Chapter 1

New Trends in Policy Making for Transport and Regional Network Integration

Marina van Geenhuizen, Aura Reggiani and Piet Rietveld

1.1 Introduction

Over recent decades, the formulation of transport policy has become an increasingly complex task. This is because transport is not pursued for its own sake, but is derived from other activities such as living, working, production and recreation, which are themselves subject to increased complexity. The point is that new lifestyles and new methods of production are generating an increased demand for transport, including higher frequencies of service and longer travel distances. While new technologies are helping to make transport systems more powerful and efficient, at the same time, they also introduce additional complexities due to problems of unreliability and feedback effects.

Another reason for the growing complexity arises from the many, and often conflicting, goals involved in the determination of transport policy, such as increasing the capacity of the network to accommodate larger and quicker flows, reducing costs, and limiting environmental impacts (for example, Beuthe et al., 2004). The stakeholders concerned are increasingly finding themselves in a dynamic multi-actor situation, in which they attempt to influence decision making by exerting a stronger presence and by participating in rapidly changing networks. In particular, the social acceptability of transport policies is becoming a major issue in many countries. All this implies that now the policy-making process is ‘muddling through’ even more so than it did in the past.

A more recent development is the growing awareness that transport systems are vulnerable to criminality, terrorist attacks and natural disasters. These threats add new dimensions to the design criteria of transport networks: for example, the notion of robustness of transport systems in order to counter the terrorist’s aim to achieve maximum damage. This robustness is also crucial under the chaotic planning circumstances following a major disaster, natural or man-made, when the transport system has to be used in the best possible way for evacuation purposes or the supply of support activities. In this context, the evolution of the complexity of
transport networks is clearly also dependent on technological information systems, which intensifies the ‘networked’ character of transport systems. Consequently: ‘An understanding of these complexities is imperative for the design of plans and policies that can be used to optimize the efficiency, performance and safety of transportation, telecommunications and other networked systems’ (Reggiani and Schintler, 2005, p. vii).

These issues imply that standard methods of policy analysis in the transport field should be further developed in order to address the current challenges. In particular, we mention the use of analytical methods for evaluating policy in the following main areas:

- Equity and social acceptability;
- Vulnerability due to terrorism and large accidents;
- Uncertainty and risk.

The socio-economic, political and technological trends mentioned above have had strong impacts on the functioning of transport systems and transport policy-making routines. In addition, there have also been important consequences for land use and regional development. Transport and communication serve to increase the accessibility of regions by improving network links: for example, bridging missing links or increasing the speed of flow over existing links and nodes. Telecommunication may compensate for large physical distances and may reduce time-distance to virtually nothing. In this context, the integration of regions is an important theme, including attention to the level of integration and to its impact on the organization of supply chains, the degree of specialization and the economic performance of the companies involved. In addition, in studies on regional and national convergence, progress has been made using new methodologies permitting new perspectives on convergence (for example, Cuadrado-Roura, 2001).

This book brings together a number of papers on these themes. We classify them under two main headings:

I. Policy analysis in the transport field.
II. Transport policies and regional network integration.

Before describing the individual contributions in Section 1.4, first a short review of the themes is provided in Sections 1.2 and 1.3.

1.2 Policy Analysis in the Transport Field

The solution of transport problems is steadily changing in nature because of changes in the underlying technological, economic and political decision-making contexts. In the limited space available here, it is not possible to give an exhaustive
summary of all the developments, therefore we focus on three main forces that will receive further attention in this volume: equity issues; vulnerability of transport systems to terrorist attacks; and uncertainty.

1.2.1 Equity Problems and Transport Policies

Issues of equity and social justice play a role in transport policies in various ways. First, equity problems may be an unintended side effect of policies to address transport problems such as congestion and environmental nuisance. For example, opponents of charging for environmental externalities may claim that this measure has adverse equity effects since it will hurt the poor more than the rich. Second, equity may be the explicit aim of certain transport policies such as the construction of infrastructure in lagging regions, or subsidies to public transport to support the urban poor. In the latter case, equity is more than a side effect: it is the main motivation for a policy.

It is striking that, while efficiency plays a major role in social cost-benefit analysis, equity often receives most attention in the political domain. As a consequence, the outcomes of social cost-benefit analysis are often considered as less relevant in policy-making processes. But as noted, for example, by Viegas (2001), the notion of equity is not unambiguous. Equity concepts may cover horizontal equity (comparable individuals should be treated in a comparable way), level playing field (transport sectors should be treated in a similar way according to taxation, etc.), and the principle that individuals that are negatively affected by policies need to be compensated. Standard cost-benefit analysis is based on adding the net benefits of all winners and losers. But, by doing so, equity issues are ignored. A positive net benefit means that, in principle, the winners can compensate the losers. However, this is only a hypothetical compensation, and therefore a policy alternative with a clearly positive aggregate net benefit may have serious equity consequences. In order to improve the systematic search for, and development of, policy alternatives, there is a need for a tool where, in addition to efficiency concerns as reflected by cost-benefit analysis, equity concerns are also operationalized.

