SVI
Vereinigung
Schweizerischer
Verkehrsingenieure

ASTRA

TA-DT 25A/1999

TECHNOLOGIEFOLGEN-ABSCHÄTZUNG UND VERKEHR: EINE ANNÄHERUNG AN EIN VIELSCHICHTIGES UNTERSUCHUNGSFELD

Kurzfassung der Vorstudie “TA im Verkehrswesen”

EVALUATION DES CHOIX TECHNOLOGIQUES ET TRANSPORTS: PREMIÈRE APPROCHE D’UN CHAMP D’INVESTIGATION À FACETTES MULTIPLES

Résumé de l’étude préliminaire „La TA dans les transports“

TECHNOLOGY ASSESSMENT AND TRANSPORT AN APPROACH TO A MULTI-LEVEL FIELD OF INVESTIGATION

Short version of the TA-study TA in transport

Editorial in german only

Die vorliegende Kurzfassung fasst einige wichtige Ergebnisse aus der TA-Vorstudie “TA im Verkehrswesen” zusammen.

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Der Forschungsantrag wurde gestellt von der Vereinigung Schweizerischer Verkehrsingenieure SVI; finanziert wurde die TA-Vorstudie vom Bundesamt für Strassen und vom TA-Programm des SWR.

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TRANSPORT – THE PRODUCT OF A COMPLEXITY OF INTERACTIONS

Transport is a feature of our everyday lives and at the same time is influenced by our daily routine. This complex interaction makes it especially difficult to assess the consequences of technology in the field of transport.

We are mobile – in our work, in sport and in our leisure time. On the one hand there are dormitory towns on the edge of the metropolis and on the other, offices in the maze of towering city-centre blocks. Without a viable transport system to cover the distance between home and the work-place, between the shopping mall and the sports field, it would not be possible to maintain this spatial differentiation between urban centres and the surrounding areas. Modern life depends on the pulse of the main transport routes. A transport seizure results in supplies running out and the total breakdown of social communication. Mobility dictates the rhythm of modern society. And it is precisely for this reason that it is difficult to assess the effects of changes in the complex interplay between transport technology, political decisions and individual behaviour on our transport systems – and in turn what consequences they will have for society.

The history of transport – and some wrong prognoses

The fact that a new means of transport can literally revolutionise current conditions and that its consequences are not limited to technical aspects such as distance, time or capacity was demonstrated by the introduction of the railway. It was not only the simple man in the street who found it difficult to come to terms with the ”incredible iron horse”, which he approached with superstition and mistrust, but also members of the nobility. They quite rightly feared that this new means of transport would reduce their privileges as regards mobility. In the future the enjoyment of rapid and comparatively comfortable travel would no longer depend on having one’s own carriage. In the mid-19th century, Countess Hahn-Hahn complained in letters written while travelling, ”Oh dear me yes! It’s all part of the modern way of life! The railway is bringing equality and centralisation and those are the two *idées fixes* of those who like to call themselves Liberals. As if centralisation did not lead to the most awful tyranny! All barriers are being swept aside, along with rank, pleasures and needs. At a small cost old people and children, people of class and the common folk, rich and poor, humans and animals are being whisked from place to place thanks to the steam engine.” (Sieferle, 1984: 112).

As far as regards the development of transport, history reveals examples of grossly false predictions. It is said that at the end of the 19th century the inhabitants of European cities fea-

An article published in the Neue Zürcher Zeitung in 1904 describes the general attitude in the early days of motorised transport:
”The enjoyment provided by the motor-car is an expensive, in fact a very expensive sport, which means that only few people can afford such a luxury. (...) Like all new inventions, the motor-car has met with widespread scepticism, and this will continue to be so until it has become a common means of transport. Indeed, was there not a flood of negative criticism of bicyclists when the bicycle became a common feature in our streets? Today we are quite used to it; we have had to get used to it, in particular since the bicyclist was lucky enough to be able to pass the antipathy towards him on to a ”greater evil”, the motor-car driver. Human inventiveness will perhaps offer us a new vehicle one day which, in comparison, will make us look kindly upon the motor-car and will attract our widespread antipathy away from it. (...)”

red that their streets would sink totally under the flood of horse-dung if the volume of traffic increased further. It never came to that because horses and carriages were soon to be replaced by motorised transport. But here too, the predictions of experts were wildly off the mark: the new idea of motoring was first seen as a sport (see box p. 1). The wealthy man-of-leisure who treated himself to a car had to make an enormous physical effort to start his machine with a crank-handle or to push-start it. A hundred years ago hardly anyone foresaw that the exclusive motorised carriage would one day become a means of transport for the common man. And even in the economic boom of the 1960s the development of individualised motor transport was very much underestimated.

