12. FUTURE SAFETY GAINS AND SAFETY PROBLEMS CONNECTED TO NEW TECHNOLOGIES

A STUDY BASED ON EXPERT INTERVIEWS IN THE FRAME OF *PROMETHEUS*

Christine CHALOUPKA

FACTUM
Vienna, Austria

12.1 INTRODUCTION

PROMETHEUS is a EUREKA project were European car industry and scientists from universities as well as other scientific institutions are working together. The main targets of this project are

- making traffic more safe.
- harmonize traffic flow,
- increase the efficiency of travel and transport management.

The study presented here is a part of a bigger project in the frame of a PROMETHEUS project the author and Ralf Risser were involved in.

12.1.1. PRO-SAFE, The Safety group within PROMETHEUS

Our part in this project is the participation in a group called PRO-SAFE, the safety-group, consisting of engineers, and social scientists. One of the main activities of the group till now was to assess the different technical and electronical systems, which are produced by industry and which are in no case more than prototypes by now, with respect to their safety impacts and to their possible negative side-effects.

We also were involved in the creation of the socalled *Traffic-Safety-Checklist* which is now computerised. The idea of the checklist is to motivate scientists e.g. engineers who try to create a special technical system to think about different possible outcomes and side-effects of the product under discussion. This means that producers of new technologies should also think about e.g. unprotected roadusers and the influence of their product on behaviour of all road users, on life-quality etc..

12.1.2 Traffic is a social system

We think that an important contribution to the work of the safety group of us as social scientists is to make the others aware of the fact that traffic is mainly a social system. In this system behaviour of all road users is to be taken into consideration. Behaviour cannot be programmed like some technical systems.

An example for the importance of a social scientist being involved in discussions about future traffic is the fact that a group of engineers working out such scenarios of future traffic to start with did not consider pedestrians and cyclists. The role of the social scientist, among others, is to detect and deal with problems deriving from the fact that the needs of certain groups are not considered adequately.

12.1.3. New technologies - new behaviour?

Another part of our work especially for the Austrian sponsors was to find out which tasks and problems road users of future traffic will have to solve and if they will have to learn new behaviour in order to be able to participate in traffic correctly and safe.

For example, there will be different levels of intervention in driving activities by different vehicle equipment:

- information warning
- recommendation
- mandatory order
- automatic intervention
- automated driving

Some of the new technologies will strongly interfere with the activities of the drivers. E.g., if braking will be done by the system to keep distance in certain situations, nobody knows till now, how drivers will react to this and if and how they will accept this interference by the machine.

12.2. INTERVIEWS WITH TRAFFIC SAFETY EXPERTS AND ENGINEERS FROM INDUSTRY

Regarding these coming possible changes in the traffic system it seemed interesting for us to know about the opinion of traffic safety experts on the one hand and engineers from industry on the other hand. We wanted to know

- if there were different points of view regarding the efficiency and the safety gains of new technologies
- how both groups assess the role of engineers in relation to social scientists in the frame of designing new technical systems
- if engineers show relevant lack of interest regarding social psychological aspects of traffic behaviour.

So we interviewed members of the safety group (=safety experts) and some engineers from car and supplier industry.

Why these two groups?

Members of the safety-group are experts coming from different scientific areas (engineers, social-scientists, economists, physicians etc.). They are involved in safety projects since many

years. They have been meeting each other for several times since the founding of the PRO-SAFE group and therefore used to work interdisciplinarily.

The engineers from industry are involved in mainly technical problems which are sometimes only scarcely related to general safety ideas. Most of them work together with other engineers but seldom with social-scientist or persons from other scientific disciplines.

12.3. TOPICS OF THE INTERVIEW AND MAIN RESULTS

The questions of the interview concentrated on various topics.
The whole questionnaire will be added in the appendix of this contribution.

a) The importance of the role safety plays in the frame of one's own work

Although both groups know the difference between objective and subjective safety, in both groups accidents are looked at as the most important criterion for unsafety. Only two members of PRO-SAFE mention that an unsafe feeling of road-users can be regarded as a hint for unsafe traffic.

b) The point of view about

- *the role of engineers regarding traffic safety work*
- *their responsibility regarding the outcome of engineer's products (liability regarding products)*
- *communication and possible problems with other scientific disciplines (e.g. social scientists)*

Both groups think that the "voice" of the engineer is not taken into account by the public or media as it should be. Two examples: Both groups are of the opinion that journalists for example only hear what they want to hear. Manuals are not read by users correctly, mostly they are not read at all, so as a matter of fact, technical systems sometimes are used incorrectly.

