

Introduction

Cities are often interpreted as being a kind of spatial organization which favor functional interaction. However, this is a fragile property, as urbanist Jane Jacobs pointed out in 1961: “when we make cities more accessible, the intertwining uses of different urban functions invariably get smaller”.

Opening up urbanized space to the largest number of people possible remains both a societal factor, and a target for urban development which is difficult to achieve. Of course, since the 1960s, the matter has evolved considerably in Western countries, even if our dependency on cars is still being spoken about.

Thus, society has undergone heavy transformations in terms of its organization (feminization of labor, temporary jobs, increased professional mobility, flexibility, part-time hours, etc.) as well as attitudes and ways of life (ruptures within home lives, individual autonomy, mass but individual consumerism, etc.) or its spatial foundations (discontinued, heterogeneous, low density and multi-polarized cities).

Introduction written by Arnaud BANOS and Thomas THÉVENIN.

These major changes inevitably result in changes regarding the needs for mobility, which are admittedly becoming more and more urgent. But these are also changes which concern more evolutionary, and more complex needs, to such an extent that the traditional “right to transport” maxim from the 1970s has gradually been substituted by a “right to mobility”, including individual mobility which has become a key to the metaphorical safety-deposit box of urban space management. In this ever changing context, both a better characterization and estimation of transport supply and demand is vital.

It was therefore logical for the ANR’s program for *Villes durables* (French National Research Agency, *sustainable cities*), via one of its funded projects, to help spread the most recent practices in this both rich and fertile domain.

The chapters in this book focus on the double issue of characterizing the supply of transport and estimating its demand.

Part 1. Characterizing transport supply

The issue of urban transport systems requires us to answer at least two pressing questions, namely: which mode of transport, and for which users? Here we will focus on the public’s mobility. It is true that the question of mobility in goods and commerce domains is a whole other universe in itself, which might even justify the publication of another book in the French IGAT series on this theme. In addition, it would be difficult to attempt to deal with *transport systems* without tackling the difficult yet fundamental question of intermodality. These different points are dealt with in the following seven chapters, in directions which are as varied as they are complementary.

Part 1 is dedicated to characterizing transport supply, and the first four chapters within paint a detailed picture of the technological and methodological investment needed in order to accurately describe transport supply in urban areas.

In Chapter 1, Thomas Thévenin willfully roots his reflections in the recurrent and largely detrimental problem of dispersion and the lack of interoperability of data-bases dedicated for uses within transport domains. He thus proposes a model using generic data, both temporal and spatial, which could bring together approaches, and those authorities within the domain, around a common theme. Using very specific information, organized and structured on what he refers to as “GIS-Transport”, he shows that it is possible to carry out performance measurements on modes of transport over the entire mobility chain, on the global scale of a community.

In Chapter 2, Robert Chapleau hammers the point further: characterizing the urban public transport supply is above all a communication problem between those involved, between methods and softwares, and between objects. He shows how to model a transport system, public transport in particular, in order to describe it in terms of its spatial, temporal, static and dynamic components. In doing so, he demonstrates the important role played by GIS (Geographic Information Systems), regarding user information as well as supports for those making important decisions. This underlines the irreplaceable contribution of these tools to the technical credibility of the many interventions carried out on public transport networks.

Chapter 3 goes into more detail on this matter, as difficult as it is fundamental, with regard to collective transport networks. Alexis Conesa and Alain L’Hostis define multimodal and intermodal accessibility, by introducing an essential component; travel time accessibility. They show that in order to assess the way in which a given transport

system adapts to the rhythm of urban life, it is vital to specify accurately certain time-related constraints. As difficult and unrewarding as it is, creating data bases for travel times using graphs gives us a relevant and realistic representation of mobility conditions. This is a major asset for those wishing to consider both the organization of transport systems and their inclusion in urban areas.

Finally, Chapter 4, written by Cyrille Genre-Grandpierre, allows us to question the previous three chapters, concerning their spatial base in particular, due to the fact that the formalization of transport networks by using graphs – mathematical abstractions with properties which are perfectly known and controlled today – is not, therefore, exempt from certain biases. The relationship between a transport network and its designated service area (the land) is either hardly or not taken into account by these approaches, to the extent that other options bringing into play fractal geometry may be put forward.

Part 2. Estimating transport demands

Characterizing a transport supply independently of the underlying demand would be quite paradoxical. Accurately defining real and desired mobility on the scale of a city or community is nonetheless a sizeable matter. As a concept which is complex, multiple in form, and ever changing, mobility in daily life is really only offered progressively and partially with regard to the analyst. How, in these conditions, can we claim to approach this concept with enough precision in order to adjust transport services to it, these services which are adapted to the needs and expectations of the public? The following three chapters tackle this difficult question, using three complementary angles of approach.

In Chapter 5, Patrick Bonnel gives both a broad and thorough review of the methods used to estimate demands

for transport in urban environments. Within the ever irrefutable *four step model*, he shows how aggregate and disaggregate models may be combined to produce reliable predictions of the demand for transport. He takes advantage of this in order to propose a pragmatic and realistic vision of modeling and its irreplaceable heuristic qualities. Modeling's potential for exploration is largely reinforced today by the power of computer tools for visualizing information, letting us bypass traditional approaches of *input/output*, based on rigid "black-box" interfaces between the modeler and his/her data.

This is precisely what Olivier Klein demonstrates in Chapter 6, with many supporting examples. At the risk of surprising non-specialists, he shows that visualization is both a scientific and artistic activity, rooted in soils as varied as they are fertile. Interactive strategies, directly involving the user in the processes for analyzing his/her data, may be imagined and carried out today, within ergonomic computer processing environments. The future seems widely open to GIS, which are truly interactive systems, directly involving the users within the virtual universes they control, and providing them with many alternative and complementary methods to do so, methods which are specifically adapted to the geographical nature of the information. These approaches, applied to the dynamic visualization of daily urban mobility, let their potential shine through.

Finally, in the 7th and last chapter, Olivier Bouhet combines supplies and demands for transport in all their varied and rich ways of expressing themselves, within a multiple criteria procedure which is particularly relevant when it is a matter of guiding decisions in a multiform environment. Applied to the *tram-train* project around the French region of Grenoble, this procedure shows its strengths when it is fed with geographical data correctly from different origins (multiple sources), which are essentially heterogeneous.