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Needs for evidence-based road safety decision making in Europe

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Abstract

The objective of this research is the assessment of current needs for evidence-based road safety decision making in Europe, through the consultation of a panel of road safety experts. The members of this Experts Panel have extensive knowledge of road safety management processes and needs in their country, being either directly involved in decision making, or working closely with decision makers. Two consultation methods were implemented: semi-directive interviews and written contributions. The synthesis of the results was carried out by means of a predefined matrix, in which the road safety management tasks were separated into their components, and were then cross-tabulated with distinct categories of needs. The results provide valuable information on the current and future needs for evidence-based road safety management in Europe. A number of key issues were brought forward with wide consensus among Experts, such as the need to make the consideration of scientific evidence in road safety decisions compulsory in all countries. The establishment of appropriate procedures was emphasized, including institutional arrangements for road safety management, with the necessary links and interactive procedures for local needs. The results also include

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useful recommendations, for the setting of targets, the use of cost-benefit analyses, the analysis of combined effects of measures, the collection of data on measures implementation, the collection of exposure and behavioural data, the estimation of injury under-reporting and the standardization of analysis methods.

Keywords: road safety; evidence-based policy; experts panel; needs assessment

1. Introduction

Within the research project 'DaCoTA - Data Collection, Transfer and Analysis', particular focus is put on road safety policy issues, and the actions and practices of field actors (Allsop, 2003; Bliss, 2004; Elvik, 2008; Brougton, 2010). The related research activities are meant to anchor the development of the European Road Safety Observatory (ERSO) into policy-making by feeding information on the needs for data knowledge and methodologies obtained from decision-makers and stakeholders in European countries (ERSO, 2008; 2008b). More specifically, the research carried out within DaCoTA aims to identifying policy-makers' needs in terms of data, data analysis and methodological tools, and consulting major stakeholders on these issues. Moreover, it aims to defining a methodology for the investigation of road safety management and policy-making processes, as well as gathering and making available qualitative information on road safety management and policy-making on a sample of countries.

Within this framework, an Experts Panel was created and a consultation was launched for the preliminary assessment of knowledge, data and analysis needs within road safety management (Dupont & Muhlrad, 2010). The objective of the consultation of this Experts Panel was the assessment of current needs for evidence-based road safety decision making in the European countries. In particular, it was intended to identify specific needs for knowledge, data and tools, which should be taken into account for the creation of useful and relevant road safety decision support tools.

The objective of this paper is the presentation of the results of the consultation of the Panel of Road Safety Experts, and the assessment of current needs for evidence-based road safety decision making in Europe. The paper starts with a presentation of the methodology used for the consultation (i.e. selection criteria for the experts panel, consultation methods, questionnaires etc.). Then, a description of the sample characteristics of the experts panel is given, followed by a detailed analysis of the results of the consultation.

2. Methodology

2.1. Selection of the Experts Panel

The selection procedure for the present study capitalized on the existence of a group of National Experts established by the European commission to obtain information and data concerning accident and road safety, as determined by a council conclusion. This group of experts has been set up in the framework of previous research activities of the European Commission, to allow further developing the CARE database on road accidents in the EU, as well as to develop country performance indicators across the different member states. The National Experts group includes representatives from all member states as well as from the non-EU "Schengen" countries (Norway, Switzerland, Iceand). As such the group offers ideal possibilities for liaison with those countries for the purpose of a consultation. The experts

were also asked to advise one or two additional names for their country. Additional names were provided by the DaCoTA partners involved in the analysis, for the countries whose road safety management organisation/structure they were familiar with.

2.2. Road safety management data matrix

The consultation of the Experts Panel was carried out by means of a predefined matrix (Muhlrad & Dupont, 2010), in which the road safety management tasks (i.e. fact-finding, development of programmes, planning and implementation of programmes, monitoring and evaluation) were separated into their components, and were then cross-tabulated with distinct categories of needs (i.e. knowledge, data, methodologies, tools) (ETSC, 2006; SUPREME, 2007).

