

SUSTAINABLE CITIES FOR COUNTRIES IN TRANSITION LEARNING FROM MISTAKES IN COUNTRIES WITH HIGH MOTORIZATION

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Abstract

Sustainability is one of the key issues for any wealthy future development. Sustainability is inevitably linked with quality of life. Today's transport system is identified as unsustainable. Attempts to improve the transport system towards the objective of sustainability failed. The cause for this failure is found in the evolutionary development of the human being. A basic solution taking this finding into account is presented. The key element for a sustainable future is the parking organisation. Strategies tackling only the flowing traffic must fail.

Keywords: Sustainability, quality of life, parking organisation

INTRODUCTION

Cities in Western Europe are confronted with increasing problems not only in the field of transport but also in the environmental, social and economic sector. Economic activities are leaving the cities and settle along motorways, offering free parking opportunities for customers. On the other hand public transport, the former backbone of the transport system, is losing customers and becoming highly subsidized. The increasing congestion on all carriageways for cars, especially on motorways, is a clear indication for a lack of market economy in this sector. All kinds of treatment to mitigate or solve the problems have failed so far. Therefore something must be wrong with the traditional planning approach. A new approach taking into account individual human behaviour as well as system behaviour is opening the understanding for previously unexpected effects. Both fields were not the focus of traditional transportation planning, although early studies from the end of the 19th century point into this direction (Lill, 1889). The motorization in South Eastern European countries is still closer to a sustainable level than in Western European countries. In EU countries the motorization is between 400 and more than 500 cars per 1000 inhabitants. In Croatia, Bulgaria and Hungary the motorization is between 200 and 250 cars per 1000 inhabitants and in Romania around 130 cars per 1000 inhabitants (EU Transport in Figures, 2000). Therefore cities in South Eastern Europe have the opportunity to avoid the main mistakes made in Western European city and transport planning. Although (Newman, Kenworthy, 1989) have no data from these cities in their diagram (Figure 1), it can be taken as sure, that most of the South East European cities are still in a sustainable position, considering density and energy for transportation. Their chances to choose a sustainable path towards the future are better than in most Western European cities. This paper will describe a new approach towards a sustainable, socially balanced and economic wealthy city development.