1.2.2 Transport System Performance Under the Threat of Major Accidents and Terrorist Attacks

The threat of major accidents is a consequence partly of natural disasters, such as earthquakes, volcanic eruptions, floods, tsunamis, and partly of man-made disasters. In both cases, transport is a relevant dimension of policies designed to reduce damage. When the accidents can be predicted with some degree of certainty, depending on the type of accident, then evacuation strategies may make sense. It is clear that this solution may easily reveal a lack of capacity to serve the sudden transport need at short notice. In that event, simulations with transport
models may help to predict where the main bottlenecks will be, and whether expanding capacities at critical places can reduce these bottlenecks.

A related problem is the optimal use of transport systems for relief activities after the serious incident. The experience with the 2004 tsunami indicates that there is a need for creative combinations of existing transport modes that make use of waterways and roads, as far as they are still functioning, and air transport in cases where the usual transport modes are no longer operational. This raises questions such as whether and how transport infrastructure should be designed so that it is more robust in the case of natural disasters, and whether reserve capacities should be created to make incident management more effective. After the worst is over, it is necessary to select the best model of policy making for the reconstruction stage. As reconstruction often occurs under time pressure, there is a chance that links with overarching planning aims and principles are forgotten.

Of special importance is the vulnerability of transport systems in the case of criminal activities and terrorist attacks. The recent experiences in this field – the tragic train bombings in Madrid (2004) and London (2005) – make clear that transport is a soft target in both cases, because it is more difficult to protect than other targets. Given the different objectives, it is plausible that criminal activities like theft are mostly related to freight transport, whereas terrorism is more oriented towards passenger transport. The costs of these threats go far beyond the direct costs of criminal acts and terrorist attacks. For example, preventive measures, although necessary, can sometimes lead to delays in aviation schedules, implying an increase in the generalized costs. These changes may result in a decrease in overall travel demand, like in international trade (Nitsch and Schumacher, 2004) and in international tourism (Fleischer and Buccola, 2002).

Even this limited list of examples demonstrates that both natural and man-made accidents have far-reaching consequences for the planning and operation of transport systems that thus deserve due attention from policy makers and researchers during the coming years.

### 1.2.3 Transport System Planning and Uncertainty

Uncertainty in transport policy and planning is a theme that has attracted a great deal of interest since the 1990s. Failure to reach goals, adverse impacts of policy measures, large budget overruns in transport projects, and forecasts of future transport demand that turn out to be wrong, have all increased attention for uncertainty. Accordingly, it is now realized that transport policy – situated as it is in a dynamic field of actors' interests, and at the same time attempting to influence systems that are unpredictable due to chaotic dynamics – suffers from uncertainty in many ways. Of course, policy tools already exist to increase insight into the costs and benefits of alternative policy interventions, or to learn about critical conditions and events in the future, as in scenario analysis, but what is new is the recognition of the need for awareness of intrinsic uncertainty and the acceptance of the implications of uncertainty for ways of policy making.
The reason why it is particularly transport policies that face such a great and comprehensive uncertainty stems from the derived character of transport which causes uncertainty in related policy areas, such as regional economics, housing and land-use planning, to spread into the transport field. Moreover, the transport system itself is complicated in nature: as it encompasses all types of infrastructure, service provision, maintenance and control, use by passengers and freight, information systems to smooth processes, and an array of institutions that influence all the operations. What adds to the complexity is that, in forecasting exercises, different time-horizons need to be taken into account, ranging from a few minutes and hours to a few decades, not to mention different geographical scales.

If we take a comprehensive view of policy making and transport system behaviour, a wide range of sources of uncertainty can be identified. For example, there is complexity in the transport system itself, including social behaviour encompassing both daily traffic management and long-term planning and policy. In addition, there is complexity in policy making due to the 'human factor', including public opinion, emotional reactions to policy measures, value-oriented decision making, and so on. Another class of complexity in policy making is caused by the limited consensus on specific policies; a poor match with policies in adjacent fields, and so on (Friend and Hickling, 1997). There is also overestimation of the ability to design future transport images that are realistic, caused by simplistic conceptualizations of technological development and its impact on society (Geels and Smit, 2000). This limited list of examples of sources serves to demonstrate the widely different origins of uncertainty and its wide presence.

1.3 Transport Policies and Regional Network Integration

A useful tool to analyse the interrelationship between transport systems and regional development is the accessibility concept.