The key tasks identified for policy making and road safety management were:

- Fact finding: diagnosis of the road safety situation at country level, international comparisons between European countries, establishing facts in order to identify target groups for road safety action;
- Road safety programme development: setting up quantitative targets, selecting appropriate measures or combination of measures addressing the priorities identified in the "fact finding" phase, assessing the expected combined effects of the measures to ensure the quantitative targets can be reached in time;
- Preparing implementation: identifying requirements for the sectoral implementation of measures addressing infrastructure, transport and traffic, vehicles, behaviour, health factors, costing the overall programme and defining funding mechanisms;
- Monitoring and evaluation: following up accident and injury trends, forecasting changes and future trends, assessing the overall effect of road safety policies, evaluating individual measures in the short and the long term.

For each of these tasks, the needs for knowledge to be examined included:

- Data: basic data, composite indicators (definitions, data collection and management, quality issues);
- Technical tools for data treatment: data analysis, modelling, forecasting, costing, etc.
- Other decision-support tools: methodologies, syntheses, aids to access the relevant information or tools, etc.
- Training tools: methods to assess the needs for training, training programmes, other training systems (simulation, games, expert systems, etc.)

2.3. Data collection

Two consultation methods were implemented: semi-directive interviews and written contributions. The preferred method for consulting experts was through semi-directive interviews carried by members of the research team. However, due to language and time constraints, only experts from the countries with representatives in the team and/or those using a language spoken by a team member could be directly questioned. In order to give a chance to experts from all European countries to provide an opinion, a request for written contributions was also sent to all of the panel members through the EC.

To further guide the written contributions, three questions were asked:

- To identify the most important tasks, both in the practice of each country and in the opinion of the expert;
- To elaborate on the needs for knowledge for each of the most important tasks;

- To identify the needs which are already satisfied through the current offer of data and knowledge at the European level and the needs towards the satisfaction of which further efforts or research are needed.

The format of written contributions was left free, so that experts did not feel constrained and could easily express themselves. In practice, some experts followed the list of tasks, some used the cells of the matrix, some used the three questions to structure their contributions and a few experts provided ideas outside the framework provided. Text analysis was used to examine the information collected.

To ensure comparability of interview material, guidelines for the interviewers were prepared and used in interviews with the experts. Some broad and open questions were formulated to ask the experts in order to get them on the right track for the purpose of the consultation; these were similar to the three questions raised in the request for written contributions. Based on the objectives and preoccupations of the research, precise questions were also provided to get some relevant information on key problem areas: these questions, which formed the framework for the directive part of the interview, were to be asked only if experts had not covered the ground through their spontaneous contributions.

3. Results

3.1. Sample description

In the whole mailing list, 79 names could be considered as "targets" for this consultation. Of all the persons who received the invitation from the European Commission, 38 in total contributed to the consultation. 20 of these contributions were interviews and 18 written contributions. Three persons who were interviewed sent written contributions as well. Two written contributions were produced by two persons jointly and one interview was conducted with two persons jointly. Overall, the number of contributions obtained can be considered satisfying.

The respondents are spread widely across the Union and other European countries. It must be noted however, that, although the member states that more recently accessed the EU did contribute to the consultation, they tended to do so to a lesser extent than the other member states. Few contributions were received from decision makers who are not involved in research activities. The majority of the contributions came from people leading a road safety research group, or from scientists who have an advisory function in the government (present or former). There were also a number of researchers working directly in the institution that is responsible for decision making (in-house expert/statistician).

3.2. Analysis of the results

The results of the consultation, in terms of needs in data and tools for evidence-based policy making, are presented in the following sections, separately for each road safety management task

3.2.1. Fact-finding and diagnosis

1. Assessment, improvement and treatment of existing data
Data:
- Better definitions for serious injuries, crashes
- Targeted databases and information sources for searching relevant facts
- Disaggregated data for better problem examinations

- Risk ratios for specific types of infrastructure, road user groups
- International comparisons of trends in specific groups of road users, e.g. motorcyclist, elderly, notorious offenders
- Periodically updated basic fact-sheets on crashes and injuries
- Exposure data and behaviour indicators

Tools:

- Standardized methods for checking injury/crash data, assessing underreporting and for linking police and health databases
-GIS-based systems for data collection by the police
- Flexible tools to access crash and injury data
- Methods for assessing underreporting and for linking police and health databases
- Seminars and other training tools for fact-finding, interpreting the data
- GPS support for data collection

2. Insufficient or missing data and needs for new tools

Data:

- Definitions of behaviour indicators and their priorities
- Definitions of work related crashes (on the way to and from work)
- Exposure data for motorcyclists and pedestrians
- Road safety expenditures, also in comparison with expenditures on other policy areas (e.g. environment)
- Definitions of exposure indicators for international comparisons
- Definitions of common behavioural indicators
- Comparative fact-sheets on costs of crashes in EU countries
- Systematic collection of weather data, of disaggregated exposure data for specific road user categories, etc.

Tools:

- Standardized methodologies for data collection on vehicles, roads, drivers, traffic
- Software for linking the databases
- Link to the database of work related crashes
- Common methodologies for collecting behavioural data and road users' attitudes
- Statistical methods for priority setting
- Common method for identification of hazardous locations
- Quantitative risk acceptance method
- Descriptive analysis methodologies to identify crash patterns
- Common methodology for priority setting
- Common methodology to assess costs
- Establishing a system for collecting behavioural indicators
- Methods for collecting exposure data on walking and cycling

3. Needs for a better understanding of road safety

Data:

- Fact-sheets on typical crash scenarios and the relevant causation factors in European countries
- In-depth crash investigations and analyses of severe crashes

Tools:

- Guidelines for crash investigations and analyses
- Methodological tools for better understanding crash scenarios using surveys of user behaviour
- Naturalistic driving studies and driving simulator studies
- Evaluation of impact of external factors on road safety, e.g. economy, weather, demography

4. Integration of road safety with other sectoral policies

Data:

- Examples of synergy between road safety and the environment agenda
- Values of fatalities, injuries per capita for comparison with health sector

- Synergy between road safety and the environment agenda

3.2.2. Development of programmes

1. Tools for target setting and the selection and combination of safety measures
Data:
- Results of combined effects of safety measures across the EU
Tools:
- Tools to determine ambitious but realistic targets
- Efficiency assessment methodologies which integrate other implications of safety measures (health, mobility, environment, etc)
- Models for estimating the combined effects of measures
- Forecasting a baseline scenario when developing a road safety programme
- Statistical models (time series analyses and forecasting) for target setting
- Multi-factoral models for the implications of safety measures (safety, quality of life, health)
- Efficiency assessment methodologies which integrate other implications of safety measures (health, mobility, environment, etc)
2. Improvement of data and knowledge on the effects of road safety measures
Data:
- Data on the efficiency of measures and policies implemented in local conditions
- Information on the efficiency of in-car technologies
- Summaries of good practice including the implementation conditions
- Examples of "best practices" and evaluations of their effectiveness – on ERSO site
- Databases with accumulated international experience on safety effects of various measures and interventions
- Information on frameworks for safety rules and regulations in the European countries
- Overview of and information about measures that are taken in other countries with respect to specific target groups
- Detailed costs of safety measures and interventions
- Systematic updates of results of meta-analyses of safety effects and CBA/CEA ratios of safety measures
- Costs of safety measures in the European countries
- Comparisons of the frameworks in which measures are implemented
- Thematic reports on good practices in Europe concerning key problems
Tools:
- Tools enabling quick search of recent findings/summaries of studies on specific issues
- Effectiveness of behavioural measures
- Standardized procedures and methods for carrying out the evaluations
3. Developing knowledge on public acceptance
Data:
- Information on public attitudes concerning safety measures
- Comparative information from the countries concerning the acceptance of specific measures
4. Integration of road safety with other sectoral policies
Tools:
- Methodologies to identify common factors to be addressed when safety and environmental impacts are considered
5. Improving stakeholders involvement in knowledge-based decision-making and implementation processes
Data:
- A national database accessible to all stakeholders
- Survey of good practice in at least the best performing European countries on involving all the stakeholders in the programme's development
- Data collection systems for “the assessment of the main stakeholders’ strategies and interests”