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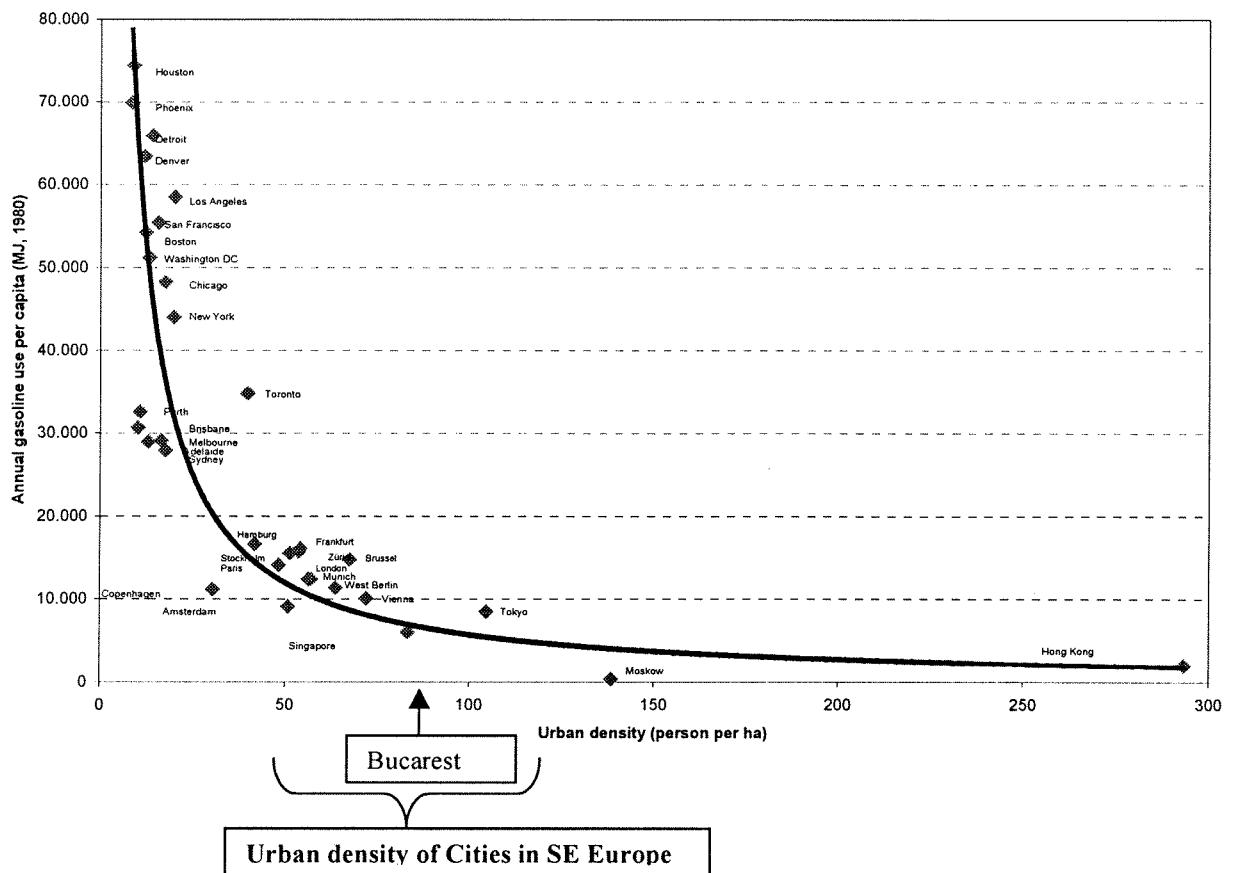


Figure 1: The existing situation in cities of South Eastern Europe gives great opportunities for sustainable development.

KEY WORDS AND WHAT THEY MEAN

Sustainability and quality of life became keywords in many of the 4th and 5th framework research programmes of the European Union. They are also of increasing importance for practitioners and politicians in transport planning and city development. But what do these expressions mean? Sustainability needs stability, resilience and flexibility over time. Quality of life has different definitions: Quality for the humans of today, or the humans in the future? Quality of human life or the life in general including the human one?

Quality is not something which appears suddenly. It needs a long time till quality is developing – and the development of quality is a process. Quality is the final result of an optimisation process, which needs always more time than the life span of the elements of the system.

Time was now mentioned twice, in combination with quality as well as with sustainability. What is “long time” in the context of our subject? The minimum length of time to reach some stability in a process is the lifetime of the core elements – here the human being. To ensure stability not only the lifetime but manifold the lifetime is needed to test the resilience of the development against changing and fluctuating conditions in the environment. If a process is developing faster than this critical time, the risk of instability and collapse is increasing progressively.

COMPLEXITY OF TECHNICAL SYSTEMS

A problem of modern societies is the complexity of the system, they have created with technical means. This system has a behaviour which is not directly perceivable anymore and therefore from an analytical point of view difficult to understand. The system is an open system, depending on material and energy flows. The behaviour of the system elements is not linear and it is changing with time – it is dynamic. The system behaves in its complexity like a natural system. But then, why don't natural systems cause comparable problems? The answer is that they had time enough to develop – more than four billion years. The optimisation process was long enough that finally we were able to think in terms like “sustainability” and “quality” as we were able to recognize this attributes in our environment.

Contrary to this development, modern techniques and the economy are developing much faster and do not have the time to wait till the system has reached a sustainable stage. There is no time to wait for enough experience whether the solution chosen is the best one for the future. Often it is seen as good enough, if it is good enough for today, or even for yesterday. Acceleration is the credo of this period. The probability to develop quality or sustainability in such an accelerated process is very low, close to zero. As sustainability is always the result of high quality, structures, developed in such a process of hurry, are not at all sustainable. So quality is an important indicator for sustainability.

