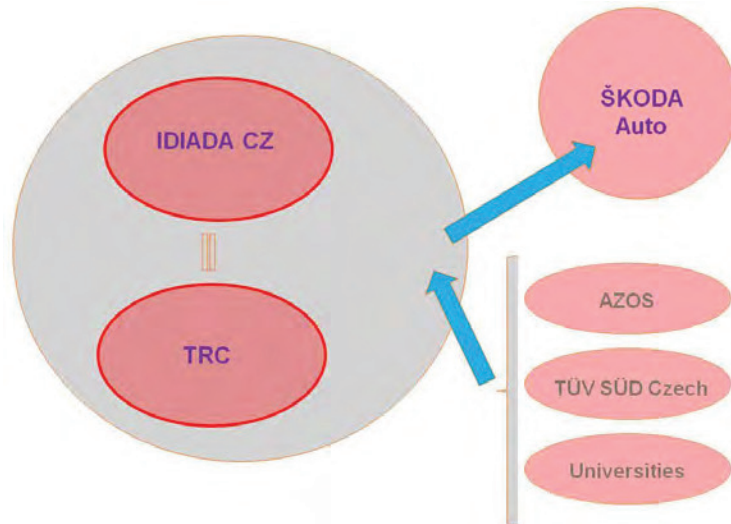


Figure 7 The process of involving other actors in national traffic accident research

The basic function of national traffic accident research determines the collection of information directly from accidents. Collecting information is provided through off-site teams, which are invited to accidents directly from the police via a special telephone number. Off-site teams depart for traffic accidents within a radius of 50-70 km from the place of work. Nowadays one off-site team is directly in place from Skoda Auto Technical Development, focusing clearly on researching Skoda car accidents. The first team also works in the framework of national research, which is already a part of an independent evaluator of traffic accidents. Today's distribution team is shown in Figure 8.

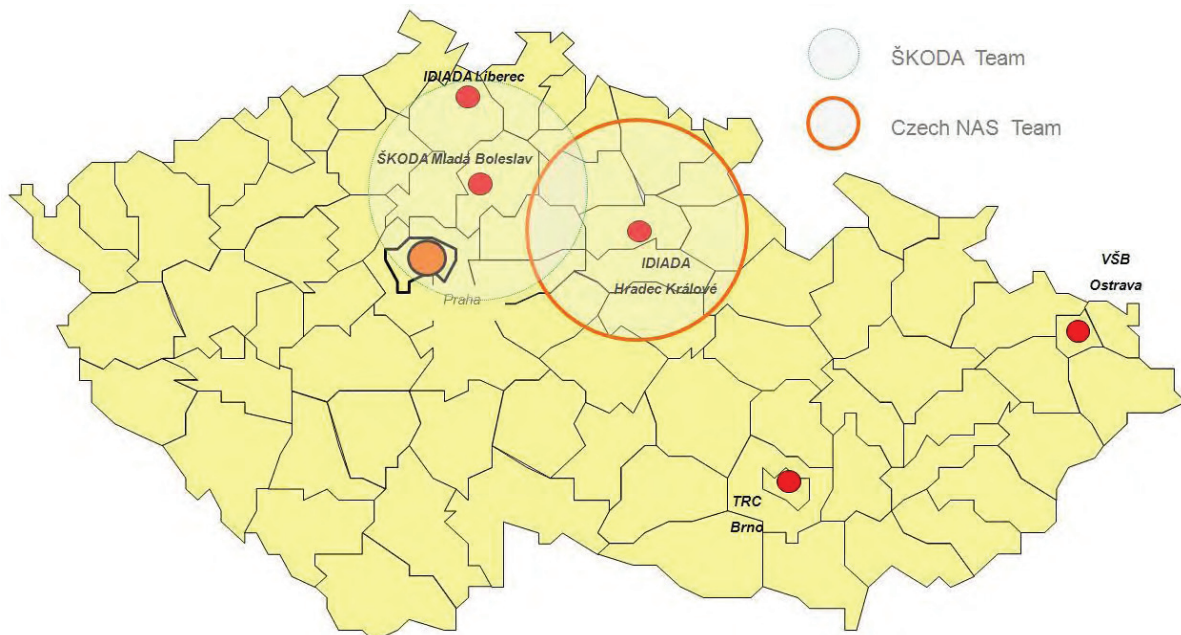


Figure 8 Current distribution of teams in the area of Czech Republic

There are future plans to extend the teams to a total number of three from the beginning of 2011. Figure 9 indicates the planned distribution. These teams could work in the future in the area of the Czech Republic.

