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SUSTAINABLE DEVELOPMENT IN URBAN TRANSPORTATION

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Abstract

Three-quarters of the population of OECD (Organisation for Economic Co-operation and Development)[1] countries are living now in urban areas. Because of this fact the most transport-related environmental and health problems occur in cities and their surroundings. The structure and growth of urban regions are therefore of crucial considerations in strategies of sustainable development. The criteria of sustainability are most of all, the clean air, the quiet neighbourhoods and the economic prosperity without detrimental impacts and depletion of finite natural resources.

Keywords: sustainable development, urban transportation, transportation policy.

1. Introduction

The principal target of facing transportation and land-use specialists is that the urban and suburban dwellers should have access to the services and activities integrated in their everyday life, while minimising the negative impacts of the travel.

In order to bring about sustainable travel in urban areas, integrated policy packages are needed. The implementation of these policy packages aims to integrate land use and transportation planning, manage private vehicle travel, optimise public transport use and promote walking and cycling in urban areas. Implementing multi-sectoral, integrated policy packages has proven easier said than done, because the co-ordination and co-operation among the stakeholders is complex and often resource-intensive.

Many countries and cities are developing policy schemes to render urban travel more sustainable. Translating these plans from words to action is often a much more difficult task. All levels of Government have important roles to play in assuring that effective policy options are identified and implemented. Next to the Regional and Local Government the National Government's role (establishing a broad, sectorally integrated policy framework) can be a determining factor in bringing about sustainability in urban areas.

[1]Members of the OECD: Members of the European Union, Czech Republic, Iceland, Poland, Hungary, Norway, Switzerland, Turkey, Australia, USA, Japan, Canada, Korea, Mexico, and New Zealand.

2. Trends in Urban Transportation and Conflict Areas

This chapter summarises the principal trends in urban travel. It is on:

- questions of the suburbanisation and the increase of the population in the cities, the growth of the per person car ownership;
- the dominating role of private cars in the urban transportation in the cities, and a lot of short trips by car;
- the pedestrian and the bicycle as an important factor in the transportation but not in all urban areas.

2.1. Development in the Urban Transportation

Suburbanisation Contra Population Growth in the Cities

A majority of the urban areas reported a continued suburbanisation of their urban population over the period 1990-2000 with a decrease in number of city centre residents in a number of cases (e.g.: in the USA, in the EU, in Hungary, in Romania, in Korea and in the UK). A number of cities reported, however, a strengthening of the city centre relative to the rest of the urban areas (first of all in Japan) because the redevelopment of degrading inner cities appears to be luring some residents back from suburban areas. (*Fig. 1*).

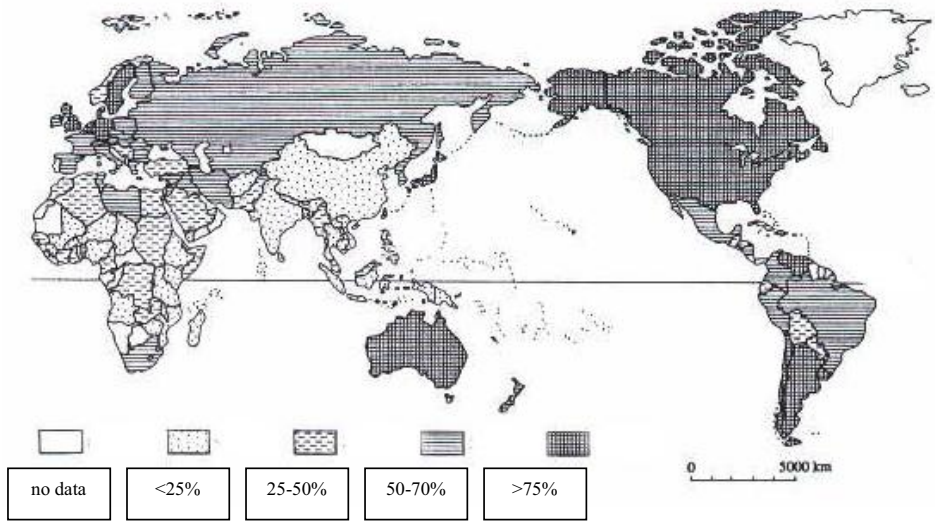

Fig. 1. Rate of the urban population in the countries of the world [1]

A majority of capital cities reported significant population growth in the suburban areas, but successful transportation policies and the reducing of noise nuisance seem to be attracting some inhabitants back to the urban core.

