

Traffic research relating to both short-term and long-term traffic planning

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Traffic planning is a term covering a wide range of varying activities and comprising all different means of traffic. An attempt to illustrate future traffic planning in more general terms can therefore be extremely difficult. However, we can no doubt benefit from certain experiences when considering the problems facing us.

Generally speaking, traffic planning has so far been a relatively isolated activity performed by experts and researchers, technicians and economists. The planning process can very briefly be described as follows: the politicians have determined certain aims – the fulfilment of specified traffic requirements – after which the traffic planners have supplied the technical and economic solutions, for instance the building of roads or railways, the improvement of collective traffic systems, etc. The planners have often presented a separate solution to each problem.

For a number of years Sweden, like most other countries, has successively built up the necessary know-how for the development and implementation of traffic planning. This planning has covered different levels – local, regional and nationwide traffic – and applies both to individual and collective traffic, passenger and freight traffic. It would be far from true to claim that this planning is now perfect and equals all reasonable demands. On the contrary, we are still only at the beginning of a long process towards ever-improving traffic resources and knowledge of how to achieve them.

What are the chief aims of present-day traffic planning? One might say that, both in the case of individual and collective traffic as well as passenger and freight traffic, efforts have been concentrated partly on increasing *accessibility* and partly on making travelling and transport *economically possible* for the individual or the firm. I shall in the following be limiting myself to passenger traffic only. However, the same conception applies also to freight traffic.

Passenger traffic planning has been included in the overall societal planning as a means to create swift and cheap traffic solutions on the basis of the existing structure of *private dwellings – places of work and service facilities*. This has created an ambition to make work and service more accessible and to stimulate and increase (in the short-term view) the traffic input. Several different methods have been used in this connection. In the case of individual traffic it has chiefly been a case of improving the road network, creating shorter routes which permit faster traffic, etc. In order to increase the passability of the collective traffic the most important factors are to increase the regularity, concentrate the bus or train line networks, and increase the speed. In latter years the additional most important method has been to lower the fares for collective travelling by introducing subsidies.

All the measures now mentioned have aimed to in-

crease the capacity of the traffic machine, increase traffic output and reduce the dependence on distance as such. The main obstacle facing these efforts has been the possibilities of society to meet the traffic requirements by means of tax revenue.

The role played by traffic researchers in this planning process has been comparatively simple. It has been their job to suggest measures and point to methods which would make it easier for the planners to achieve their main goal – good accessibility. The researchers have thus studied how, given certain prices, the traffic is divided amongst different means of traffic, the effects of reduced travelling times, the influence of the convenience factor, etc. Behind all these studies we find the assumption that the consumer, that's to say the traveller, should be comparatively free to choose the means of travel which he/she prefers. This attitude has resulted in the tremendous expansion of private motorism all over the world. Existing differences between the number of cars per 1 000 inhabitants in various countries are almost entirely related to variations in economic development. On the other hand, the views with regard to the motorcar as a means of traffic are fairly similar, or rather have been fairly similar.

The traffic planning which has taken place in our major cities has thus aimed at building up traffic systems which can transport large numbers of people swiftly and cheaply. The governing principles for the construction of these systems have often been of a fairly short-term nature, whereas the solutions chosen often have had exceedingly long-term effects, for instance motor highways and underground railway lines, which are built to solve current traffic problems but which have consequences affecting societal development for perhaps up to 100 years after their creation.

It is here we find one of the most serious failings within present-day traffic research and there is every reason to consider this matter. I shall revert later on with some examples of the conflicts with regard to aims which can arise when adopting short term, alternatively long-term approaches to traffic problems. First, however, I think there is cause to dwell somewhat on the working technique often adopted by researchers when making long-term assessments instead of the more usual short-term forecasts.

As I mentioned just now, it is quite an ordinary technique within traffic research and traffic planning to have a comparatively short planning horizon – at best up to about 15 years. Based on forecasts for such a period of time, the planners suggest to the politicians that a highway or underground railway line, etc., should be built. Then one leaves it to the traveller to choose the means of traffic he/she finds most suitable. Now, should a politician begin to worry about what the future will look like after the 15 years have elapsed, the planner approaches

the researcher with a request for a scenario for the future or a long-term prognosis. This is where the responsibility of the researcher enters the picture. A scrutiny of such long-term forecasts almost invariably shows that they are to a very small degree related to all the investments we have already made or are making and which will be in good working order for maybe 100 years ahead.