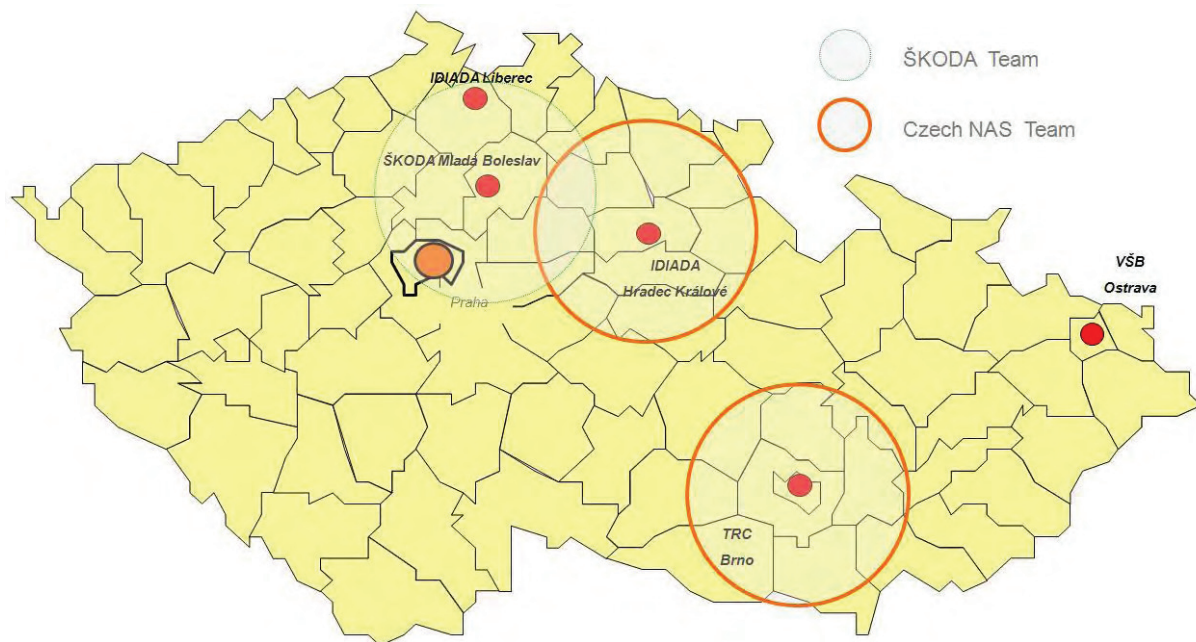


Figure 9 The planned distribution of the teams from January 2011

Marketing

The project NAS is determined for different groups of users of research results and, thus, for different customer groups. The customer's structure is outlined schematically in Figure 10.

The customers of the national research project are divided into three main groups - a group of nation institutions, a group of direct commercial customers and a group of indirect customers.

The group of nation institutions can be characterized as a user of output data from the research. Direct commercial customers are those, who use data from research for their daily work and obtain the data for consideration. Indirect customers are those, who are able to use the research data for generating topics for subsequent research projects. An important part here will be EU research projects.

In the field of financial support national project plays important role In-Depth Accident Analysis (thereinafter IDAA). It is separated sub-project of NAS which is held for four years and deals with collection and processing of real accident research data. Much of the cost should be covered by the state support which is crucial for the starting of the NAS.