Urban density appeared to weaken in large urban areas, stabilise in medium sized urban areas, and drop in small towns and cities.

The share of the population living in the urban versus rural areas in Hungary has remained stable; almost two thirds live in urban areas. Only 30 per cent of the population lives in cities of 100.000 or greater.

Car Ownership: on the Rise in Majority of Countries

The per person car ownership has increased since 1990 in virtually all countries. The average car ownership rate among EU cities was 0.41 cars per person in 2000. Countries reported an average accession of more than 30 per cent in per person car ownership, with double digit percentage increases in virtually all cities. The average car ownership rate was 0.29 car per person. Of particular note is the average rate of car ownership in capital cities, 0.35 cars per person compared to overall average of 0.38 (*Table 1*).

The car ownership trends are the lowest in city centres where public transport is available and parking space is very scarce and expensive, it is the highest in suburban areas poorly served by public transport.

Table 1. Number of passenger cars [cars per 1000 inhabitants] [2]

	1970	1980	1990	1991	1992	1993	1994	1995	1996	1997
Austria	160	298	388	397	412	422	433	447	458	469
Belgium	214	321	388	397	400	409	423	428	435	442
Denmark	218	271	309	307	310	312	312	321	329	340
Finland	155	256	389	385	384	371	368	372	379	378
France	234	341	466	474	476	478	478	477	477	478
Germany	194	330	447	460	471	479	488	495	500	505
Greece	26	89	171	173	177	188	199	211	223	229
Ireland	137	218	225	237	242	252	265	280	291	313
Italy	189	313	483	501	518	520	540	553	571	577
Luxembourg	212	352	480	196	513	523	540	559	559	573
The Netherlands	197	322	368	368	373	376	383	364	370	372
Portugal	49	94	187	203	205	224	242	258	277	297
Spain	70	202	308	321	335	343	351	362	376	390
Sweden	248	347	421	421	414	410	409	411	413	419
UK	214	277	361	360	360	367	372	374	388	398
EU (15) average	184	291	401	410	418	423	432	437	447	454

The rate of private car ownership in Hungary (230 per 1000 inhabitants) has increased by 18 per cent since 1990 and is presently about half of the EU average.

Private Car Use Up

Private car travel in the urban areas soared in the 1990s. Average car mobility in the EU in number of trips pppd (passenger person per day) went up 10 per cent from 1.51 in 1990 to 1.66 in 2000. Per person car trips exploded in accession countries and in other CEE[2] countries, with average car mobility jumping 70 per cent from 0.66 in 1990 to 1.13 trips pppd in 2000. The increasing of the car mobility was registered in all urban areas. The growth in car use has been concentrated primarily in suburban areas.

Public Transport – Decreasing Popularity

There is a decrease in public transport trips during the 1990s. The trend in Paris is toward stability. Norway saw a decline in ridership in its main cities in the first half of the 1990s partly reserved in the second half in response to investment in public transport systems. A drop in public transport trips was registered in all urban areas of EU accession countries. The ridership levels in accession countries remain on average far above western European levels. In the USA, mass transit accounts for only 4 per cent of trips but grew 5 per cent during the 1990s.

Passenger travel by public transport is also decreasing in Hungary, while 84 per cent of urban trips were made by public transport in 1980, this number fell to 73 per cent in 1990 and 56 per cent in 1998. The decrease has been less pronounced in Budapest where 65 per cent of passenger trips were performed by public transport in 1998. Budapest's transport system is well developed. Its capacity decreased by 12 per cent between 1992 and 1995, due to service reductions and closing of certain lines. Although public transport passenger trips have decreased by 16 per cent since 1990, they still represent nearly 65 per cent of total passenger trips (compared with 40 per cent in London and Paris and 70 per cent in Zurich).

Non-Motorised Means – Great Differences among the Cities

In the share of pedestrian and bicycle trips a considerable variance has been revealed among European cities. In a lot of cities increases in the number of cycling trips were reported, in other cities there was no change or drops in the trips by bicycle. The average number of walking trips dropped 10 per cent from 0.84 trips pppd in 1990 to 0.77 trips pppd in 2000 reported (except Paris, Nantes and Bratislava).

[2]CEE: Central East European

Length of Trips by Car on the Rise

The length of car and motorised two-wheel trips has increased since 1990 in the large majority of urban areas. This increase appears to correlate with the observed suburbanisation.