MOBILITY AND TIME CONSTRAINS

Is the mobility of today contributing to quality of life, which is depending on life supporting physical, social and cultural systems? Or do some parts of mobility endanger quality of life and sustainability? If we take a look at different modes of transport, we recognise that mankind has enough experience with walking. The human development was the development of the biped, walking in upright position on the earth for more than 2 million years. Since about 5,000 to 10,000 years boats and horses are in use. 200 years cycling, about 150 years railways, 100 years cars, about 50 years aviation and some years of telecommunication characterise the fast development in the other fields of transport.

Hypothesis

100 years of car use are not long enough to produce sustainable quality of life and sustainable city structures.

Quality of a complex system, like a city, could be described by indicators. Indicators describing the modern technical transport system are far away from giving acceptable values. Examples are:

- 1 h driving a car costs in the system about 40 minutes and more of a human's lifetime.
- 1 h daily car use by each individual car driver produces in the system 24 h of noise and air pollution.
- 1 h of individual comfort results for 24 h of social pain. This is not a favourable C/B ratio.
- Space and energy indicators point into the same direction.
- The Ecological Footprint of this kind of mobility is far too big!

But: Mobility is a prerequisite of life and quality of life!

Is this true for each kind of mobility? Physical mobility was expensive before the invention of transport modes driven by external energy sources. Mental mobility is always expensive. So people try to avoid this effort. There is a trade-off between mental and physical energy (Figure 2). Individual quality can be defined as effortless, enjoyable, interesting and safe life. But reaching this individual goal is not necessarily sustainable.

BEQUEST: Tradeoff

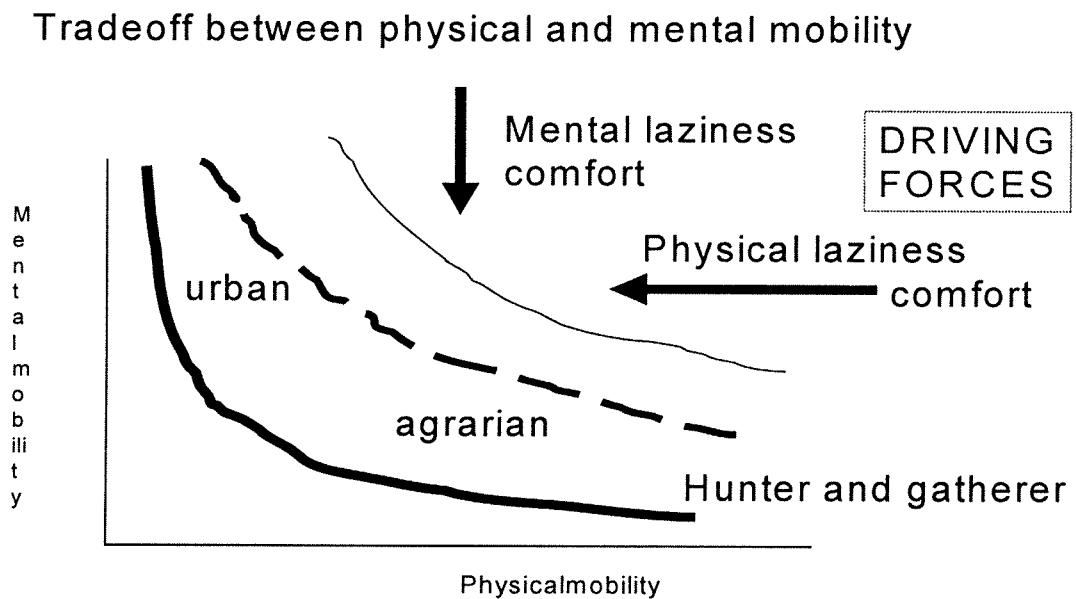


Figure 2: Trade-off between physical and mental mobility

Problem of open systems:

