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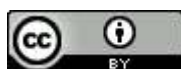
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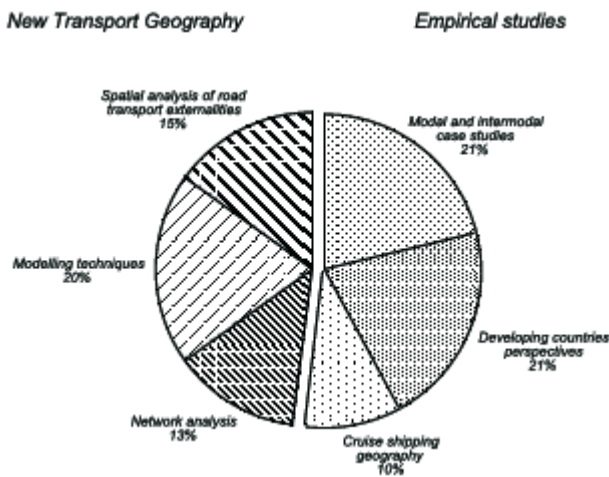
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Transport geography at the turn of the century

Pierre Arnold, Jacques Charlier and Isabelle Thomas

- 1 Let us have a look at the scientific literature produced by the Belgian geographers working in Belgian research institutes. Figure 1 shows that the nature of transport geography studies has changed quite dramatically during the second half of the 1990s when compared to the previous periods covered in the surveys of this research field by Brulard (1984), Mérenne (1988) and Brulard, Charlier and Mérenne (1996). Until recently, most papers were empirical and descriptive, and this kind of material still accounts for half of those published in the last few years. But a new trend has been identified towards more inductive and theoretical research, with a strong quantitative and modelling component. Hence the division of this state-of-the-art review into two parts, even if it should be made clear that allocating some material into a given section instead of the other has been sometimes rather arbitrary. When compared with the previous years, research in transport geography is increasingly becoming collective within teams of researchers combining different, often complementary backgrounds, expertises and approaches to the discipline, at intrauniversity and interuniversity levels, including internationally (see the large proportion of joint papers).

Figure 1. The new trend in the nature of transport geography studies conducted by Belgian geographers in Belgium.



A steady flow of empirical studies

- 2 The twenty papers or so with a clear empirical approach can themselves be divided into three subgroups and two of them are rather new. This means that evolution is also taking place within the more conventional researches, which should be clearly connected with the French school of transport geography. These two new frontiers for deductive studies are, respectively, those relating to the developing world, especially Africa, and those exploring the geography of cruise shipping in its transport dimension. They should be regarded as logical extensions of methodologies tested previously in developed countries, especially in Belgium and in nearby European countries. The latter subfield still accounts for one fifth of the papers reviewed here, and it seemed therefore logical to cover them in first stance.

Modal and intermodal case studies

- 3 As shown by Thomas and Verhetsel (1999) in a broad description of the road transportation system in Belgium, sustainable transport is becoming a key concept in politics as well as in research. This is clearly illustrated in a regional case study on the development and the spatial organisation of new road infrastructures around Wavre and Louvain-la-Neuve by Arnold and Van Wunnik (1998). The same search for greater sustainability is behind a review of the Belgian high speed train network by Charlier (2000), wherein a series of applied proposals are made in respect with new intermodal nodes along the high speed lines, including a new major airport. In his review of the Benelux seaport system, the same author was also suggesting a new freight-only railway line connecting these ports with Northern France in order to relieve the high pressure of transit traffic by road (Charlier, 1996a).
- 4 A second set of four publications relates to sea transport and port geography, with a special issue about containerisation of a leading international journal to be mentioned first (Slack and Charlier eds, 1999). The next two papers by Charlier (1998 and 1999) about Antwerp and Zeebrugge are more than just factual, as they show that, on the one hand, a

growing port traffic and an even faster increase in port added value do not mean an higher number of jobs in the post-industrial era and, on the other hand, that all tons of cargo do not have the same economic weight and that, therefore, quality is more important than just quantity in ports as more generally in transport. The last paper of the series is also dealing with Antwerp, as well as with Ghent and Rotterdam (Charlier and Malézieux, 1997), where port-oriented redevelopment strategies are carried in the older port areas, some parts of which are not ripe yet for a 'docklandisation' process, as in London.

Developing countries perspectives

- 5 With its less elaborated transport networks, subsaharan Africa is offering an interesting field to explore the more general processes of transport development. This is especially true for land-locked countries where intermodal transport is still in its infancy, as shown in a general overview (Charlier, 1996b) as well as in two case studies in Burkina Faso (Charlier, 1996c) and in Rwanda and Burundi (Charlier, 1997).
- 6 South Africa offers the example of a rather well developed transport system wherein ports play a major role (Charlier, 1996d). New gateways are being added in the port network such as Richards Bay (Charlier, 1996e), and a smaller scale symmetrical example has been explored in Ivory Coast, where San Pedro might also become an port-industrial growth pole (Charlier and Aloko-N'Guessan, 1999). In these examples, railway connections to the hinterland are of utmost importance, as also shown in Benin for Cotonou (Charlier and Tossa, 1996) and in Togo for Lomé (Seghbor and Charlier, 1997).

Exploring the geography of cruise shipping

- 7 Geographers were late in exploring tourism, and 'blue tourism' is still very much a *mare incognita* for them. A first general overview of this fast growing industry, seen from a transport geographer's perspective, has been given by Charlier (1996f). He has also shown how seascapes are part of the cruise products and are key factors in the microgeographic definition of many ships itineraries (1996g). The search for climatic complementarities is another major issue, this time macrogeographic, as shown by Charlier and Arnold (1997) and by Arnold and Charlier (1999), who explored the seasonal complementarities of the main cruise markets and identified the major inter- and intraregional migration flows of cruise ships.

