

The spatial, environmental, economic, and social impacts of speed in transport

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1. SYNOPSIS

More speed in transport on average does not reduce the time spent on mobility but usually increases the travelling distances, which has various negative effects.

2. ABSTRACT

Speed and technical progress are still fascinating many people. Fast modes of transport enable people to travel greater distances and give them the illusion of greater freedom and more choice in the way of life.

Also many politicians claim that the building of major roads (and thus the increase of the speed of travelling) brings about more jobs and more general welfare.

I will try to show that on the contrary speed in transport, be it on road or on rail, is not only responsible for environmental damages but also for disruptions of social and economic structures, both in the cities and in rural regions and is increasing existing social and spatial inequalities.

There is a strong interrelationship between planning measures and the increase of traffic and often planning is getting under pressure by transport projects designed for highest possible speed e.g. because of rising land prices.

I am convinced that the only chance to meet the mobility needs of socially less advantaged and to contribute to improving the quality of life for everybody is by reducing speed. In the cities this means speed limits for car traffic and giving priority to the slow modes of transport (walking and cycling) and to public transport.

Also in public transport it would be better to invest in a very dense extensive tram network on the surface rather than in some prestigious projects of underground lines that are very fast but expensive and therefore limited to a few corridors .

3. INTRODUCTION

The dream of overcoming space and time seems to be as old as mankind and it is expressed in several fairy tales like e.g. in “The Seven League Boots”. Technical progress brings us nearer to the fulfilment of these dreams: The fascination of speed, allowing ever larger distances to be managed in ever shorter time seems to be unbroken. Fast modes of transport give people the illusion of greater freedom, more choice in the way of life and nearly unlimited movement of goods which is said to boost the economy.

Therefore many politicians still claim that the building of major roads and also high speed trains bring about more jobs and more general welfare.

On the other hand it is commonly agreed that transport is responsible for quite a high percentage of the damages to the environment (such as noise, pollution, energy and land consumption, congestion and safety risks) and that measures have to be taken to avoid the negative consequences of transport.¹

Although many experts are aware of the fact that solutions can only be found by giving priority to measures aiming at reducing the overall amount of transport or at least by avoiding further increase, politicians very rarely dare to take decisions in this direction. Reducing the amount of traffic in reality is very difficult to achieve first of all because it implies interfering with ways of life of part of the society and secondly there is strong resistance and pressure against such measures from powerful enterprises and last not least most of the politicians are part of the car orientated society. Therefore the priorities in transport policies are set completely different: What is

discussed most of all is the technical improvement of vehicles to make them more environmentally friendly, technical measures to organise transport more efficiently to make better use of the existing road network and thus to enable more cars to get along in shorter time. Shifting some of the traffic on to public transport is becoming more and more important as it is obvious even to the most car orientated decision makers that despite all technological improvements and despite the fact that there are still more roads being built, there is a limit to the growth of car traffic, especially in the cities where space is limited.

A green paper of the European Commission claims sustainable mobility, but the aim is simply seen in the reduction or at least the prevention of further increase of the negative aspects of transport. At the same time this green paper claims a strategy “of increasing mobility in road transport”ⁱⁱ.

In the following I will talk about:

- The impacts on the development of cities and the conurbations,
- The impacts on economic development and employment.
- The social impacts
- Suggested solutions

4. THE INTERRELATIONSHIP OF TRANSPORT AND TOWN PLANNING

Historical development

The development of human settlements has always been strongly interrelated with the mode of transport available in the respective time. Towns were either established on trade routes at river crossings or ports or they originated from marketplaces at the foot of a fortress (which was mostly situated at a riverside). The medieval city was very dense and crowded because of the need of the fortification. Walking was the main mode of transport.

With the disruption of the fortifications urban development became more and more a function of the development in transport technology.

In the 19th century factories were built at rivers or at the newly constructed canal system . Housing of the workers was mostly situated in the immediate vicinity of the factory. But with the invention and the rise of the railways workers’ homes were established in large buildings around commuter railway stations.