To prevent degradation, we have to pay the price for negentropy (to keep the order and prevent entropy). Technical means in the transport system have replaced human or animal energy by fossil or electric energy. The user has the impression that he can save energy and can move effortlessly. But in the system the energy demand has increased extremely. For the same purpose 100 times more energy is used. This has enormous effects not only for the transport system itself but also for a lot of other structures. New mobility, based on cheap external energy which replaces internal body energy, has changed:

- Structures in settlements and economy
- Societies
- Cultures
- Values

The definition of „Quality“ was reduced during the last fifty years to

- Quality of traffic flow and
- Quality of transport.

Even the lowest indicator of sustainability, keeping human beings alive became obsolete. Take care for a safe and social-encouraging environment for the next generation was not as important as convenient parking and driving cars. The analysis shows that mechanical kinds of mobility are violating basic elements of sustainability:

- To big ecological footprint,
- Cultural degradation – not only change,
- Degradation of system supporting values and
- Degradation of settlements and urban structures etc.

Effects of this kind of technical progress

The availability of cheap external energy for transport gave and gives nearly unlimited opportunities to save precious mental energy for almost everybody (Figure 2). Under these circumstances city planners can forget all the duties to create a liveable city. The "Charta from Athens" was used in a way which separates and isolates city functions from each other. The multifunctional city was divided into parts for housing, working, recreation and central functions. All of them in different places producing a tremendous amount of mechanical traffic. Poor city planning creates problems in the transport system.

- Politicians were happy, they could "solve" local problems by moving them away – out of their spatial responsibility.
- Economy can fulfil its basic theories: "Economy of Scale" and the miracle of "Theory of Comparative Cost Advantages" perfectly.
- Car drivers can compensate local deficits by using the car.
- Car and oil producing industries became a synonym for the national economies.
- Car driver and transport building lobbies got more and more political power to transform the environment in order to fulfil the wishes (not needs) of their clients.

GDP became the leading indicator for all decisions and this system fits very well into the following dogmas, like:

- Saving time by increasing travel speed.
- Increasing mobility all the time is happening.
- People have the freedom of modal choice etc.

Modern transport science knows that all three assumptions are wrong. There is no time saving in the system, if the speed is increasing. The time budget remains the same, only the distances increase. Mobility in terms of "trips per inhabitant and day" has not changed although the motorization has increased. There was only a change of modes, but not in the number of trips (Schafer, 1998), (Brög, Erl, 1999). And finally there is no absolute freedom of choice for people in real life. Circumstances from outside (built structures, lack of information etc) hinder people in this kind of freedom.

Why this was not seen well over the last 200 year?

The artificial environment including the car is one of the latest levels of evolution. But the car touches the human being at one of the earliest and therefore most effective evolutionary levels. Using a car saves 50% to 85% of internal body energy effort compared to walking. So the human body perceives car use as nearly effortless. At the same time the speed compared to walking is increased tenfold and more. Freedom from time and space is possible – or seems possible. An ancient dream of mankind is nearly fulfilled. The user gets enormous benefits, while he doesn't perceive the negative effects directly with his senses!

THE EFFECTS

City sprawl and concentration:

City sprawl on the one side (Figure 3) and concentration of economic activities outside the traditional settlements is one of the effects which could be observed worldwide.