The annual passenger transportation performance by mode is seen from *Fig.2*.

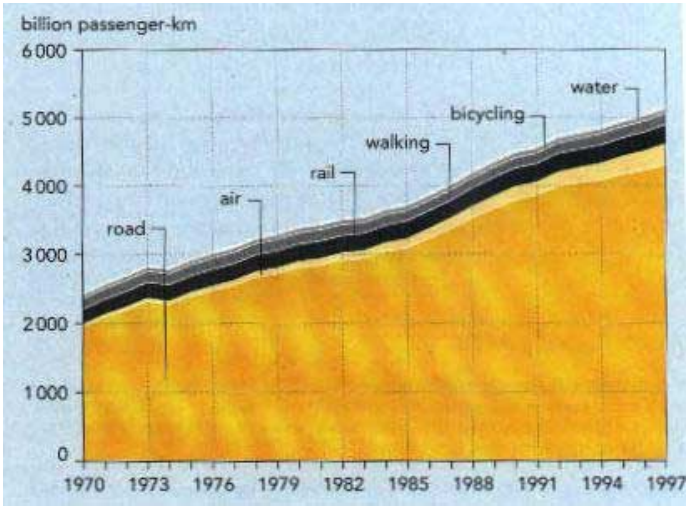

Fig. 2. Annual passenger transportation performance by mode (EU) [2]

In large and very large urban areas, public transport supply and demand in all appears to have improved overall in the 1990s while small- and medium-sized cities show less positive results.

The number of short trips by car substituting walking have increased, average speeds have risen, whilst congestion is encountered more frequently. In many cities the worst congestion has moved from city centres to suburban radial access corridors and to concentric suburb-to-suburb routes. In wealthier cities of the EU accession countries, rapid growth in car ownership and use has resulted in severe congestion. In EU accession other CEE countries, congestion is perceived even more severe than in highly motorised OECD cities.

2.2. Environment and Safety

Environment and safety in the cities are the criteria of sustainability most of all, the clean air, the quiet neighbourhoods and the economic prosperity without detrimental impacts and depletion of finite natural resources.

Air Pollution and Noise

Ozone appears to be the most serious air pollution problem in urban areas, while considerable improvements in emissions of sulphur dioxide, nitrogen dioxide, particulates and hydrocarbons have been observed. The latter two appear to pose still particular problems in non-accession CEE countries. Several reviews highlighted improvements in air quality, noise nuisance and accidents in response to policies aimed at improving sustainability.

The lack of focusing on carbon dioxide emissions at urban level may reflect a perception that climate change is a global one, rather than local issue. The national climate programmes can help to shape urban transport policies and may take fuller account of the actions taken at the local level in urban areas.

Regarding noise several countries recorded recent progress but noted concern for the future. Noise reduction is a priority area in the future attention in most of the countries reviewed. The annoyance because of the noise is illustrated in *Fig.3*.

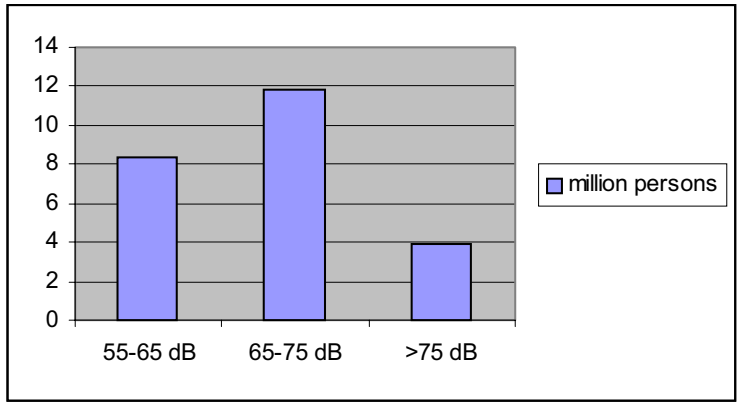

Fig. 3. Number of people highly annoyed by road transportation noise – preliminary estimate (EU) [2]

Road Safety

In EU countries, trends in traffic accidents were uncoupled from trends in car traffic. In some EU accession countries, the number of traffic accidents is rising in proportion to increases in car traffic, and accident rates are much higher overall than in western countries. This is primarily due to insufficient safety awareness and driver education, but the poor condition of cars and roads is also a contributing factor. The numbers of fatal accidents in road and rail transportation are seen from the *Fig. 4*.