Cities developed in a star-like pattern from the centre along the railway lines. Only with the rise of the motor car the areas between the railway lines became built up as well and the development of urban areas happened more disperse.

Urban sprawl became more of a problem with greater speed. More and faster roads enabled people to travel greater distances.

With the increase of the accessibility of the city centre land prizes increased as well thus driving out less profitable urban activities such as housing. In many cities the centres have become nearly entirely central business districts and high quality shopping areas. And because of the high land prizes building density has been continually increased.

The concentration of business in a relatively small area and the fact that an ever increasing number of people travelled to their work places by car created ever increasing environmental problems not only in the centres themselves but also in the urban districts around them. People who could afford it began to move out to the edges of the city or out of town altogether thus creating still more traffic and leaving back those who had no choice and had to put up with pollution and noise. The consequence was social segregation and the emergence of slums.

Car transport needed more and more space. Therefore in most cities the existing tram-networks were abolished and in the larger cities replaced by underground railways. A fast mode of public transport was also seen as precondition to enlarge the built up area and to provide good housing for the workers in a healthy environment. (e.g. in Vienna by the Social Democratic Party.)

In many cities large blocks of housing were built at the edges of the city to improve the workers' housing conditions and to make more room for the enlargement of the central area. And since more and more workers were able to afford cars, car traffic increased despite the existence of the Underground.

The present situation

In addition to the outward movement of population other developments are taking place which are also related to the possibility of travelling large distances in relatively short time for an increasing number of people.

Therefore a higher degree of specialisation in the urban context is taking place and the concentration of urban functions in dispersed locations, like large shopping centres in the fields, leisure centres, school centres, cultural centres, even office centres. This leads to the situation where many facilities in the more densely built up area and even sometimes in the city centre itself are closing down and again people without a car are affected most.

It is obvious that very low building density especially of residential areas leads to more traffic, especially car traffic, since public transport becomes very inefficient and expensive in these areas. But it must also be seen that very high density is also creating more traffic. Because of the lack of parks or private gardens, often insufficient ventilation and light in the apartments, combined with traffic congestion, pollution and noise in these areas people drive out of town for leisure and relaxation.

Transport policies

Town planning measures, urban or regional, often have a very strong impact on the development of traffic. They can be responsible for a massive increase in traffic. But measures in transport policy also have an impact on the spatial development and they always had.

Incentive for new settlements by transport measures

When the first tramlines appeared in Vienna some (wealthy) people started to live in the villages outside the city in their former summer residences. They thus had the possibility to live in a healthy environment and still enjoy easy access to their offices, to the shops and the cultural facilities in the city.

New major roads produce quite strong incentives for the development of new building land even if this originally had not been planned before, or the new roads can also be responsible for the building land being much more densely used.

In Vienna a major road was built some years ago in one of its outer districts in order to ease the traffic in parallel roads leading through housing areas and to take up the through traffic. Very soon several general and specialised shopping centres were built here and they have created so much additional traffic that there would be the need for a very expensive reconstruction of this new road only a few years after having been constructed.

Centralisation processes through underground lines

The construction of new underground lines can also have negative effects on the city development although it is usually seen as one important contribution to solve urban traffic problems.

But because an underground line enables people to travel great distances in a short time, it leads to a concentration of certain urban activities at very few locations, activities that are now lacking in other areas so that people are forced to travel longer distances. Also the concentration of jobs in the city centre is reinforced by radial underground lines.

More car traffic through commuter trains

The extension of underground lines or fast commuter trains to the edge of the city or into the conurbation often results in more car traffic as well, because extensive low density housing settlements, and industrial areas emerge in between the train stations outside walking distance. People living or working there are using public transport for certain purposes like travelling to work in the city centre but apart from that are much more car orientated than the population of the more densely built up areas.

Parallel construction of road and rail

This sort of development has been reinforced by the fact that the provision of fast modes of public transport very often coincides with the construction of major roads parallel to the public transport lines. Therefore the objective of shifting transport from road to rail cannot be met. What happens is the increase of the overall amount of journeys.