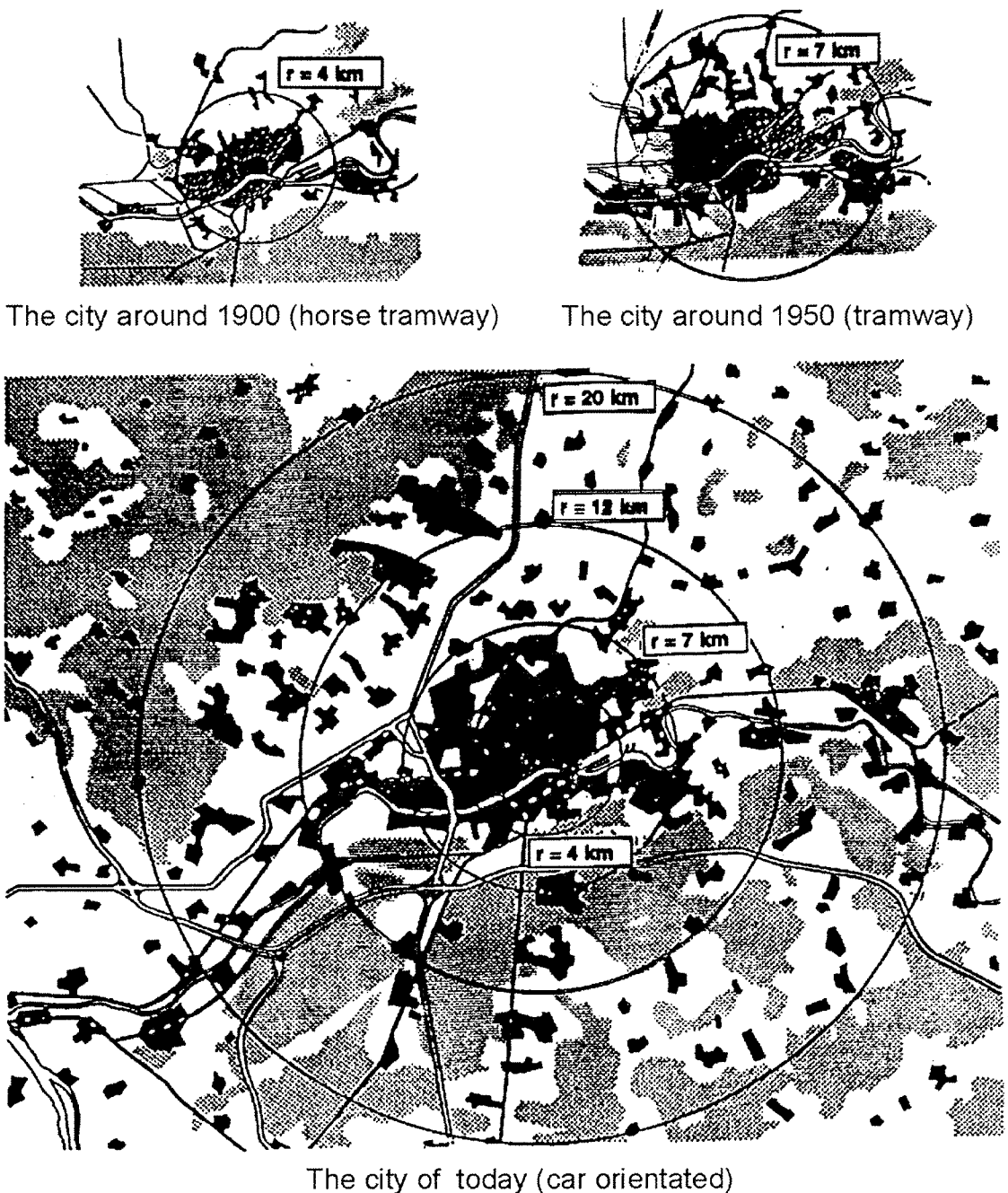


Figure 2: Historic development of cities (Wortmann, 1985)

Loss of economic power

Loss of economic power of cities and communities are the outcome of this degradation of structures. First small structures disappeared then the middle one and finally the competition between the remaining big structures began, caused by increasing the speed of the system wherever it is possible. As soon as people were able to use the car they got access to higher speed and a lot of advantages compared to slower system users. But with increasing motorization the system changed the structures.

Europeans have followed for decades the American principles. But meanwhile the Americans have realised that their planning approach is far from being optimal and they are looking for better solutions in Europe. Today American planners are coming to Europe to learn from our

old structures how to escape from the dilemma this way of life has produced. During the TRB meeting in Washington in January 2001 these attempts were discussed in several meetings.