What is the reason for this? Well, traffic researchers have to a great extent simply not been interested in tying

together the future with the present. One may perhaps sympathize with such omissions within other sectors of society, but it is a dangerous matter when it comes to traffic, since all investments we make in that field have such a long life, compared for instance with investments made within the engineering industry.

The following two figures illustrate what I mean in diagrammatic form.

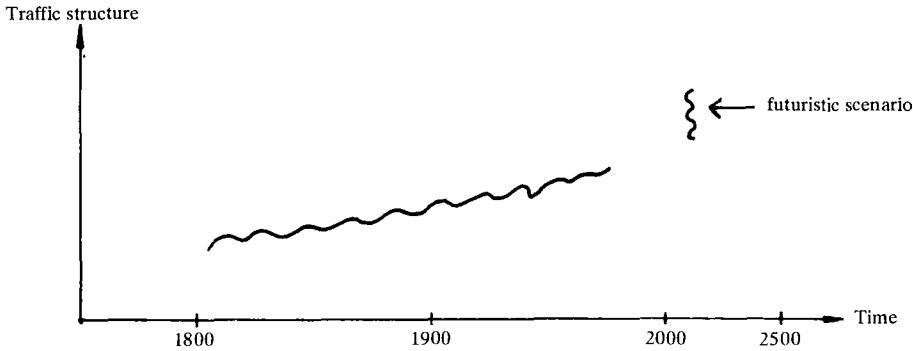


Fig. No. 1.

Fig. No. 1 illustrates a certain factual development of the traffic machine. It could for instance show how the road network has developed. For the years immediately following 1975 there are certain tangible plans which can be indicated with a certain degree of accuracy. Later on, when a more long-term prognosis is to be made, same often hangs in the air, completely separated from all previous investments. It is at this stage that different

more or less fantastic projects see the light of day. They may be possible from a technical point of view, but lack all economic relevancy.

Instead, we traffic researchers should strive to develop our methods so that they also include determining the long-term effects and ties of the investments which have already been made or may be executed. The figure would then have the following appearance.

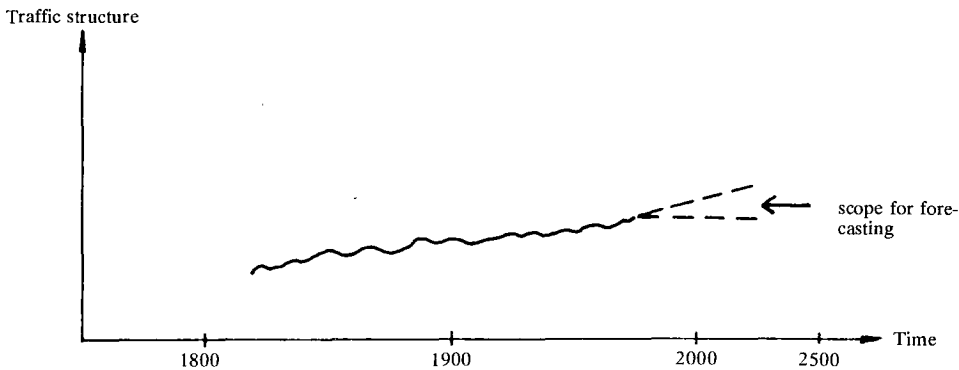


Fig. No. 2

The ties resulting from the often short-term decisions are as a rule so great also in the long-term view that the scope for a prognosis, not least within the traffic sector, is very limited indeed.

This type of approach is by no means a new phenomenon. It has been discussed in many connections among futurologists. However, tangible studies and more thoroughly prepared proposals about such studies are more rare within the traffic sector. This is all the more regrettable in view of the fact that traffic planning is facing a number of really formidable trials which will place great demands both on researchers, planners and politicians.

There are many circumstances which would seem to indicate that this very roughly outlined earlier planning

procedure can now be regarded as more or less unsuitable and due for development along other lines. Based on experiences mainly in Sweden, it seems reasonable to me to claim that politicians – and in this case I refer to politicians active at the central decision level – have a desire to participate in and also actually do engage themselves in the entire planning process, thereby exerting an influence on the technical solutions successively evolved. This is mainly a consequence of the fact that traffic planning already has been or will soon be given an entirely different dimension.