Changes in the inner cities

From the 1950s to the 1970s in many European cities the growing car ownership and usage led to an ever increasing need for road space in the cities with the consequence of extensive tramway networks, as they exist in many European cities, being abolished, buildings being pulled down, like lower density - often low income - housing, public green space being destroyed, and even cultural monuments like this baroque church in Vienna being sacrificed.

Pedestrians lose space

Although nowadays it is not so easy to pull down buildings the competition for road-space still goes on and is usually won by the cars (either moving or parking) at the cost of other means of transport and other demands on public space. The slowest mode of transport like walking is the one that usually loses out most.

Although everybody, no matter whether he or she is driving, using public transport or riding a bicycle, is also a pedestrian, pedestrians often quite adequately perceive themselves as being pushed to the walls, sometimes literally.



Their space is continuously reduced either by the pavements being generally too narrow or by being narrowed by legally or illegally parked cars etc. Sometimes “pedestrian reservations” are allocated (or pedestrian zones as they are called officially), if they are expected to be profitable, which is often the case in the city centres. In some of these pedestrian zones it then happens that it becomes difficult to cross the road, although only used by pedestrians like in Munich on Saturdays. In London officials are now discussing introducing a one-way-system on the pavements in Oxford Street because moving along has become very difficult. Apart from some of these „reservations“ walking in the city becomes less and less attractive: Very wide roads form barriers between parts of the town, noise and pollution make it unattractive to stay anywhere near busy roads or to open windows in apartments or offices facing them.

Very few pedestrian crossings are forcing people to make detours, sparsely lit and unattractive underpasses are causing many people feel uneasy if not afraid.

The waiting time spent at traffic lights is often very long, but one has to be a rather sporty type to be able to cross the road at the green light.

The insufficient quality of open space and the often unattractive situation for pedestrians is another reason why people tend to move out the city, if they have got the choice, or why they



use the car instead of walking, cycling or public transportⁱⁱⁱ or why many people tend to do their shopping or spend their leisure time in decentralised locations where they can only get to by car, thus producing more traffic.

5. ECONOMIC ASPECTS

There is the wide spread assumption especially among economists and politicians that the provision of roads and high-speed railroads forms a precondition for economic growth and the economic development of a region. The policy adopted is usually one of „predict and provide“, a policy which has often produced even more traffic than predicted since reducing existing barriers encourages more people to travel or more goods being transported. (see the above examples).

Shift of production to „low – wage – countries“

But it can be shown that despite transport growth very often the provision for fast transport has not led to economic growth let alone a reduction of unemployment.

On the contrary a study carried out for the European Parliament in 1995^{iv} shows a decreasing level of employment in various sectors of the economy despite massive transport growth . (see table 1)

With increasing speeds in transport and very low transport costs in relation to the production costs, the so called „location costs“ become more important, like the level of wages, the labour legislation, the environmental laws etc. at a certain location.

Therefore especially large scale enterprises move their production to countries where these costs are lower, thus causing unemployment in the so called developed countries (see tables 2 and 3). There is also the increasing pressure to reduce the social and environmental standards.