The group of engineers of industry is more longing for information exchange with other disciplines (social scientists and juridical people) than the members of PRO-SAFE. This is not astonishing because the safety group already consists of representants of different scientific groups.

With respect to questions concerning responsibility of the engineer regarding his products the opinion differs in very much both groups: We received such different statements os, e.g.,

- there is no responsibility at all
- the product should be as safe as possible but how to use it is a matter of the driver´s responsibility
- there is total responsibility of the producer of technical systems

Concerning possible consequences of technical systems, there exists a very new Austrian study that shows the opinion of about 400 engineers of different engineering areas of them think that

they are not responsible at all for their work and that science is free. But the study also says that the more engineers were not only working scientifically but of applied technology critically about their work and the more they thought that they had to consider possible unintended side-effects of their work.

c) *The awareness about the fact that traffic is a system consisting of the interfering components man-machine-environment*

Regarding this topic knowledge and consciousness about the importance of this point differ very much between both groups.

Engineers from industry seem to know that there are some interfering system components but the components machine and environment are dominant. Traffic is not seen as a social system. Not so within the PRO-SAFE group. They don't look at traffic reality heavely in a "technical" kind of way, although the group consists also of engineers.

d) *The knowledge about other safety criteria than accidents*

The group of the engineers of industry stated that they were very much interested in all kinds of safety criteria other than accidents. But they did not know where to get informations. Their bosses did not support them at all in this respect. Therefore there has been rather few possibility for them till now to order literature or to participate at congresses dealing with all kinds of problrms connected to transport.

In PRO-SAFE, other safety criteria than accidents are well known: traffic conflicts, violations, errors, etc. However, aspects of life-quality as possible criteria are not so much taken into account.

e) *The necessity of providing for special aids for participation in traffic (including pedestrians, cyclists, all other non-car drivers)*

In both groups there exist similar opinions about this. First of all, engineers from industry rather than members of PRO-SAFE think that it is technically possible to provide for help for unprotected road users. Moreover, they think that those technical inventions should be rejected which make it necessary to find special safety- and information-outfits for the unprotected road users.

f) *Knowledge and awareness of the importance of some tendencies of human behaviour when dealing with technical products like compensatory behaviour delegation of responsibility, behaviour transfer, imitation,*

Concerning different behaviour adaptation tendencies (risk compensation etc.), it could be found out that *risk compensation* was very well known by both groups. They think that it is a

relevant factor of influence for road users behaviour which should be taken into account when producing technical systems.

Delegation of responsibility was seen as an important fact by the members of industry but not so much by the members of the safety group.

Concerning *ambiguity of signals* some members of both groups had not thought about it, and some others did not think about it as a relevant matter of safety work.

Both groups have similar opinions about the problem of *imitation* in traffic. They think of it as a problem only of a special group of people namely young males.

Although members of both groups know about these problems, engineers from industry till now did not think about possibilities how to warn consumers and inform them about the fact that their behaviour could be influenced by the technical system. They meant that also in the future this would be a rather unrealistic demand: Managers from car- industry and people who would sell the products lateron would not tell the public about possible side-effects. They are afraid of a rejection of the products by the consumers as a consequence of such information.

g) *The point of view concerning socialisation effects in traffic and concerning "accident proneness"*

Regarding possible socialisation effects both groups have very similar opinions:

Some of them think that there exists something like a national driving style. Some think that driving behaviour is a matter of different driving experience and not at matter of nationality.

In practice, critical behaviour is seen as being most typical for certain groups of drivers. According to their point of view, accidents are mostly found

- in the group of young males, people with lack of experience or who want to show off
- in the group of the elderly people
- and special professional drivers (freight or taxis drivers) because of their exposure

Members of the industry name some other "types" of drivers they think cause problems

- people who are aggressive
- on the contrary people who are very freightened
- and others who are stressed and/or very much in hurry.

Of course, this categorisation does not at all contradict the concept of socialisation. Aggressive behaviour, stress etc. are most certainly products of both social and individual influences.

12.4. CONCLUSION

The interviews showed that the discussion about social-psychological matters within PROSAFE so far has lead to the result that there exists a somewhat more complex sight of traffic

than in the group of engineers of industry. Traffic is seen as a social system where human properties are taken more into account.

The interdisciplinary work in PRO-SAFE seem to be fruitful for the understanding of each other. Still, engineers in PRO-SAFE tend to try to solve traffic-problems by technical means and not by social-scientific ones like, e.g.. information-strategies, feedback and tutoring, public relation work, etc.

This means that social-scientific knowledge has already found the entrance into the traffic safety world, the necessity of more discussion about it seems clear to us.

ICTCT could be a platform for discussion. It seems to be necessary to find a common language to understand each other. Being able to make ourselves understood in our group is a good precondition to make ourselves understood in public, by politicians and opinion leaders.