I initially mentioned that traffic planning has hitherto primarily aimed at increasing accessibility, that's to say transporting people between two points in a *swift and*

cheap manner. Consequently, all forecasts and futuristic scenarios have been governed by this rather simple principle, and the same applies to the methods chosen.

The new feature of special interest for the future is that traffic planning in all probability will be governed not by one aim alone but by perhaps four or five different goals. To the principle of *high accessibility* can be added a *reduction in the negative effects on the environment*, efforts to *minimize energy consumption*, a *high degree of traffic safety* and, last but not least, an integration of traffic planning into the general welfare policy with *traffic being regarded as an economic equality factor*.

There is no exaggeration in venturing to say that a number of serious conflicts will arise as to which aim should take precedence over the other and, seeing that different aims call for different methods, future traffic planning will become extremely complicated and delicate.

I should like to briefly comment on some of these aims and their probable effects, with particular emphasis on the aspects of energy consumption, illustrating how that principle clashes with other aims, above all the desire to achieve a high degree of accessibility.

The demands for a *traffic machine which is less ruthless to the environment* have increased in step with our growing knowledge of the connection between serious illnesses and pollution, the long-term effects on vegetation caused by the discharge of sulphur, etc.

As a result, traffic solutions previously regarded as being both rational and natural are now considered completely unthinkable by both politicians and public opinion. We can in fact expect more and more frequent restrictions where traffic – above all private motoring, road transport and air-borne traffic – is concerned.

This makes it obvious that the aim of achieving high accessibility in many cases will directly clash with the demands concerning the environment. One can be fairly sure of the fact that, in the long-term view, the environmental demands will be more and more accentuated.

Traffic safety is yet another question which in recent years has become increasingly important and, politically speaking, an evermore burning issue. In an age when tremendous efforts are being made to cure illnesses, prevent epidemics, etc., more and more people are beginning to question the justification for the death of hundreds of thousands annually in traffic accidents.

The aims relating to traffic safety will no doubt also affect traffic planning far stronger in the future, despite the fact that great achievements have already been made in this field.

A third aspect I should like to dwell on briefly is a line of development which is becoming increasingly noticeable in more and more countries, namely the view that good traffic resources should be regarded as a *social right*. At least as far as private traffic is concerned, this means that we are beginning to regard traffic in the same light as schools, medical care, etc. This results i.a. in collective traffic to an ever increasing degree being financed by public funds and in public agencies becoming responsible for both planning and running. This of course automatically leads to the question of traffic resources becoming a political issue. It also results in harder priorities between different means of traffic or, in other terms, a political directing of the traffic to certain means of traffic and traffic solutions. A debate is presently in progress in Sweden regarding these questions and corresponding discussions are also being increasingly held in other countries as well. Not least the future demands for a society which economizes with existing resources will require increased Government intervention, which in turn presupposes the need of an increased societal economic input. The free choice of traffic servi-

ces, to which we have become accustomed, can in future be severely restricted.

This brings me to the question of resources and the effect which efforts to reduce the consumption of energy can have on traffic planning.

First of all, it should be emphasized that a general aim to reduce energy consumption within the traffic sector can constitute an excellent example of the risks of *sub-optimizations*. Efforts to reduce energy consumption within the traffic sector could for instance result in increased consumption within another sector, which might lead to an increase of the total energy consumption. Without exhaustive analyses of the intersectorial connections relating to energy consumption the risks of such effects should definitely not be ignored. However, in the following I shall simplify matters by assuming that such risks do not in fact exist. I therefore base myself on the simplified assumption that efforts to reduce the consumption of energy within the transport sector constitutes a meaningful policy. In order to further simplify the discussion only passenger traffic will be dealt with.

Efforts to reduce energy consumption in connection with passenger traffic can be regarded in a short-term and a long-term perspective.

Attempts to reduce energy consumption can be divided into four different sub-goals or rather methods of achieving the aims. The first aim can be termed a *reduction of the total traffic sector* or the *prevention of a continued growth of the total traffic sector*, see Fig. No. 3.