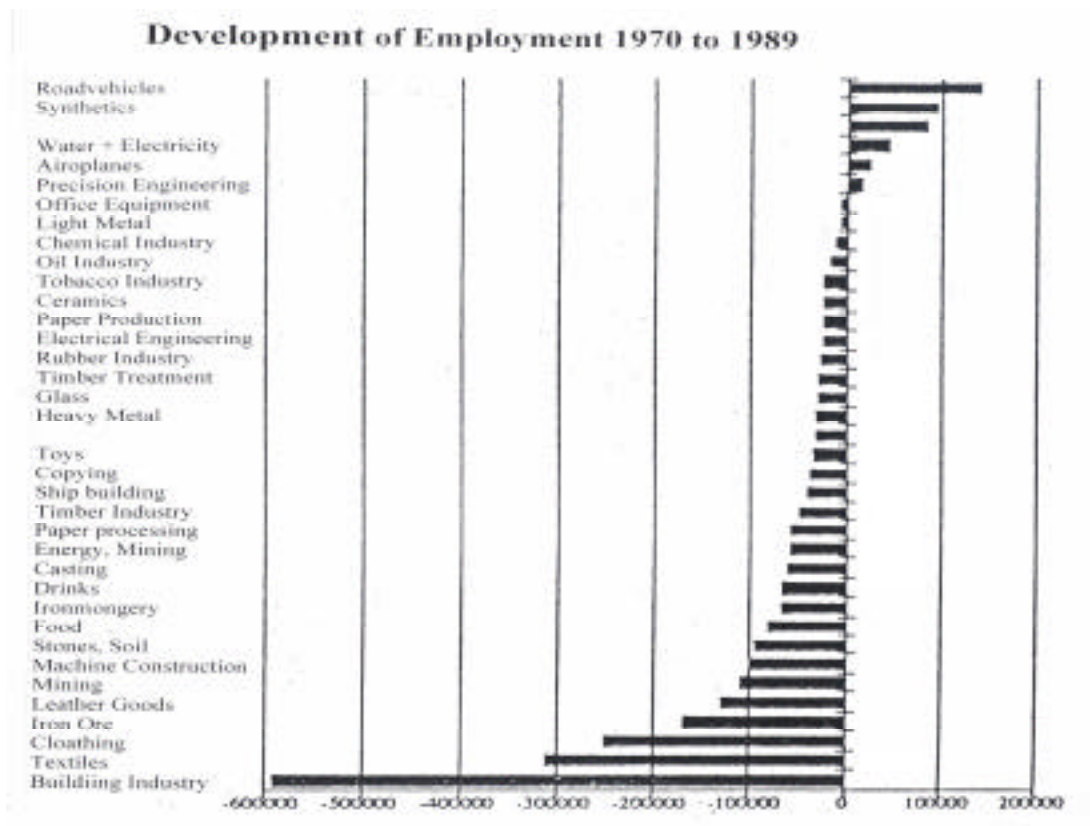


Table 1.v Development of employment in various sectors of the industry 1970 to 1999

Table 2. International comparison of wage levels^{vi}

	Singapur	Hongkong	South Corea	Taiwan	Germany
Working hours per year	2100	2350	2290	2330	1635
Average wages per hour in __	1,96	2,15	2,39	2,74	10,31
Non wage labour costs in % of the average wage	59	23	44	20	86
Overall labour costs in __	3,12	2,64	3,44	3,29	19,20
Overall costs in% (Germany = 100)	16,3	13,8	18,0	17,1	100

Table 3. Shifts of production away from Germany^{vii}

Economic sector	Shift happened within the last 3 years	Planned in the next 3 years
Industry	24	30
Raw materials and production goods	20	20
Capital goods	28	36
Consumer goods	24	32
Food	8	9
Building	2	6
Transport	10	16

Centralisation, concentration and specialisation

Many economists would not deny these facts, but they would argue that they are outside the reach of national policies. The provision of infrastructure however can support the economic development of deprived or decaying regions and reduce unemployment there.

In fact regional enterprises can sometimes enlarge their market by the possibility of fast transportation of goods but products of distant locations can be brought to the local markets more easily as well, thus increasing competition which smaller enterprises often cannot withstand.^{viii} It can therefore be said that the provision of transport infrastructure tends to reinforce centralisation where the economically strong areas, usually the conurbations are getting stronger and economically weak areas are getting weaker.

What happens sometimes is the clustering of enterprises of a single sector of the economy in a certain location, like for instance the car industry, which makes the local economy very unstable, since the whole economy of a region becomes dependent on this single sector.

Another development is the increased specialisation of industry. There are firms that only put together the different parts produced by different enterprises often in different regions or in different countries. "Just in Time" deliveries instead of storage of the raw material is another consequence of low costs and high speed of transport.