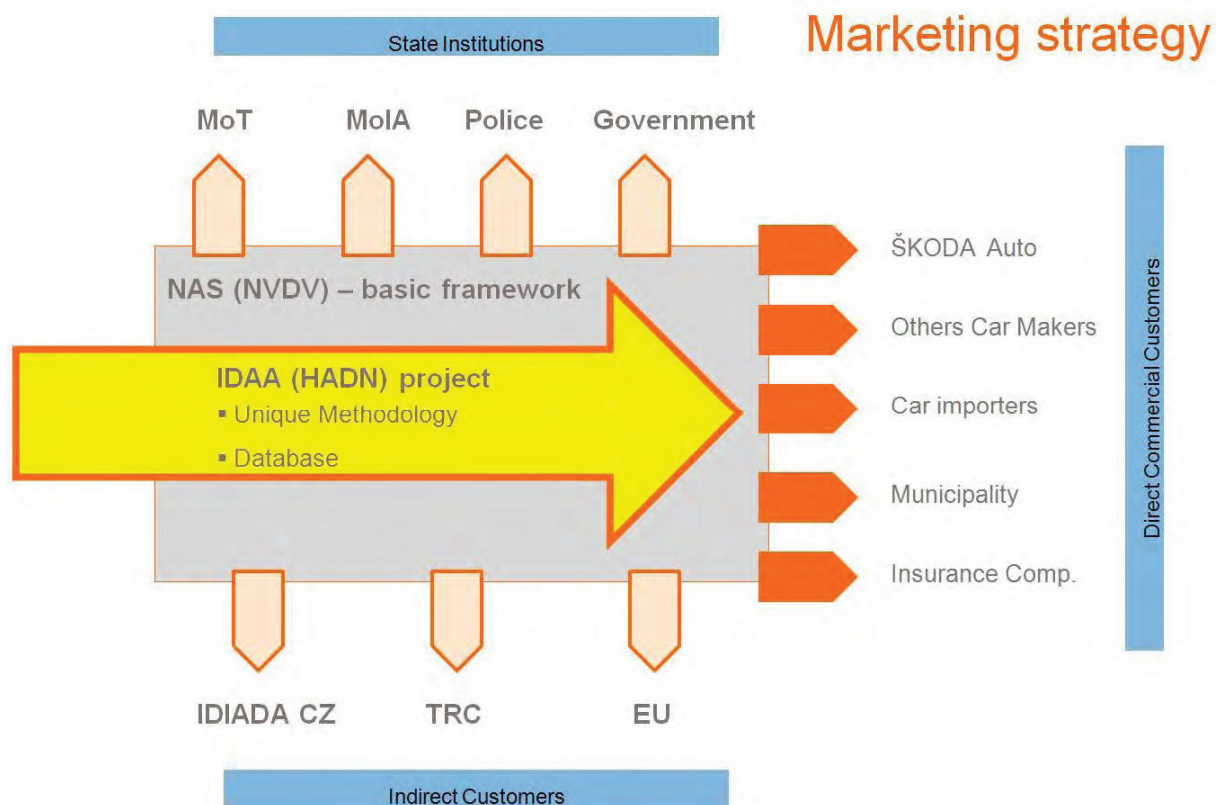


Figure 10 Customer's structure of the project National Accident Study of the Czech Republic (MoT – Ministry of Transport, MoIA – Ministry of Internal Affairs, NVDN = NAS commonly used Czech equivalent, HADN = IDAA commonly used Czech equivalent)

DISCUSSION

The future of the NAS is based on the assumption that the year 2010 is considered as a pilot project with the testing operation of collecting and evaluating data from traffic accidents. From the beginning of 2011 a fully-functional structure of the Traffic Accident Research will be created and solid data, which will be of explanatory character, will be generated.

That means that in the area of the Czech Republic arise research project concerning real accident data collection which is unique within Central and Eastern Europe.

Based on this assumption we hope to begin cooperating with foreign countries. First of all, we expect cooperation with the GIDAS-group in Germany.

Reciprocal cooperation in the field of experience exchange, data sharing and further improvements of the methodology is one of the joint efforts. There is a change in traffic atmosphere in recent years in the Central and Eastern Europe; there is an increase of aggressive behaviour among drivers which has serious consequences in the whole traffic. Another particularity is in the field of workshops, it is possible to repair car using two heavily damaged vehicles and apply it for traffic capability. Some accredited car workshops has found losses in sale with non-approved car part.

Furthermore, we are preparing cooperation with Poland, Slovakia, Hungary and Spain which is positively influenced by IDIADA company agencies in those particular countries. Some meetings had been already processed. The goal should be to develop cooperation across the European Union.

CONCLUSION

New research findings could reveal the exact causes of traffic accidents. Consequently, the results presentation should influence the driver's behaviour, possibly also may lead to change of dangerous infrastructure points more effectively, and could find the best active safety systems preventing more

accidents as well as increase safety features in vehicles. As an example, several awareness campaigns have already exploited our findings for argumentation.

Rising National Accident Study is a unique project within the area of Central and Eastern Europe which has the courageous goal of charting the traffic situation in the Czech Republic and gaining detailed data for future precautions. This information will be important not only for the state administration, automotive companies, automotive suppliers, insurances but also for the European Union.

REFERENCES

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