Aim	Method	
	Short-term	Long-term
Reduction of the total traffic sector	Restrictions	Alterations of the settlement structure
	Increased fares	
	Increased petrol prices	
	Reduced collective traffic	

Fig. No. 3

In the *short-term* view the aim can be achieved by introducing different types of restrictions on travelling, for instance petrol rationing, imposing a ban on driving, increased energy tax on petrol, increased collective fares, a reduction in collective traffic, etc. These methods are in stark contrast to what has earlier been indicated as the usual aim of traffic planning, that's to say accessibility, and implies a reorientation of the entire traffic policy. Corresponding measures in the *long-term* view could be to change the settlement structure so that private housing, service facilities and work places are located close to one another. It is difficult to prophesy as to how this would affect freedom of choice as regards work, recreational possibilities, etc. In all probability scattered building in sparsely populated areas would be made impossible and this aim might also mean the death of all small places. Even our present major cities might prove to be unsuitable. However, a long-term effort to reduce the total traffic sector might still prove to be necessary and therefore increased knowledge of regional variations within the traffic sector is highly desirable.

Another aim of energy resource policy could be to *transfer traffic from an individual to a collective basis*. Behind this goal we have the conception that collective traffic per person is less energy-consuming than individual traffic (see Fig. No. 4).

Aim	Method	
	Short-term	Long-term
Transfer from individual to collective traffic	Restrictions on individual traffic	Fully developed collective infrastructure
	Increased petrol prices	Reduced road-building
	Reduced collective fares	
	Fully developed collective traffic	

Fig. No. 4

The *short-term* measures which can be adopted are restrictions on individual traffic, increased petrol prices, reduced fares for collective traffic and a fully developed collective traffic. It is quite apparent that some of these measures are entirely contrary to the aims which were intended to reduce the total traffic sector. As far as the *long-term* measures are concerned one can mention a development of the collective infrastructure and abstaining from further roadbuilding for individual traffic. This aim becomes particularly interesting when being compared with the two following goals which aim to reduce energy consumption within the individual sector respectively the collective sector.

The aim of reducing *energy consumption within the individual traffic sector* could, in the short-term view, be accomplished by increased petrol prices and energy tax, restrictions, the stimulation of co-driving and the use of smaller and energy-saving cars (see Fig. No. 5). In this case the means agree with what I have said previously concerning the other aims.

Aim	Method	
	Short-term	Long-term
Reduced energy consumption within the individual traffic sector	Increased petrol prices	Increased passability on the road network by building away queues and straightening out roads
	Restrictions	
	Stimulation of co-driving	
	Reduced energy consumption per car	

Fig. No. 5

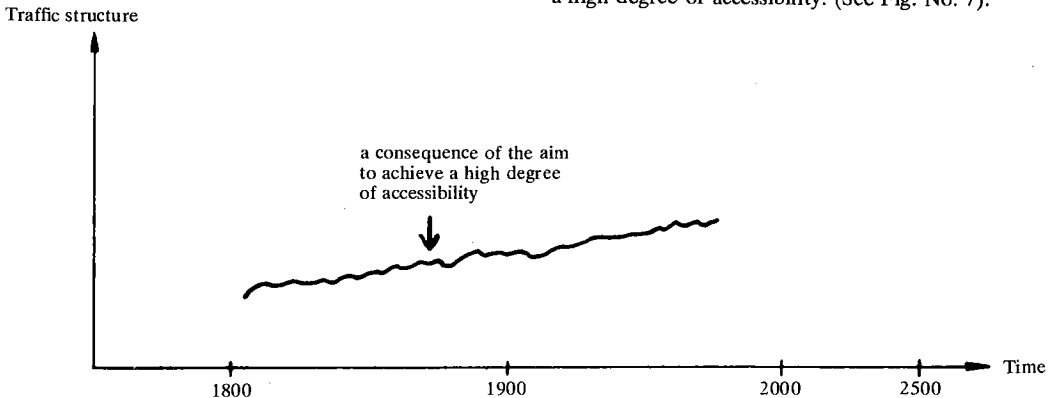


Fig. No. 7

In the *long-term* view these methods can no doubt be augmented by measures aiming to improve passability by building away queues, straightening out the road network so that the driving distances become shorter, etc. In this latter respect the measures chosen comply with present-day road policy. Efforts to reduce energy consumption within the individual traffic sector are probably easiest to fit into present traffic planning. However, there can be no doubt that a far-reaching one-sided aim to reduce individual traffic would have considerable effects on other parts of social-welfare policy, such as for instance the efforts to achieve equality within employment policy and as regards regional policy.