Liberalisation of the market

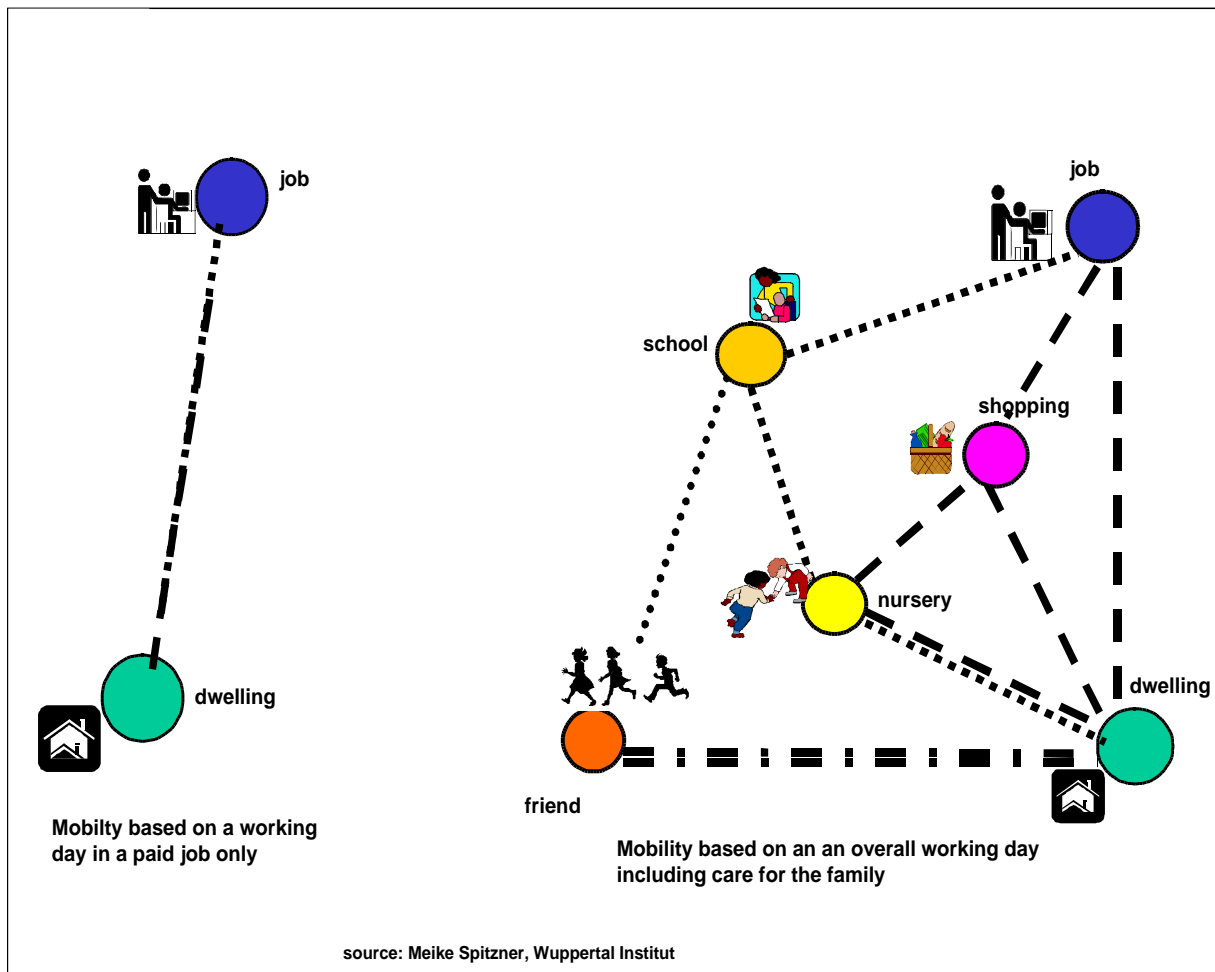
Although several Green or White Papers of the European Commission have acknowledged some of these fact and "sustainable mobility" is said to be a priority in transport policies the massive investment in transport infrastructure is continuing.