We can summarise that the transport system (or the mode) is influencing the city structure fundamentally due to the effects described above.

THE WAY TO THE SOLUTION

What is the solution?

If the underlying, system dominating structure, in which the basic system behaviour is rooted, does not change, no sustainable solution is possible. If a measure should be effective, it must work at the same level as the driving force of the system. The human body energy consumption is the driving force in the transport system. Any measure which does not touch the level of human body energy can contribute towards the desired direction or not, but it can never solve the problem.

Existing structure

Under given conditions car owners are not at all interested to get to the public transport stop, to the local shops etc. They are captured in their cars and not any more connected to the community or the city structures (Figure 4). Neighbourhood is losing its attractiveness. The city centres and the traditional living districts are downgraded (Figure 5). The cause is not the traffic flow, the cause is the existing organisation of parking!

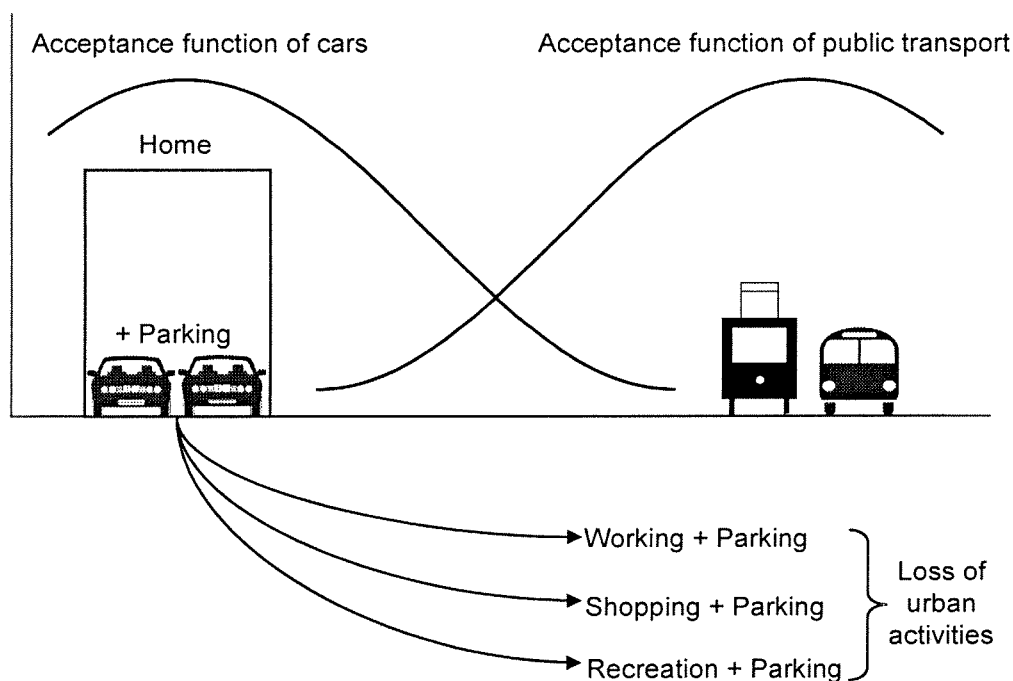


Figure 4: Existing structure

The basic solution

Only if the parking organisation is changed, the system can be stabilised without loss of mobility and accessibility – for all! The distance to the parked car must be at least as long as to the public transport stop! The cars have to be parked in garages or parking places in a distance, not shorter than the distance to the public transport stop (Figure 6).

