Spatial Concentration and Transportation : A Note

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Investigations into the positive and negative socio-economic implication of agglomerations deserve much attention. Such issues are of cause of major importance for Japan, but are certainly not unique for Japan, but are also emerging in other countries.

For instance, also South Korea has a deconcentration policy. It is interesting to note here that essentially in the Seoul area similar problems as in Japan exist : the high density and concentration in metropolitan areas. It is interesting to observe that problems of spatial concentration are closely linked to accessibility issues and thus to transportation systems. If we look at figures from the past few decades, we observe interesting patterns. An analysis of the evolution of transport since the beginning of the 1970's brings to light that both person and commodity transport has risen significantly in all EC, OECD and ECMT countries. Almost all countries show a similar pattern. At the same time it is interesting to take a look at investments in infrastructure in these countries. What is interesting to see is that in the mid-70's until mid-80's, there has been a structural decline in infrastructural investment in all these countries, except for railways. It is quite evident that a decline in investment on the one hand, and on the other hand an increase in transport cause severe frictions that will emerge. The situation which has been sketched here is a very clear illustration of an increasing tension between supply and demand.

There is an increasing awareness of the critical role of transportation in the current economic and technological restructuring processes. In the past years the context and substance of transportation planning in many countries have exhibited dramatic changes. Transportation planning is no longer a 'fixed route' planning, but is increasingly characterized by the need for flexible and visionary policy strategies and decision processes in an uncertain environment.

The external environment has a completely different 'face' compared to a decade ago. The drastic political changes in centrally planned countries, the return to market oriented societies and the new belief in competition and free entrepreneurship in many countries have destroyed the idea that public government were the vehicles par excellence for ensuring 'the greatest welfare for the greatest number of people'.

Furthermore, the substance of planning has changed. A fine tuning to a variety of

democratic desires of citizens is more and more required, making planning a **theatre of democratic operations**. Thus external megatrends and internal system's movements force planning towards a client orientation. At the same time, more frictions between wish and reality become apparent, so that planning as a science tends to become the art of **conflict resolution**. This provokes a re-orientation in terms of scope and research methodology. This is clearly witnessed in transportation planning in many countries.

In the past decades transportation planning all over the world has been strongly dominated by engineering views on network use and its expansion. Only in recent years social science oriented views have begun to enter the discussion of transport behaviour and infrastructure, as transport policy nowadays is increasingly facing a dilemma between economic-technological potential and environmental-social constraints. Transport infrastructure is a critical success factor for competitive advantage and internationalisation of our economies, whereas at the same time a further network expansion of traditional infrastructure is generally incompatible with the need for a high quality of life. Thus transportation policy does not only require engineering solutions, but has to be implemented on the basis of broad actual and future concern for our societies. At the same time, it has to be recognized that sky-rocketing mobility has become a widespread phenomena in all (developed and developing) countries, at all geographical scales ranging from local to international. This 'mobility drift' is clearly not only a technology-driven phenomenon ('technology push'), but also a result of far reaching changes in our ways of living, thinking and working ('market pull'). Our welfare societies are generating a complex array of contact patterns (material and immaterial) which require physical interaction at an unprecedented scale. Nevertheless and paradoxically, the daily travel time per person has hardly increased in the past decades ; this 'law of conservation of travel time' means essentially that the average travel speed—and hence distance—has increased because of high efficiency increases in our transport systems. Apparently there is an intrinsic resistance against an unlimited rise in travel time due to the high time preferences, so that the need for quality improvement of transportation networks (i. e., higher speed at relatively low costs) has come to the fore. It is also noteworthy that the travel frequency tends to rise in most countries.

Similar observations emerging from social science research can be made in the context of changes in labour force participation, life styles, demographic development etc. In all such cases social science research provides convincing empirical evidence that changes in our societies are major driving forces for the intensification of spatial interaction (persons, goods and information) in our Western world.

In addition, the awareness of the limits to growth in mobility has also dramatically increased. Environmental and safety considerations have become major factors in the social acceptance of our mobile society. Thus new transport solutions and technologies will have

to be implemented within increasingly narrower limits imposed by our society. The range of such solutions is even further limited by the simultaneous behaviour of all actors in our modern transport systems generating congestion effects (including high accident rates).

Thus the transport sector has become a focal point of social concern and interest. The scene of the transportation sector can only be understood by means of rigorous social science research. Neglect of the findings from such research renders transport policy ineffective, as can be seen from the experience of 'transport solutions' in many European countries (e. g., parking policy, modal shifts etc.).