"Liberalising market access is the number one goal ...(and) economic development, and the increased speed of movement of freight and people within the common market is the primary objective"^{ix x}

6. SOCIAL ASPECTS

- Socially disadvantaged people like elderly, disabled, people pushing prams or carrying weight, people who cannot afford cars or have not got access to a car like many women whose husbands are using the family car for their daily journey to work, and last not least children, suffer most from the negative consequences of car traffic in general and of high speeds specifically.
- As I said before, the possibility of travelling over great distances changes the urban fabric and reduces the density and the quality of locally existing activities in urban areas which means that people without access to a car have to invest much more time for the necessary activities or they have to put up with a reduced quality of those activities or they simply cannot make use of some urban activities at all, e.g. cultural activities or adult education etc.
- In newly developed social housing estates at the edges of the cities people are often faced with insufficient public transport especially outside peak hours, poor provision of social and cultural infrastructure and shopping facilities. There are usually few jobs available near these residential areas, a fact that tends to create serious problems for people who have to care for small children, usually women.
- The social problems especially among young people in these large housing developments who are lacking adequate job opportunities and leisure facilities are well known.
- Often existing social networks are broken up by the changes of urban development as discussed before. But especially for socially less advantaged groups these networks are very important for physical and psychological mutual support.
- As a consequence of high speeds and the resulting safety risks smaller children are often not allowed to walk, cycle or take public transport to school, to friends, to leisure activities etc but have to be taken everywhere by car. This not only increases the amount of traffic, it also increases the burden for the person who is taking the child, usually the mother, and it reduces the child's possibility to gain independence, and last not least the possibilities for physical exercise.
- The poor quality of open space in many areas affect those most who are dependent on walking and public transport and those who have to use open space more often (usually women) because of the different necessary activities.
- Women's (especially with small children) daily routine, very often differs to a great deal from those of men. It does not consist of a single journey to work and back home but of a series of interlinked journeys (see graph 4). Therefore in general women who have not got access to a car are dependent on short walking distances to the necessary facilities and a densely knitted network of easily accessible public transport which in general cannot be provided for just by underground railways:

Due to high construction costs of underground lines they are only limited to a few corridors, and due to high operating costs and in order to increase the space available for car traffic, tramlines have often been abolished. To increase the speed of the underground railway there are greater distances between the stations. Therefore walking distances to the stations and the necessity to change between lines have been increased, and thus often the overall travelling time.



Graph 4. Transport needs based on different every-day routines

7. WHAT CAN BE DONE?

It seems obvious from what has been said so far that for various reasons great efforts are necessary to reduce transport or at least to avoid any further increase. To achieve this aim it needs co-operation between town and regional planning, transport policies and financing policies on the one hand but also co-operation between regions and/or countries

Planning measures

Discussing planning measures for the reduction of transport, the slogan of the “town of short distances” often comes up, where everybody lives within walking distance of his or her job, with sufficient shopping and leisure facilities nearby. The problem is that many of the developments in the building structure that have taken place in the last decades cannot be altogether undone. Furthermore high specialisation and the demand of freedom of choice in jobs make the implementation of the above slogan very difficult. Last but not least many people change jobs very often either by choice or more often involuntary and because of the increasing number of part time jobs many people have to take more than one job at the same time. Therefore living near ones work can often not be implemented. In addition it must be recognised that for low income families the housing market does not encourage frequent change of dwelling .

Therefore planning measures will not show immediate effects on the amount of transport but they form a precondition for future developments and for the effectiveness of measures in transport policies.