3.2.3. Implementation issues

1. Specific methodological needs
Data:
- Information from road safety audits and road safety inspections
- Information from the public health sector on the ways of risk education and changing behaviour
- Infrastructure: detailed databases providing a description of road lay-out, signing and marking, safety devices, etc
- Digital road maps for mapping crashes
-Detailed information on the vehicles involved in crashes
- Overview of safety evaluation results of ITS on board vehicle systems
- Fact-sheet on automatic enforcement in European countries, including legal and operational dispositions to implement the measure
- Samples of spots and posters for road safety campaigns
- Review of the contents of driver training programmes in European countries
- A fact-sheet on the details of injuries and the hospital and health burden in Europe
- Examples of education programmes for ambulance drivers
Tools:
- Sound common method to identify black-spots
- Common methodology and training material for in-depth crash analysis
- Tools for micro-simulation of road user behaviour in certain environment
2. Funding issues
Data:
- Information on the potential funding sources for road safety measures
- Database of the costs of road safety measures in European countries
Tools:
- Methodology to assess the costs of crashes to be accepted by decision-makers
- Tools to assess the cost of road safety measures, including guidelines to identify elements of costs
3. Monitoring implementation
Tools:
- Good practice and methodologies for monitoring implementation
4. Complexity of the implementation process and training needs
Data:
- User-friendly interfaces to help new users in finding road safety material in the internet D/T
Tools:
- Methods to assess the training needs of individuals involved in implementation processes

3.2.4. Monitoring and evaluation issues

Data	Tools
1. Tools and methods for monitoring, forecasting, and policy evaluation	
Data:	
- Monitoring serious injury in addition to fatalities	
- Database on confounding factors for the models' development (weather, exposure, etc)	
Tools:	
- Two kinds of models: for short- and medium/long- term monitoring	
- Methodologies on evaluating trends/forecasting accounting for multiple factors and interventions	

- Statistical methods for developing forecast models
- Statistical methods for isolating effects of specific policies
- Crash prediction models for various road types
- Statistical methods for following-up trends
2. Tools and methods for the evaluation of safety measures
Data:
- Reliable data on measures and interventions applied
- Detailed monitoring of the measures implemented
- Definitions of surrogate data applicable for some evaluations
Tools:
- Evaluation techniques for various kinds of safety measures
- Appropriate techniques for the evaluation of safety effects of various measures
3. Reporting on road safety action
Data:
- Norms and quality standards for infrastructure improvements and other RS measures
- Detailed information on the measures implemented
- Review of good practice and the tools used for regular reporting on the programme's implementation

3.3. Synthesis of the results

The results of the consultation of the Experts Panel include numerous useful remarks and recommendations on the various road safety management tasks, from fact-finding and assessment of the problem, to the development of road safety strategies and programmes, and from the planning and implementation of these programmes to the monitoring and evaluation of their effectiveness. These can be outlined as follows:

- Road safety management needs to be guided by ambitious yet realistic targets for the improvement of road safety.
- A more sophisticated approach to cost-benefit and cost-effectiveness analyses is required, to assist decision makers in the selection of road safety programmes and measures.
- A methodology for priority setting in the selection of road safety measures is required.
- A most challenging related task, also calling for methodological developments, concerns the assessment of combined effects of road safety measures (as is typically the case when proposing a road safety programme).
- On the other hand, the richness of existing results on the road safety effects of various measures and interventions needs to be better exploited, by means of the creation of handbooks and databases with accumulated international experience on these questions.
- The desirable improvement in road safety may depend on the current level of road safety of each region or country, e.g. the lower the road safety performance of a region or country, the higher the potential for road safety improvement.
- A total lack of information is observed as regards measures implementation data and information (procedures, conditions and costs for implementing the measures).
- The evaluation task is most essential to the long term process of policy-making. It is stressed that, while it is the last step of evidence-based road safety policy making, it should also serve as the point of re-initiating the whole process of assessing the situation, selecting new measures etc.
- Particular emphasis is given on the development of tools enabling the identification of reasons and mechanisms that may lead to the more or less favourable outcome. This is a key question affecting the transferability of experience between countries.