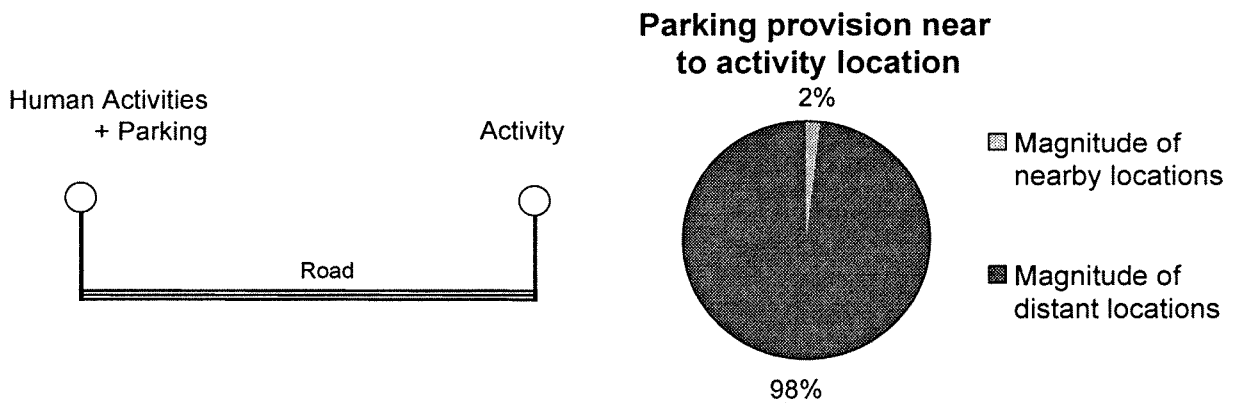


Figure 5: Effects existing structure

The Basic Solution

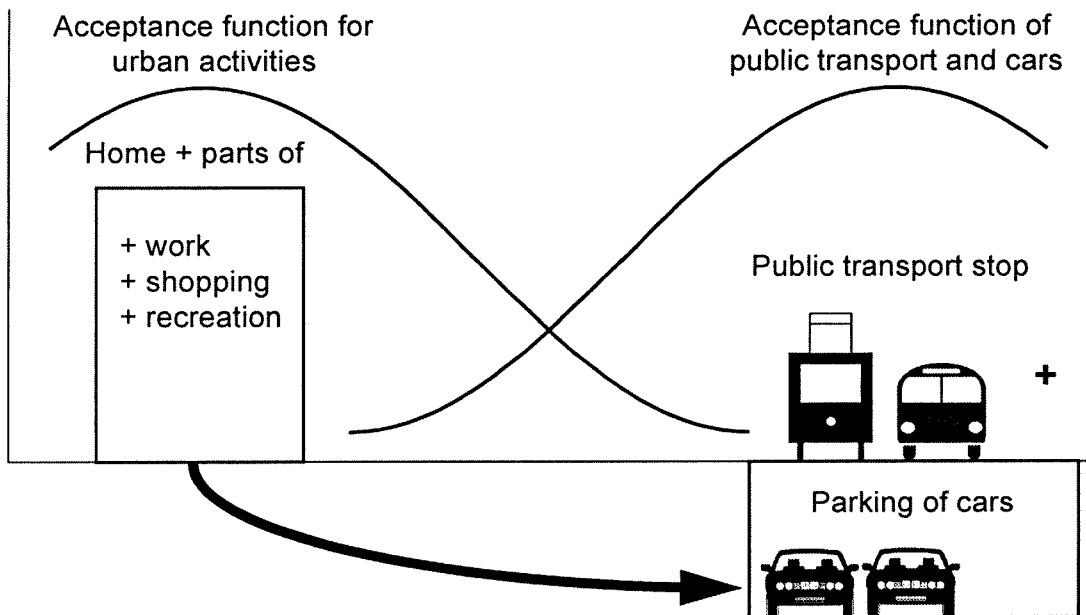


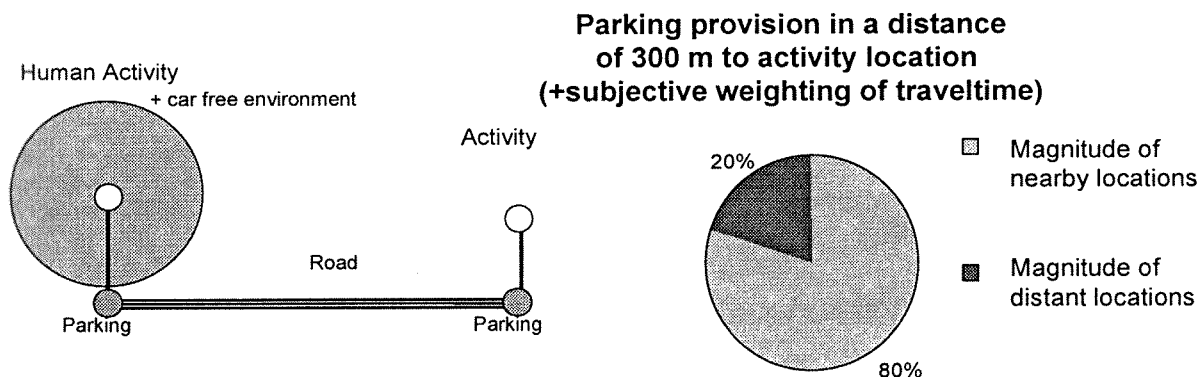
Figure 6: The basic solution

Then the people have the chance of choice between modes and many activities are coming back into the city (Figure 7). Market economy is now introduced into the system of city and transport. Car traffic was excluded from the principles of market economy in many ways. The main element is the parking organisation and not the traffic flow which was in the focus of most traffic experts in engineering and economy. If this principle is understood, it becomes clear why all attempts to introduce road pricing will have no substantial effects.

CONCLUSION

In a dynamic system interrelations between the elements are the crucial point to keep it sustainable. The system depends on its elements and the elements depend on the system: Man – society – man made structure – nature. To be sustainable, the footprint has to be (at least) smaller than the carrying capacity of nature, man, society, culture,....

BEQUEST: Real effects including human nature



Real effects, taking into account human behaviour:

80 % of the city is revitalised

Figure 7: Effects parking organisation

The outcome: Sustainable micromobility

Micromobility was the life-blood of all sustainable cities. If we can re-introduce this lifeblood into our cities by organising the transport system in the described way, the cities will become again the centres of our economy, culture and society – and they will be sustainable, as they have been during the last 10,000 years.

The effects of uncontrolled motorization have not yet caused too much damage in most South Eastern European cities. They are in a better position to reach the goal of sustainable development than cities in high motorised countries. This gives politicians and administrations the opportunity to develop city structures in a more sustainable way than in the West. The preconditions to apply results of system research which have