Zoning- and development plans

- Where new developments have been considered necessary it is important that they do not take place in the green fields but in connection with the already existing built up area. Thus the existing facilities can be used and adapted, and existing public transport facilities especially on the surface can be expanded slowly according to the growing demand. Thus it is also easier to develop smaller housing units at a time and avoiding the problems arising with huge housing estates with their unbalanced social - especially age - structures and the resulting unbalanced demand of social facilities.
- Pure residential areas or pure industrial or business areas etc should be avoided as far as possible. Only industries with dangerous or harmful emissions should be allocated on purely industrial areas. Instead mixed use should be provided for even at marginal locations.
- The development of different types of housing and different types of enterprises thus offering different types of employment facilities should be encouraged either by planning measures or by subsidies or both. This would also make shopping facilities more profitable because they would be used not only by the residents but also by the workers.^{xi}
- Sparse provision of building land connected with the possibility of prescribing building obligations.
- Provision of green wedges, reaching as far as possible into the densely built up area of a city, thus increasing the quality of the environment in those areas and avoiding traffic for recreational purposes.
- The conversion of housing into offices in central areas should be restricted
- Higher densities in the dispersed very low density areas, using the possibility of prescribing minimum densities, as it exists in some countries (like Germany) or introducing it where it does not.
- At the same time densities should be limited in the densely built up areas.

Land laws

- To be able to enforce planning measures, better land laws would be necessary that enable municipalities to compulsory purchase land whose owners are not willing to develop it according to the plan.
- Rates and taxes should be higher for undeveloped building land thus avoiding hoarding and speculation

Environmental measures

Emissions should be limited and there should be subsidies for improvements. Thus it would be easier to implement mixed land use.

Co-operation between municipalities, regions, countries

Last not least the co-operation of regions and countries and the mutual adaptation of the different planning legislation is essential. Otherwise restrictions imposed in one province or country lead to the shift of enterprises to other locations.

Measures in transport policies

As I have argued before it is necessary to increase the spatial resistance for environmental, economic and social reasons.

There are two major components for increasing the spatial resistance: increasing costs and reducing speed.

Increasing costs

The prices paid for transport, especially for cars and lorries are far lower than the costs arising for society, taking into account the costs for road construction and maintenance, environmental costs, accidents etc. It would therefore be necessary to internalise the external costs.

Reducing speed

Reducing speed in transport means reducing the travelling distances. In the long term this will also result in different structures of settlements, and it might strengthen local and regional economies thus lowering down the negative aspects of globalisation.

a) Car transport

- Speed limits should be imposed both in cities, towns, and villages, and in the countryside including motorways

- The provision of public transport for new settlements should be completed before, or at least at the same time as the roads
- Measures to increase the capacity of the existing road network should be restricted
- In the competition for road space in towns absolute priority must be given to public transport, cyclists and pedestrians

b) Public transport

- The principle of reducing speed applies to public transport as well. Therefore priority should be given to a densely knitted network of preferably trams but also busses rather than some very fast corridors. For the public transport users short walking distances to the stations are important as well as the reduced necessity of changes between lines.
- The same applies for the construction of very fast train lines (like the TGV or the Trans Rapid) at the cost of a densely knitted network of regional train lines.
- If however these fast lines, underground lines in cities or fast trains between cities, are constructed, at least major roads should not be provided for at the same time. Otherwise the overall amount of transport is going to be increased.

c) Non motorised traffic

The slowest modes of transport, cycling and walking should be promoted specifically and at the same time the quality of public open space should be improved. The quality of public open space is related to the provision of local shops and facilities and also to the acceptance of existing local facilities.

The importance of promoting especially walking in cities has also been recognised by the European Parliament as early as 1988, when a Charta for the Protection of Pedestrians was passed^{xiii}, but unfortunately this Charta does not seem to be known by transport planners and decision makers.

Financing policies

Rates and taxes

Different rates and taxes in different provinces or countries are also often one reason why enterprises shift locations. In order to keep them in the respective province or municipality (and to keep the taxes paid by them) often concessions are made as far as planning decisions are concerned that have negative impacts on the city development. This is another reason why co-operation between different regional authorities is important

Subsidies

a) Housing subsidies

The equalisation of revenue and costs between government, provinces, and local authorities, which is based on the number of inhabitants of each province or municipality leads to competition for inhabitants. In Austria some provincial governments offer very high housing subsidies in order to persuade people to move from the city to the country which quite a number of people do while continuing working in the city.