ACKNOWLEDGEMENTS

This project was financed by the Austrian FONDS ZUR FÖRDERUNG WISSENSCHAFTLICHER FORSCHUNG during 1992.

REFERENCES

RISSER R. & CHALOUPKA CH. 1993, Prometheus und Sozialwissenschaften, Sozialwissen schaftliche Grundlagenarbeit im Bereich "Sicherheit" im Rahmen des EUREKA-Programmes PROMETHEUS; Forschungsbericht P8634-SOZ, FACTUM Eigenverlag, Wien

APPENDIX

a) Questions concerning traffic safety in general and the importance of the role safety plays in the frame of one's own work

- What is meant by "traffic-safety", according to your opinion?
- Do you know the difference between objective and subjectiv traffic-safety?
- Which role does safety play in the frame of your work?
- As an expert which possibilities do you see to improve traffic-safety in the frame of PROMETHEUS (or in the frame of your work)?
- Are products of your institution/company systematically analysed with respect to safety (if the products are results of research: are they evaluated?)?
- What do you think is necessary to make traffic safety work
  - a) of your institution
  - b) in general

  more efficient regarding machine, man, environment (the ideas can be utopical) - from a

  a) technical,
  b) legislative,
  c) executive point of view

---

b) Questions concerning

- **the role of engineers regarding traffic safety work**
- **their responsibility regarding the outcome of their products (liability regarding products)**
- **communication (problems) with other disciplines e.g. social scientists**

- Do you think that in public (in media, in discussions with politicians etc.) the ideas of engineers/technicians connected to traffic are considered adequately?
- Do you feel need of more information exchange with experts (scientists) from other disciplines?
- If exchange allready exists, do you have the feeling that the cooperation is difficult somehow? If yes, in which sense?
- What should be changed?
- Do you think that there is responsibility from the engineers' side with respect to how the products he created are used "in the field"?
  - If yes: Where do you think are the limits of this responsibility?
  - How is this responsibility reflected or how should it be reflected, respectively?

c) Questions concerning the awareness that traffic is a system consisting of man-machine-environment

- Traffic is a system that consists of many components which influence each other (man-machine-environment) - To which degree are such system-aspects taken into account by yourself when working (e.g. do you think of how new products will be used in practice and to which degree this can have consequences for other road-users (e.g. pedestrians, non-equipped drivers)?

d) Questions concerning the knowledge of other safety criteria than accidents - including life-quality

* Do you feel need of special information (about accident-data, taffic conflict analyses, critical incidents, errors, behaviour-analyses, etc.) that could help you to integrate safety aspects more systematically into the products you create?

- Do concepts like "traffic-conflicts" or "behaviour interaction" normally play a role in your work?

- When thinking about traffic-safety, do life-quality aspects play any role?

- In your opinion are there contradictions between life-quality and traffic-safety aspects?

---

e) Questions concerning the necessity of providing for special help with regard to new technologies (including pedestrians, cyclists, other non-car drivers)

- Concerning the implementation of new technologies/RTI-systems in traffic in the next future: Do you think that road users will need more help for (e.g., do they have to learn new behaviour patterns, do they need new types of instructions, or feedback)?

- Who should provide for such help (e.g. driving-schools, legislation, producers, traffic-safety institutions)?

- How can it be made sure that such an equipment will be accepted, or bought and that this kind of equipment will be used in the way it was planned to be used?

f) Questions concerning the knowledge and awareness of the importance of behaviour tendencies when dealing with technical products

- Do you know the expression "**risk-compensation**" - what does it mean?
  - Do you have any spontaneous ideas, what could be done to avoid behaviour modification that "eats up" traffic safety?
- What does the expression "**delegation of responsibility**" mean?
  - Which new technologies could create problems in this regard?
  - What could be done to avoid them?
- In traffic we often are confronted with the problem of the "**ambiguity of signals**" - what does it mean?
  - What could be done to avoid negative effects deriving from the ambiguity of signals?
- Do you know the expression "**behaviour transfer**" - what does it mean?
  - Do you have any idea, how to tackle the problem of behaviour transfer?
- Which role does "**imitation**" play in traffic?
  - Do you think that there are people who are especially affected by imitation - both in the active and in the passive role?
  - What role could imitation play with respect to traffic safety ?

---

g) Questions about the point of view about socialisation effects in traffic

- In your opinion, which factors influence people so that they become "typical" cardrivers (Mr. or Mrs. Austria, Sweden etc.)?
- Are there in your opinion people who create more problems in traffic than others or that are involved in accidents more than others. Do you think that there exists something like "accident-proneness"?