Finally, the consultation of the Experts panel brought forward a number of specific questions and needs related to the data and methods required for knowledge-based road safety management. This is a rather heterogeneous group of particular issues, which is yet worth outlining, due to the emphasis put to these issues by several experts:

- Particular effort should be devoted to addressing the injury under-reporting issue in Europe and to establishing a common definition of injury severity, through the linkage of Police and Hospital data.
- In several European countries, the question of reliably determining the accident location still needs to be dealt with.
- Improved and standardised methods for the treatment of hazardous locations are required. Moreover, the integration of data from road safety audits and road safety inspections would be most useful.
- The lack of sufficient and reliable exposure data is still a major limitation of road safety analyses.
- A need for collecting more, and more reliable behavioural data is underlined.
- The collection of in-depth accident investigation data in the European countries may assist in the understanding of accident mechanisms, and in the promotion of cost-effective technologies.
- The linking of road safety related databases (e.g. accidents, health, exposure etc.) would significantly facilitate evidence-based policy making.
- The added value of new methodologies such as simulator experiments, naturalistic driving studies etc. should be thoroughly explored.

4. Key messages and recommendations

From the results of the consultation of the Experts Panel, a number of key issues were identified, concerning the promotion of evidence-based road safety policy making in Europe. In fact, not only a very wide consensus among Experts on these key issues was observed (i.e. the issues were raised by many Experts from different countries), but also a strong tendency to bring them forward (i.e. the issues were raised while discussing different topics and questions within the consultations). These key general messages can be outlined as follows:

- Road safety is a science, road safety policy making should be based on knowledge and only if it is treated seriously, reliable support to decision makers can be provided.
- Part of the insufficient consideration of available knowledge, data and tools in road safety management is still due to a lack of awareness on the added value of evidence-based decision making.
- The promotion of evidence-based policy making goes through the establishment of appropriate and specific procedures for its implementation.
- These procedures include on the one hand the institutional arrangements for road safety management to be carried out centrally (at national level) and by a single dedicated organization, while establishing the necessary links and interactive procedures for addressing local road safety management needs and processes.
- The compulsory consideration of scientific evidence for each road safety decision needs to be established, by means of appropriate procedures exploiting standardized methodologies, knowledge and data for carrying out the necessary analyses in each case.
- Once such procedures are implemented, it will become obvious that scientific evidence can also assist towards the acceptability of road safety policies, as well as towards a more efficient allocation of the, often limited, resources for road safety.
- The integration of road safety with other policies, mainly within the mobility, health or environmental sectors would be an important next step for maximizing the benefits of evidence-based policy making.

5. Conclusions

The consultation of the Experts Panel provided valuable information about the current practices and future needs for evidence-based road safety management in Europe. It is noted that such a process was launched for the first time at European level. The added value of this process becomes clear when considering, for instance, the selection criteria of the Experts Panel. The proposed profile of the Experts, although not at all restrictive in terms of background and experience of the Experts, was formed around the basic idea of persons working at the interface between road safety science and road safety decision making.

In this consultation, particular emphasis was given to the open nature of the questions, allowing the experts to provide their own experiences, views and messages and to put emphasis on the issues they consider themselves important, without being "directed" by a detailed questionnaire to certain specific judgments. This type of open consultation determines the way the results are analysed. Rather than enabling a quantitative analysis, a wealth of information on all aspects of road safety management in the European countries was provided. Of course, the analysis of such material requires time, and is fastidious. However, the results provide the necessary basis to design closed questions for a more systematic assessment of the knowledge needs encountered in decision-making processes.

Another considerable methodological contribution of the Experts Panel consultation concerns the creation of the proposed matrix for the assessment of the needs for evidence-based road safety management, which a linkage of these needs and benefits to road safety management tasks for the first time in a comprehensive and systematic way.

Finally, the information gathered through this process of organizing and carrying out the consultation includes not only the needs for knowledge, data, tools and analyses, but also the related needs for better road safety management processes and structures, allowing the integration of knowledge and decision support tools into policy making. From these results, the appropriate directions are given towards knowledge-based policy making in the European countries. Moreover, it is possible to set the priorities in the steps required towards this objective.

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