Towards a new transport geography

- 8 As far as we know, two research teams are particularly concerned with this new research trend: the economic geographers of Antwerp (U.F.S.I.A.) and those of Louvain-la-Neuve (U.C.L.); both teams are conducting research on several spatial aspects for a sustainable road transport system (Thomas and Verhetsel, 1999).

Network analysis

- 9 Topological graphs are a common way for representing part of the geographical environment and more particularly transportation networks linking cities together or

within cities. For ages, geographers have dreamed of synthesising the *morphology of a graph* by one or several indexes. Beguin and Thomas (1997) have reviewed the literature about this problem and shown that nowadays no index measures the shape and size of a graph in an unambiguous way. It is still impossible to show which networks are topologically identical, which networks look alike.

- 10 Other papers have been concerned with the evaluation of transport systems by means of local *accessibility indices*; this is the case of an empirical study conducted on the Walloon railway network (Arnold and Sandraps, 1998). Another geographical problem bound to the transportation system itself is the route description, which is also tightly bound to G.I.S. and cartography (Van Waes, Vanherre-weghe and Verhetsel, 1997; Van Waes, Verhetsel and Vanherreweghe, 1998).

Modelling techniques

- 11 Networks are the physical supports for many economic and transportation activities. They also determine the location of most human activities: place of residence, workplace, location of firms, location of public services and even - at another scale - the location/development of the cities themselves are depending on accessibility and hence, on the shape of the transportation network.
- 12 *Location-allocation techniques* have been used and applied on theoretical networks in order to show the link between the shape of the transportation network and the modelling results. Conclusions are interpreted in the context of the 'New economic geography' research trend (Arnold, Peeters and Thomas, 1995; Peeters and Thomas, 1995; Arnold *et al.*, 1997; Peeters, Thisse and Thomas, 1998). All papers confirm the strong link between the transportation system and the optimal locations in the case of autarky as well as in common markets: the transportation system induces a strong inertia of regional systems. In the same vein of papers, Peeters and Thomas (1997) showed that the choice of the parameters in using l_p -distances for estimating distances does not affect the solutions of the location models. This means that real-world distances can easily be estimated by such functions without affecting the operational results.
- 13 In terms of optimal locations, a new avenue of research has also been opened by Arnold and Thomas (1999), and by Arnold *et al.* (2000). These authors showed the operationality of the optimal location techniques in finding the optimal locations of *transshipment facilities* in a multimodal perspective for freight transport. Real-world applications are now on their way in national as well as international contexts. Let us also mention the publication of an application of an optimal location model for an up to date problem in a 'green transport' perspective: *garbage management* in the city of Brussels (Charlier, Puissant and Thomas, 1999).
- 14 Last but not least, another series of operational modelling tools for transportation planners are the urban transportation plans and the *intra-urban transportation modelling techniques* bound to them. They enable the geographers to simulate fluxes under several assumptions such as daily traffic variation, congestion and/or multi-modal transport. These models help the urban planners in an economic geography perspective (Verhetsel, 1998; Verhetsel and Peetermans, 1998).

Spatial analysis of road transport externalities

- 15 Transportation generates negative externalities that are to be measured not only globally but also locally (see Thomas and Verhetsel, 1999 for a review). Congestion and road accidents are two examples worth studying by geographers. Verhetsel (1998) has introduced *congestion* in an intra-urban transportation model testing several route alternatives. By using sensitivity analyses, she showed how acute the problem is in a large city like Antwerp.
- 16 Several interesting methodological aspects are bound to the spatial analysis of *road accidents*. Thomas (1996) showed how far the aggregation of the data influences the simple statistical description as well as modelling choices. Black and Thomas (1998) applied global spatial autocorrelation indices to road accidents data in Belgium and showed that accidents do not occur at random. Other spatial aspects of road accidents and road safety have also been published in national (Thiran and Thomas, 1997) as well as international perspectives (Bruneau *et al.*, 1998; Vandersmissen *et al.*, 1996; Vandersmissen, Thomas and Morin, 1996).

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ABSTRACTS

The period covered by this bibliographical review (1995-2000) is characterized by an important development of the theoretical researches in transport geography. This new trend is illustrated by a great diversity of materials, which can be divided into three sub-groups: network analysis, modelling techniques and spatial analysis of road transport externalities. But a significant part of papers with a strong descriptive component indicates that empirical studies still constitute a concern of the Belgian geographers, especially in connection with new research areas as the developing world and the geography of cruise shipping.

La période couverte par la présente revue bibliographique (1995-2000) est caractérisée par un important développement des recherches théoriques dans le domaine de la géographie des transports. Cette nouvelle tendance est illustrée par une grande diversité de contributions qui peuvent être regroupées en trois sous-catégories: l'analyse des réseaux, les techniques de modélisation et l'analyse spatiale des externalités liées au transport routier. Une part substantielle d'articles présente une composante descriptive importante, ce qui montre que les études à caractère empirique constituent toujours une préoccupation des géographes belges, particulièrement dans les nouveaux domaines de recherche que sont les pays en voie de développement et la géographie des croisières.

INDEX

Keywords: transport geography, network analysis, modelling techniques, road transport externalities, transport and development, cruise shipping

Mots-clés: géographie des transport, analyse des réseaux, modélisation, externalités liées au transport routier, transport et développement, croisières

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