When the car first started its conquest of our daily lives, not only the rapid spread of car-ownership but also its technical features were not at all foreseen. Around 1900 there were 4000 cars on the road in the USA, of which around 40% had steam-engines, 40% had electric motors and only 20% had petrol engines. The fact that the latter became the norm is due far less to technological development than to the enormous influence exerted by the American oil lobby.

2 PROGNOSES, SCENARIOS AND TECHNOLOGICAL ASSESSMENT

The many different basic aspects of mobility make it impossible to draw up a precise prognosis for future development – not only with respect to quantitative changes such as increased mileage or a rise in the total number of vehicles on the road, but rather with regard to the quality of mobility: how we travel or transport goods.

Transport specialists overcome this difficulty by not making prognoses but rather devising various scenarios and thus taking into account different possible development trends in basic conditions such as economic relations with neighbouring countries or the introduction of new environmental laws. Precise statistics for the future are therefore replaced by a broad pallet of possibilities, which allows for a variety of likely developments. It must be said, however, that like prognoses different scenarios are characterised by the fact that they can only take into account a small number of basic conditions. Devising different scenarios can thus provide a valuable basis for taking a political decision concerning transport. This is one of the methods that can be included in various evaluation and assessment procedures (e.g. suitability tests, environmental impact tests, etc.).

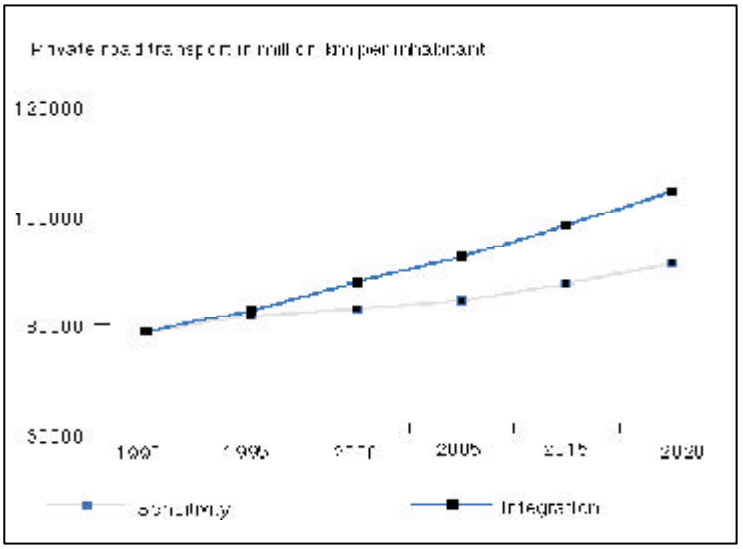
The scenario method is also an important tool in assessing the repercussions of new technology or so-called "technology assessment" (TA). Its requirements are more comprehensive, however. Its sole aim is to provide a global assessment of all the advantages and disadvantages of new technology, i.e. it attempts to predict as early as possible the positive and negative impact of new technology on the environment, culture, the economy, politics, etc. TA thus combines quantitative and qualitative analyses and involves different disciplines. Apart from the broad range of its content, TA also allows for a variety of methods to be used. So-called "participative approaches" are ad-

ded to studies which are based on the classical scientific measurement and survey methods. This type of participative process can help to break down resistance and find ways of reaching common solutions in particular in the case of controversial issues which rouse public emotion. Participative methods try to include the point of view of the general public – their opinions, hopes and fears – in assessing new technology, as well as bringing together the decision-makers in the fields of science, the economy and politics.

TA studies in relation to transport

At an international level it is the FANTASIE, HINT and CONVERGE research projects of the fourth EU Basic Programme which are of special importance for Switzerland. On the whole, TA studies are mainly carried out at a national and sometimes at a regional level today, the approaches used being strongly influenced by the cultural, political and social context and consequently differing to a certain extent. Most studies deal with individual technological developments (for example, the fuel cell or traffic control systems) or new car designs such as the electric car. Meanwhile, it is rare that transport concepts or complete transport systems are the subject of a study. Reports published so far have concentrated on road transport, while rail transport and in particular air transport and shipping as well as intermodal transport have received little attention.

In Switzerland various institutions such as federal research departments, universities, private research institutes and engineering companies, as well as advisory bodies for accident prevention, are studying issues concerning mobility and technology. The prime example of a Swiss TA study in the field of transport is the MANTO project run by the Federal Institute of Technology in Zurich. In comparison with other countries – namely Germany and the Netherlands – Switzerland has paid far less attention to TA in the field of transport to date. The lack of knowledge, namely concerning socio-scientific problems, is particularly regrettable.



Various basic conditions define the limits of the various scenarios. The "Integration" scenario is based on Switzerland's participation in the European integration process and a policy on the environment and transport which foresees no drastic measures. The "Sensitivity" scenario, however, assumes that Switzerland will remain economically independent with a slow rate of population growth and an opportunistic approach to transport and environmental policy (Graf et al., 1994).