It should be recognized at this stage that the presence of various physical, geographical, political, economic or cultural barriers—causing altogether **the** transportation problem—has usually prevented most regions from becoming a self-organizing system with equally competitive conditions. This has led to various kinds of government interventions, in both market and non-market economies, in order to ameliorate spatial economic inequalities. Although the traditional dilemma between efficiency and equity is of paramount importance in economic policy and transportation policy, it is at the same time relevant to observe drastic changes in the orientation of regional policy in almost all countries. New policy initiatives and directions (notably deregulation, supply side orientation, decentralization and privatisation) have in the past decade led to a significant shift in the background and justification of regional-economic and transport policy.

The 'undesirable' outcome of a highly mobile society (in terms of pollution, lack of safety and congestion) is—almost paradoxically—the result of rational and plausible actions of a great many individuals. Social science research has convincingly demonstrated that the neglect of social costs in individuals decision-making individual must by necessity lead to a macro outcome that is far from optimal. This explains worsening quality of life conditions in major cities all over the world.

The set of policy actions that can be envisaged in the transport sector is vast. At the same time the number of actors and interest parties that are directly or indirectly affected by transport decisions and policies is large. A major challenge will be to formulate plans that convincingly incorporate non-zero-sum game strategies with gains for all parties involved.

Thus the 'menu' of operations in the transport sector needs a customized strategy toward a multiplicity of interest parties, which once more makes clear that transport (and infrastructure) policy analysis is essentially based on conflict resolution analysis. Thus policy implementation in the transport sector is not in the first place a clean 'technocratic' application of instruments, but requires a fine tuning between goals, measures, interest groups and social acceptance. Transport policy in most countries could be much more efficient, if the inertia embedded in our social and political system would be recognized prior to the formulation of technical strategies.

Such pro-active social science oriented strategies require creative policy and social science research, not only regarding technical solutions or financial means, but also regarding material resources, human responses etc. Those countries which have been able to develop and support such research tend to be relatively successful in their policies. A particularly important, but often neglected factor in this context is the organizational and managerial setting that is necessary for making a policy strategy successful. This can be well illustrated by the operation of new (privatized) bus lines in many European countries, where the necessary efficiency rise in mass transit systems (including bus lines) has been accompanied by decentralized responsibility of bus operators thus allowing a search for creative and cost-saving public transport solutions.

In this framework it is also noteworthy that in view of the great many negative externalities of transport (notably air and road), many social scientists in various countries have recently resorted to the so-called 'user pays' principle. This has had a significant impact on the direction of transport policy in various countries, witness the current plans in Switzerland, Austria, Sweden, Norway or the Netherlands etc. to introduce tollroads, electronic road charging etc.

Another illustration of alternative transport strategy needs concerns the necessary improvement of transport systems in an efficient way by reducing the large number of protectionist regulations for specific actors. Research on deregulation principles in various countries (e. g., Great Britain, Germany, Greece) has had an important effect on political and societal thinking regarding the role of the government in transport policy.

In conclusion, transport policy is diversified and will not become uniform because of many indigenous cultural, physical and geographical factors. Much attention is needed for the identification of bottlenecks in transport systems operations, the socio-political barriers to geographical interaction, the reasons for missing links or networks etc. The recent past has shown a revival of a social science orientation in the transportation field, as is also witnessed in the policy/research agenda's of large international bodies such as the European Community, the Organisation for Economic Cooperation and Development (OECD) and the European Conference of Ministers in Transport (ECMT). It seems plausible to assume that this important position of social science research in the transport sector will become even much stronger in the near future, especially in light of the drastic socio-economic and political changes on the way towards a rapidly evolving network economy. Transportation—and spatial interaction in general—mirrors the socio-economic, spatial and political dynamics of our societies. In the **sixties**, a period with unprecedented economic growth in many Western countries, transportation policy was strongly oriented toward network and capacity expansion. From the **seventies** onward however, the limits to growth discussion marked a more modest role of infrastructure policy in which a more efficient use of existing networks

received more attention than a straightforward physical expansion. In the **eighties** new views have come to the fore, reflected inter alia in the environmentalist movement (green parties, e. g.) with its strong concern about the negative impacts of transport on the general quality of life. From the **nineties** onward also a strong interest in the potential of modern technologies (telecommunication, e. g.) for network improvement emerged, notably in the context of the missing networks discussion and of the evolving new network economies.

It goes without saying that transport is a critical success factor for regional restructuring and urban competitiveness. Recently, in a spatial context some authors have referred to the so-called 3C-regions as successful regions : 3C+regions (regions with *creativity*, *competence* and *connectivity*) are the most promising areas for spatial economic dynamics, while on the other hand the losers in this game will be the 3C-regions which are characterized by *congestion criminality* and *closure* (or isolation).