1.3.1 Accessibility

In the emerging European network, as a result of the recent inclusion of the new access countries, the spatial and functional positions of networks (and the related benefits from the use of these networks) are regarded as critical success factors for the development of regions, cities and firms (Martellato and Nijkamp, 1998). In this context, accessibility certainly plays a fundamental role, in investigating both slow dynamics, typical of the network supply side (infrastructure, facilities/locational development) and fast dynamics, characteristic of the user side (demand mobility/communication pattern) (Reggiani, 1998).

From the spatial/regional viewpoint, accessibility can be a useful instrument for exploring the (balanced) distribution of economic activities, the territorial dis-
equilibrium, and the development of the lagging zones: in other words, the growth performance of different regions.

The accessibility concept and its measures have a long tradition in spatial and transport science, starting from the 1960s. In particular, in the accessibility literature (1960–1990), three fundamental perspectives can be identified:

- The accessibility of a node is conceived in terms of its location.
- Accessibility is considered in terms of the opportunities that a person or group has, within a certain zone, to participate in one or more specific activities.
- Accessibility is identified by the benefits accruing to a group from living in a certain region and taking advantage of the available transport systems.

However, the different measures of these three indicators might produce conflicting results. In this context, transport policies would benefit from a synthesis of all the information contained in each of these indicators. In the recent literature, a great deal of attention is therefore given to the issue of a unique global accessibility measure. In this respect, multidimensional methods have been explored, such as Data Envelopment Analysis (Chapter 10) or Principal Component Analysis (Reggiani et al., 2005), with reference to the changes of accessibility in cities/regions generated by the construction of new European infrastructure projects (for example, the Trans-European Transport Network (TEN-T)). This brings us to the issue of spatial convergence, accessibility and network integration.

1.3.2 Spatial Convergence, Accessibility, and Integration

It is interesting to note that the equity theme mentioned earlier in Section 1.2 also has implications for the discussion on accessibility. Transport policies, and investments in infrastructure in particular, will yield benefits that are equally distributed among regions. There is a general fear that large infrastructure investments will reinforce the position of existing core regions to the detriment of peripheral regions. This relates to the theme of regional integration and convergence. The literature on this subject indicates that solutions to this problem of unbalance are not as clear-cut as is often thought (see, for example, Rietveld and Bruinsma, 1998). The point is that the effects on the various regions vary per sector. Some sectors in one region will benefit, whereas other sectors in that same region will shrink. The effects on consumers and producers in each region may well be both positive and negative. In many cases, the net effects are rather small. Of particular importance in the case of infrastructure improvements is that usually the main beneficiaries are found at the nodes connected by a new link, and possibly some other nodes that benefit from the upgraded link, whereas the disadvantages are experienced by the rest of the economy in a rather diffused way. Thus, typically the spatial distribution of benefits of transport infrastructure investments is uneven.

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Whereas the term 'accessibility' has the connotation of potential opportunities for interaction (for example, Hansen, 1959, in Martellato et al., 1998), the term 'integration' refers to actual patterns of interaction and flows of persons, goods and information. Increased accessibility does not automatically mean growing integration. The processes, in reality, may unfold in different ways. For example, economic actors may not be able to respond to the new opportunities, because – with the disappearance of one major accessibility barrier – other barriers to interaction may come to light, such as those caused by historical relations or by different cultures (van Geenhuizen and Ratti, 2001; and see Chapter 14). Of course, overcoming these constraints may simply be a matter of time.

Integration can also be considered in terms of quality or level. Thus, poor connectivity may allow for a certain kind of interaction but prevent other types. This is the 'selection impact' of barriers. Currently, selection impacts tend to occur in telecommunication networks. These networks have evolved under the influence of the market, meaning that remote areas – essentially lacking market size – remain disconnected from the national backbones which provide the highest bandwidth, and are excluded from opportunities for highly information-intensive innovative activities. This issue is addressed in Chapter 13. What has received scant attention in transport and communication studies is the level of integration following from improved accessibility or network connectivity. Opening a regional economy may lead to the establishment of dependence relations between actors that are asymmetric in nature. This has often happened, and still happens, in corporate ownership relations, decision structures, and the level of innovativeness of the new economic activities (for example, Taylor and Thrift, 1982). In an extreme case, the regions with improved accessibility become in effect a branch-plant economy and contribute to reinforcing the economic strength of core regions. These kinds of mechanisms and developments contribute to an understanding that improved transport network integration does not automatically lead to the convergence of regional economies.

1.4 Aim, Structure and Content of the Book

1.4.1 Aim and Structure

The aim of this book is to contribute to the understanding of the state of the art and new developments in policy making for transport networks and the regional impacts of network integration. In policy making, evaluation plays a central role as decision support, using ex ante and ex post approaches. Evaluation may include Cost-Benefit Analysis (CBA) and various other tools to evaluate policy. In addition, attention is paid to tools that analyse the impacts of transport policies on accessibility and spatial integration. This book reviews existing studies and
Policy Analysis of Transport Networks advances in decision support tools in transport policy and in broader evaluation studies of network integration and regional development (Table 1.1).