shown the fundamental mistakes made during the last 50 years in Western Europe by copying the American transportation planning principles are still upright. Cities in South Eastern Europe have the potential to keep the modal split in favour of public transport and to develop sustainable economic and environmental structures. For that they have to start immediately regulating the key element of city development – the parking places. If they organise parking, as described in this paper and introduce market economy in the transportation system, especially to car traffic, they will overtake the Western cities. This strategy will prevent exponential growth of state deficits not only in the transport sector but also in other sectors. If the countries fail to develop the transport system for their own people and follow the Western path of transport development, they will soon be controlled by international corporations, which are dependent on cheap and fast transport systems.

The knowledge of system effects is only one side of the coin. Applying the principles in reality is the other and much more difficult side. Nevertheless the structures described in this paper have already been applied in several cities in the EU, e.g. in parts of Vienna, in Eisenstadt and a lot of other cities. They have proved their promises everywhere. But their

implementation has to overcome lots of barriers. Excellent professionals in the administration, experts with system knowledge and wide sighted responsible politicians are necessary to succeed. The EU will not be much support in this process as in the EU Commission transport systems are still treated with the old and wrong myths of time savings, mobility growth or time losses from congestion.

South East European Cities have the opportunity to prevent fundamental mistakes which happened in Western Europe by thoughtless copying of American transport and city planning, which caused tremendous problems in the old historical and cultural high developed Western European cities.

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