Thus, to a large extent new socio-economic and political developments are projected on the field of transportation planning. This also implies that transportation planning cannot be undertaken in **isolation** from other fields of planning and policy-making (e. g., economic, environmental or technological policy), so that nowadays transportation planning is by definition a **multidimensional** activity focusing on multiple (public and private) interests with a strong emphasis on conflict resolution.

Furthermore, a wide variety of **new broader social developments** is taking place, which have direct or indirect implications for transportation planning. Examples are : uncertainty in income positions and labour market positions among various groups in society (leading to severe equity problems), an increase in female labour force participation in all industrialized countries (leading to complex journey-from-home-to-work travel patterns) ; drastic cuts in governmental budgets for public works including infrastructure (leading to severe problems regarding the management and maintenance of infrastructure), new policies regarding urban revitalisation and gentrification (leading to structure changes in the direction and volume of commuting flows), a large scale introduction of informatics and robotics (leading to new types of logistic management and freight transport ; an increase in car ownership and mobility (leading to severe environmental and safety problems), a reduction in the extent and scope of public policy (leading to various types of deregulation and privatisation principles in transportation planning), and a drastic socio-political re-orientation in many countries.

Such drastic changes are likely to exert a profound influence on the future spatial interaction pattern of our societies and will make it necessary for transportation planning to respond as efficiently as possible to new tendencies and new challenges. However, transportation planning is often marked by lack of resilience, so that flexible adjustments to new structural changes (e. g., deregulation, compact city design, new distributional policies) often take place insufficiently. This case of 'government failures' may then likely lead to **second**

best solutions (including forced mobility, environmental decay, unequal distribution of costs and benefits, lack of safety, a high degree of functional separation etc.).

In the framework of our discussion on new roles of transportation it should be recognized that transportation is, generally speaking, '**derived demand**'. This assertion is no doubt valid, but it is only part of the truth. Seen from the viewpoint of transportation planning, it is more plausible to state that transportation has two different faces : **increased access to many facilities** (often resulting from an improved or advanced transportation technology and usually leading to a rise in general welfare) and an **increased deterioration of the quality of life** (due to traffic congestion, pollution, noise annoyance and lack of safety). These contrasting roles of transportation planning, viz. **potentiality** and **externality**, have placed the mobility of man and society in the centre of scientific and political interest. These two poles also provoke the need for adjusted planning and evaluation methodologies for conflict resolution.

An important caveat for transportation planning is the fact that the most favoured solution to transportation problems (in the past)—viz. physical extension of networks (i. e., investment in hardware)—has proven to be valid only for very short periods of time, since capacity extension will very soon show the same kind of congestion as other parts of the network. Three options seem to be useful to cope with this dilemma :

- (1) Investments in advance modes of transport e. g., transportation based on telematics infrastructure, open new opportunities to expand interactions without major extensions of other networks, but it remains to be seen for how long, given the predicted massive growth of transportation in the years to come. Large and focused investments in telematics and new information technology infrastructure is certainly necessary in order to reduce the problems of missing networks.
- (2) It is increasingly necessary to tackle the causes of the growing demand for transportation facilities—e. g., physical planning of residential areas, locational behaviour of firms and user charges—, instead of just extending networks at increasingly growing social (i. e. external) costs.
- (3) Improvement and/or establishment of multi-modal networks is another meaningful option. This indicates both the need to think and act from a broad network perspective, when dealing with transportation problems and the need to give serious thought to all five dimensions of networks, i. e., hardware, software, orgware, finware and ecoware. Network quality is the corner stone of this approach and must therefore be set high on the political agenda.

In the past, when dealing with infrastructure issues, transportation planning was often

focused on the expansion of the physical capacity of roads, airports, etc. as a natural way of coping with capacity constraints related to hardware and software. In recent decades these options have been restricted by a large number of constraints. A neglect of such constraints tends to affect the efficiency and performance of transport infrastructure. These constraints can also be re-phrased as critical success factors. They can be represented by means of the following Pentagon of concerns or critical success factors.

- 1) hardware (physical infrastructure)
- 2) software (logistics and informatics)
- 3) orgware (institutional and organizational setting)
- 4) finware (financial arrangements/funding)
- 5) ecoware (environmental and safety effects).

The existence of these constraints has led to a growing concern for network quality. For instance, instead of extending the road network with another 100 kilometers in response to congestion—which would soon also become congested—the question is how to increase the quality of services of transport arteries (viz., comfort, speed, price and reliability of transport), for instance, by a clever combination of hardware and orgware. This performance question of infrastructure networks is thus a central one. As each transporter or passenger may have different needs, different transport modes and networks should in fact have a base quality, in order to provide a free choice and to increase capacity of all networks should in fact have a base quality, in order to provide a free choice and to increase capacity of all networks. In some circumstances, the need for physical transportation might even be reduced as the use of telecommunications is growing.