Therefore it would be necessary to equalise subsidies.

One could also think about varying the housing subsidies according to the location (e.g. higher subsidies in central areas where residential use is endangered).

b) Subsidies to the economy

The creation of local employment opportunities should be subsidised, which happens in some urban areas, encouraged by EU-initiatives such as URBAN (e.g. in Vienna) or by government programs like "Soziale Stadt" (social city) in Germany.

In addition subsidies could in general be made dependent on the location of the respective enterprise and on the correspondence of its location with planning objectives.

8. CONCLUSIONS

As I tried to show speed in transport is a very strong factor for a variety of spatial economic and social developments as it reduces the spatial barriers and increases the internal and external costs of transport to society as a whole and particularly to the socially less advantaged members of society.

But speed and the continuing tendency to increase speed is also a consequence of the way society is organised, a consequence of the capitalistic system. Therefore, if we are honest, it will be very difficult to bring about basic changes. On the contrary the increasing tendency towards deregulation and privatisation reduces the scope for action for planning.

But probably some improvement of the situation is possible, especially since there is a growing amount of experts in town and regional planning, in transport policies, in economics, in social sciences and even of politicians who are recognising the need for changes.

As I tried to show there is a whole range of measures that can be taken even without radical changes of society if decision makers start to realise that the most spectacular new developments are not always the best, and that very often a series of smaller steps bring about much better results especially if all the people involved are encouraged to participate in the planning process.

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10. END NOTES

ⁱ The contribution of transport to the European energy consumption has grown from 15,9% in 1978 to 18,8% in 1988 (The energy consumption for the production of roads or vehicles is not taken into account), and transport contributes to the CO₂ emission by 23 % (Agostini et al. referred to by Stefan Blass: „Zur Rolle der EG-Verkehrs-, Regional-, und Umweltpolitik in : Wilfried Telkämper, ed.: „Slow“, Nachhaltiges Wirtschaften, Verkehrsvermeidung und Entschleunigung – eine alternative Perspektive für Europa, süddeutsches Institut für nachhaltiges Wirtschaften und Öko-Logistik, Augsburg 1995)

ⁱⁱ Bull. EC 6/92 referred to in Stefan Blass: „Zur Rolle der EG Verkehrs-, Regional und Umweltpolitik“ in: Wilfried Telkämper ed.: Slow, Nachhaltiges Wirtschaften & Entschleunigung – eine alternative Perspektive für Europa, page 58

ⁱⁱⁱ According to a study carried out for the city of Vienna in 1993, 7 % of all car journeys are less than 1 km long, 30% less than 3 km

^{iv} Wilfried Telkämper, ed.: „Slow“, Nachhaltiges Wirtschaften, Verkehrsvermeidung und Entschleunigung –eine alternative Perspektive für Europa, süddeutsches Institut für nachhaltiges Wirtschaften und Öko-Logistik, Augsburg 1995

^v Stefan Brückl: “Gigantonomics” in “Slow” (mentioned above), page 31

^{vi} found in Stefan Brückl „Gigantomanics“ in Telkämpner ed. 1995, page 34

^{vii} see previous note, page 35

^{viii} see the Summary Report „Transport and the Economy“ of the Standing Advisory Committee on Trunk Road Assessment; Department of the Environment, Transport and the Regions

^{ix} Nicholas Low: „Earth on the Move, the Eco-politics of Transport, 2000

^x European Commission : „Sustainable Mobility, Perspectives for the Future, Brussels 1999

^{xi} see, Christian Holz-Rau, Eckhard Kutter: Verkehrsvermeidung, siedlungsstrukturelle und organisatorische Konzepte; Materialien zur Raumentwicklung, Bundesforschungsanstalt Landeskunde und Raumordnung, Nr. 73

^{xii} Document A2 –154/88