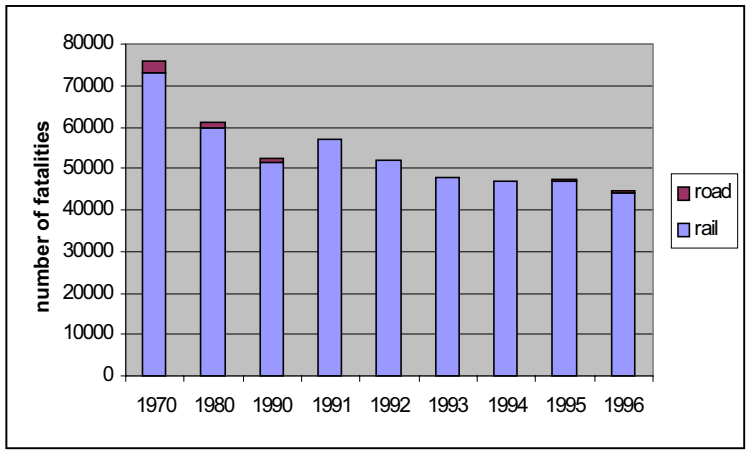

Fig. 4. Road and rail transportation fatalities per year (EU) [2]

In the perceptions of environmental and traffic problems, the congestion was seen as getting worse – particularly in large cities – and was the problem of most concern. By contrast, there appeared to be little preoccupation with trends in noise disturbance and to an even less extent with air pollution. The pollution and congestion are seen as more serious in larger cities and much less of a problem in medium and small urban areas.

3. Approach to Solve Urban Travel Problems

The strategic targets of the transportation policy are based on the demands and possibilities of the society, of the economy, of the international area and their relations. The targets and the expectations develop in social agreement with target of foreign policy, the policy of national defence, environmental policy, social and economical policy as well. The transportation policy has to function in this agreement in order to help to the developing sectors of the transportation.

The transportation policy drafts typical long term targets but it contains short term targets, too, which are generally the first steps in the realisation of the policy.

Several countries are working to develop policy solutions designed to encourage more sustainable travel patterns in urban areas. Most countries have developed, or are in the process of defining policy approaches based on the best practice, which is raising the effectiveness of current land use planning and traffic management measures – such as parking control and provision and encouragement of other means of transport – to the level of those in the best-managed cities. Countries and cities more experienced with sustainable urban travel policies appear to be experimenting with innovative approaches, including integration of land use and transportation policy,

tight parking restrictions and park and ride, use of telematics in urban transportation as well.

Sustainable Urban Travel Policies: What Are the Countries Doing?

- *Decentralisation and National–Local Government Relations*
  A number of national policy reviews revealed as an area of policy success in the decentralisation of power and responsibility for urban transportation and environment management, by matching responsibilities with the scale of the problems to be addressed.
- *Integration of Transportation and Land Use Planning*
  Urban mobility plans should contribute to improving the integration of transportation and land-use planning, a key factor in achieving sustainable urban travel patterns. Proliferation of large out-of-town shopping malls in the 1990s was symptomatic of a failure to adequately integrate land-use and transportation planning and has resulted in some countries imposing blanket bans on developments of this kind until more effective policy options are formulated. Redeveloping central city areas and inner suburbs to make them more attractive to residents has proved a successful counter-policy in some European cities, reversing the trend for depopulation of city centres. Redeveloping brownfield sites for business has also resulted notable successes.
- *Consultation*
  The improving of procedures for public consultation is a policy priority in many countries. It is increasingly recognised that a policy of sustainable transportation requires more than a government action, and the need for behavioural change makes the involvement of the actors themselves essential. Many communities are creating transportation management associations whereby employers organise reductions in employee commuter travel by car by providing public transport passes, ride-sharing programmes, flex-time and telecommuting option.
- *Quality Public Transport*
  High-quality public transport systems characterise many cities in Europe. Frequency of service, high-quality vehicles, and integrated ticketing systems for all public transport modes play an important role in most of these cities (e.g.: in Italy, in Switzerland or in Germany). A majority of cities – first thing in EU accession countries and other EEC countries – give priority to measures to improve public transport during the 1990s. Improved public transport services will remain a top priority in the coming decade.
  The other possibility is the control of costs (e.g.: introducing competitive tendering and privatisation in bus services).
- *Traffic Management*
  Managing on-road parking capacity has been the bedrock of traffic management in numerous cities in western Europe for many years. Essential to the success of these policies in reducing traffic is the ensuring a coherent fee

structure and availability of parking throughout the controlled areas. The intelligent management of traffic lights is another important tool. Many cities are introducing systems that give buses and trams priority at intersections with lights that recognise them. Intelligent signs warning drivers of congestion and proposing alternative routes can be a useful addition. Electronic signs at bus stops indicating time of arrival of the next bus can have a major impact in improving quality of service and attracting ridership.