Opportunities missed

In Switzerland a series of major projects are under way – the NART (New Alpine Rail Tunnels), Rail 2000 and the introduction of a performance-related heavy vehicle tax – without any TA analyses having been carried out beforehand. In particular with regard to the NART, which has met with opposition among local inhabitants in various places, consultation in the form of participative TA could have helped gain support among the general public for this major federal railway project. Over the past few years it is only avant-garde projects such as the underground express railway (Swissmetro) which have been the subject of technological assessments, while various case studies have been carried out on electronic traffic and parking control systems. New technical features and the corresponding services

Cars which warn the driver when he or she is too close to the vehicle in front, or which correct the steering if lane markings are not respected are no longer something out of science fiction. Whether such ”safe” vehicles will ensure more safety on the roads remains to be seen, however. Experience so far, in relation to the introduction of ABS and airbags, for example, has shown that the advantages gained by technical safety are largely offset by a more reckless style of driving.
The latest transport technology not only offers optimisation of existing vehicles but also proposes completely new ideas in transport. These new concepts include, for example, ”moving roads” – a sort of conveyor belt for motorists; sitting in their car, passengers are transported from A to B and can use their time more profitably than if they had to drive by working on their laptop computer or reading. It is possible that in the not too distant future private and public transport could be merged; chip-cards are being developed at present which would replace tickets for public transport and could include other functions such as a rental card for car-sharing or admission to museums or swimming-pools, as required. One of the new ideas along these lines is ”Easy Ride”.
Information and communication technology will play an essential role in shaping transport in the future. Positioning systems which locate a vehicle and identify its route could, for example, supply the necessary technical data for levying a road-use tax for commercial and private vehicles. This could be the first step towards a sustainable transport system which pays for itself in real terms.

may well ensure, however, that TA in transport remains a subject of controversy in the future (see box).

In this connection TA can be implemented from two basically different stand-points. On the one hand, a technological innovation is examined as to the positive and negative impact that can be expected. In any case, it can also assess the foreseeable consequences of not introducing the corresponding technology. Such studies, based on a given technological innovation, are termed ”technology-based assessments”.

On the other hand, a study can be based on a problem – for example extreme air and noise pollution in cities. Such studies are termed ”problem-based assessments”. In this case a TA study may examine various measures, including technical approaches such as underground transport and supply systems for city centres. In contrast, a socio-economic approach may aim to improve collaboration between the main players involved in ”city logistics”, in this case the various transport companies. Problem-based studies are less common than technology-based studies. They are considered more complex and cannot be restricted to single technological innovations.

The participative approach should be used for both technology-based and problem-based studies. This type of approach is especially suitable where problems are extremely complex and where positive feed-back on the part of the general public can be expected.

In Switzerland TA needs in any case to focus on genuine innovations in the system (e.g. integrated transport management systems, automatic road traffic control). Simply improving existing systems, such as better traffic-light control procedures, is of little comparative interest.

IN FAVOUR OF INSTITUTIONALISING TA

In Switzerland many different institutions are studying the individual aspects of TA in relation to transport. This makes an overview more difficult and increases the likelihood of duplication. A coordinating office would be advantageous in this respect.

The requirements with regard to TA in the field of transport are not easy to fulfil: firstly, it should be independent and remain uninfluenced by pressure from the various lobbies such as the motoring organisations, transport companies, road constructors, etc. In addition it should be possible to carry out long-term technological assessment in order to obtain the required data over an extended period of time. Lastly, TA should involve a degree of coordination and communication so that the complex questions can be dealt with in an interdisciplinary manner by groups of suitable specialists and assistants.

The results of the preliminary "TA in Transport" study recommend institutionalisation through the setting up of a coordinating office at the Swiss Science Council. The primary role of such an office would be as a forum for exchanging information and for discussion; it would keep a centralised list of people, activities and projects concerned with TA in transport, for example. At the same time it would coordinate not only the various TA activities within Switzerland, but also the corresponding TA activities involving Switzerland and other countries. In addition, it would have to determine the need for specific investigations in the field of transport among the institutions directly concerned and interested parties. Furthermore, a coordinating office would have to supervise TA studies carried out by third parties and thereby ensure that the required quality standards are maintained. Finally, the office should ensure that the results of TA studies are made public.

It goes without saying that such a central TA coordinating office and information forum could not fulfil this difficult task alone but would rely on collaboration with the main authorities, organisations and research institutes involved. If the desire for practical coordination and cooperation were backed by the necessary funding from various sides a feasible way could be found to ensure multi-disciplinary and multi-institutional collaboration with regard to TA in transport. It is precisely when Switzerland's future transport policy is focused on sustainable mobility and new transport systems such as road pricing or the introduction of a "Eurometro" that close collaboration between all the parties involved is essential.