The fourth aim, finally, is to attempt to *reduce energy consumption within collective traffic* (see Fig. No. 6).

Aim	Method	
	Short-term	Long-term
Reduction of energy consumption within collective traffic	Reduced frequency	Increased passability by infra-structural measures
	Increased fares	
	Increased combined running	
	Smaller vehicles	

Fig. No. 6.

These measures may seem drastic. However, they were to a certain extent applied during the latest energy crisis. The *short-term* methods are reduced frequency – above all during off-peak hours –, increased fares, a reduced number of lines, which means more changes and reduced travelling speed. All these measures are directly contrary to the traffic planning which has been common during latter years. The establishment of such an aim thus means a radical rethinking within the planning. In the *long-term* view the measures previously mentioned could be augmented by the infrastructural development of new collective traffic routes, roads, etc., that's to say methods which form part of presentday road policy.

In the light of what I have just said there is reason to try to connect the earlier discussion on planning and futurology with existing signs of new aims making themselves felt within the traffic sector. It is in this context that the role of the traffic researcher becomes particularly interesting.

Now let's revert to the figure shown earlier. The hypothetical development shown by the curves illustrates a traffic structure which has been based on the principle of a high degree of accessibility. (See Fig. No. 7).

When discussing the future the question now arises how much of the earlier investments must be considered incorrect and therefore abandoned due to the introduction of new aims.

It is here that the researcher has a vital part to play. When the politician – whether he himself wants it or not – has defined his aims for a traffic policy, it is the task of

the researcher to show the resultant effects and develop methods indicating for instance which previous investments are thereby made valueless. The fact of introducing new aims which are in conflict with old goals and which are also at variance with one another can hypothetically lead to the curve having the following appearance: (see Fig. No. 8)

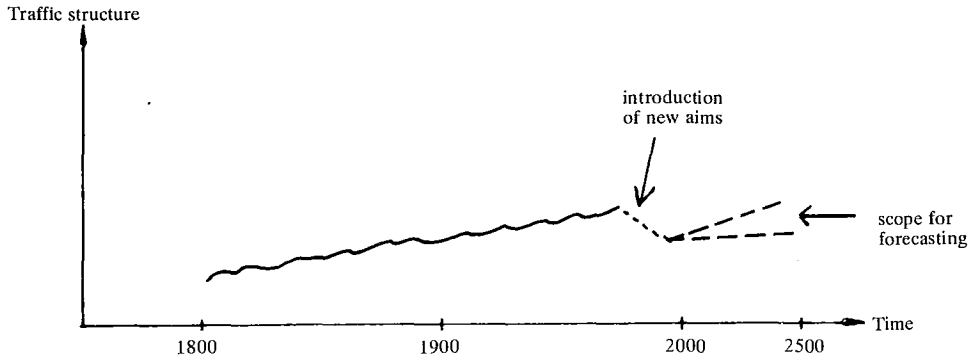


Fig. No. 8.

The scope for prognosticating which then arises differs from that resulting from traffic planning with unaltered aims.

The traffic researcher thus has a very important role to play when it comes to long-term planning and the establishment of long-term goals for the planning. The responsibility of the researcher will also increase considerably, seeing that the results which he presents will guide the politicians when making decisions with extremely long-lasting effects. At the same time the parts played by politicians and planners will change in a manner so as to make them more and more dependent on the researchers.

Another conclusion to be drawn from what I have said here to-day is that traffic planning can no longer be

considered solely a matter of traffic technique and traffic economy but instead is becoming increasingly a question of societal economy and societal politics. This change calls for entirely different means of planning compared to those previously adopted. These altered circumstances will place great demands on planners, researchers and others engaged in evolving these new means of influence and new priorities. The new situation I have described has so far primarily been noticeable in questions relating to collective traffic. In due course, however, planners etc. engaged in private motor traffic, airborne traffic, shipping, port activities and railways will gradually become aware of similar tendencies. I do not consider it an exaggeration to claim that we are facing a revolution within the field of traffic planning.