Trends in the Objectives for Sustainable Development

The principal preoccupation is preventing in all regions pollution and environmental degradation. Next come promoting public transport and reducing car traffic. Traffic management, better planning, management of sprawl, mobility management and development of road infrastructure follow in frequency as issue of priority. Promoting cycling and walking figured quite weakly in the statistics, and managing parking hardly.

The *Table 2* shows the status of integrated transport planning and tools for environmental management.

4. Possibilities of Improving Sustainable Urban Travel Policies in the Future

Recommendations for National Governments

How can National Governments improve successful implementation of sustainable urban transport policies?

- Develop a natural policy framework for sustainable urban travel that supports and influences national, regional and local targets for land use, passenger and freight transport, health and the environment. There are important links between local policies for urban travel and land use, national transportation and planning policies. These links must be identified so that policies on all levels are mutually supportive.
- Co-ordinate national policy approaches on urban land use, travel, health and environment. The co-ordination vertically among all levels of Government, as well as horizontally among land use, transportation, environmental and health sectors, is essential to realise the objectives for sustainability.
  The involvement of all stakeholders in the urban travel system is becoming an increasingly important factor in policy development and implementation for sustainable urban travel.
- Decentralise responsibilities when possible, centralise when necessary. The responsibilities must be commensurate with resources for implementation to occur.

Table 2. Integrated transport planning and environmental management

Member States	Integrated transport strategies system	National transport-environment policy	Implementation of strategic environmental assessment
Austria	*	*	Under development
Belgium	Under development		*
Denmark	*	Under development	*
Finland	*	*	*
France		*	*
Germany	Under development	*	Under development
Italy			
Luxembourg	Under development		
The Netherlands	*	*	*
Spain			*
Sweden	*	*	*
UK	*	Under development	*
Hungary			

- Encourage effective public participation, partnerships and communication. Involve the public early in the strategy design process and provide for their active involvement throughout implementation and monitoring. Inform and communicate with transport system clients.
- Provide a supportive legal and regulatory framework. It means that ensure that rules and regulations for public transport clearly specify the relative roles of public and private sectors in service and infrastructure provision and financing. Ensure that measures to promote walking and cycling in urban areas are supported in the legal and regulatory framework. The integrating of the environmental target into transport and land-use policy is very important.
- Rationalise financing and investment streams, so revenue flows from pricing measures, investment and other types of funding should be directed so that opportunities for policy implementation are enhanced.
- Sound and reliable data are the empirical basis for good policy-making, They provide insight into urban travel trend. Urban data, particularly as concerns urban travel and land use and their interactions are sparse and often of poor quality. Because of this one the most important thing should be the improving

of the data collection. Carry out consistent monitoring of implementation of urban travel and land-use activities and their links to health and environmental objectives. Organise and finance research, development, and testing of potential solutions to promote sustainable urban travel and land use are very important.

These were well-known solutions but these are not cured together in national policies. The task is to create a comprehensive policy.

5. Summary

The urban travel and land-use problems are not just urban problems. Their economic, social and environmental impacts extend well beyond the geographic jurisdictions of cities and towns to regions and to countries as a whole. The policies are designed to shape travel and land-use patterns to maximise the benefits of transport while minimising their negative impacts.

Given the broad spectrum of economic sectors and actors potentially impacted by urban travel and land-use activity, a package of complementary policy instruments needs to be developed that provides clear and well-targeted incentives to reduce the impacts of urban travel and land-use activities. This involves better integration of land use and transport planning. It involves finding ways to manage growth in car use and ensuring that alternative modes of travel by car – public transport, walking and cycling – are promoted. Fiscal and pricing instruments, legal and regulatory tools, currently available technology, and public information are some of the main policy tools available.

A policy framework that embodies clear long-term objectives for urban travel may provide the essential parameters for implementation of integrated sustainable urban travel policies.

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