Table 1.1 The structure of the book

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<th>Chapter</th>
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<td>Bråthen and Eriksen</td>
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<td>Accident</td>
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Part I: Policy Analysis in the Transport Field

Accessibility and fixed links (road, rail) 9 Hansen
Accessibility and TEN-T 10 Martin et al.
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Accessibility and aviation 12 Zembri
Accessibility and ICT 13 van Geenhuizen
Integration 14 Nilsson
Convergence 15 Percoco et al.

The book addresses, for example, the incorporation of both efficiency and equity issues in the evaluation of transport policies, and the design of an overall accessibility indicator that combines a number of partial indicators. State-of-the-art work in this book includes a review of studies on the value of travel-time savings (VTTS) due to network integration, and a review of the use of revealed and stated preference models in the location behaviour of companies with reference to infrastructure projects.

1.4.2 Part I: Policy Analysis in the Transport Field

The first part of the book contains seven contributions about new developments in the design and use of decision support tools. The newness stems from, for example, the inclusion of equity issues in evaluation methods of transport policies; a specific focus on ways to identify and map uncertainty in transport policy making; and the infrastructure.

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the European Union review the literature consider both efficiency theory concerning promising where t the mean value c between actors. H consideration of d different from trac solutions, inter al studies on the cost expansion, the study of particular 27 existing regions 1980s. A re-evalu Norwegian government infrastructure require economically viable some of its pass passengers refrain brief overview of context of the close aircraft operating candidate airports including a sensitivity that is, clearly unp final part, the author the CBA results, i

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making; and the use of CBA to support decisions on the closure of certain infrastructure.

In Chapter 2, Rietveld, Rouwendal and Van der Vlist address ways to incorporate both efficiency and equity issues in the evaluation of transport policies and infrastructure projects, given the increasing emphasis on social cohesion in the European Union. The authors begin with a discussion of inequality and poverty in the European Union and the concepts and measurement concerned. Next, they review the literature on welfare economics in order to identify approaches that consider both efficiency and equity issues, and this is followed by a discussion of theory concerning compensation measures. The social welfare function seems promising where total welfare equals the product of two factors, one representing the mean value of individual utility and the other representing the inequality between actors. However, various issues need to be solved, such as the explicit consideration of distributional aspects in the reference case, a situation which is different from traditional cost-benefit analysis (CBA). The authors suggest some solutions, inter alia, using insights from compensation measures. Whereas most studies on the costs and benefits of types of infrastructure deal with options for expansion, the study by Brøthen and Eriksen (Chapter 3) focuses on the closing down of particular parts of an infrastructure. The case concerned is a network of 27 existing regional airports in Norway, built between the late 1960s and the mid-1980s. A re-evaluation of the weak parts of this network became urgent for the Norwegian government in the early 2000s as a result of higher airport infrastructure requirements. The analysis focuses on whether each airport is economically viable, compared with the situation in which the airport is closed and some of its passengers are transferred to a neighbouring airport, while other passengers refrain from travelling by air altogether. First, the authors discuss a brief overview of CBA in aviation and present some specific issues in CBA in the context of the closure of airports, such as the change in consumer surplus and aircraft operating costs, and various network effects. Next, the selection of ten candidate airports to include in the CBA is explained. Based on the calculations, including a sensitivity analysis, two categories of airports are then distinguished, that is, clearly unprofitable ones and ones whose unprofitability is uncertain. In a final part, the authors describe the political debate in Norway after the launch of the CBA results, including the need to extend the CBA.

Chapters 4 and 5 deal with transport issues related to accidents. In Chapter 4, Axensten presents the outcomes of a GIS-based system designed to calculate and visualize optimal evacuation routes in the case of a serious nuclear accident, that is, one that involves the release of radioactivity. The investigation concerns the Barents Region with a hypothetical release from the Kola Nuclear Power Plant as a case study (Kola Peninsula, Russia). The problem to be dealt with is to move every person from the affected area to places that can harbour them, while minimizing their exposure to radiation. The approach makes use of a graph model and includes the objective of minimizing flow costs. In the optimal situation, all places exceeding a certain radiation limit are evacuated completely, and there is no
evacuation from other places below this limit. The model is tested in a hypothetical (but realistic) scenario envisaging a release of radioactivity, using one evacuation zone at the accident site and another in the Gulf of Bothnia. In the former location, no evacuation problems are foreseen as most of the population centres are both relatively small and located near the Murmansk-St. Petersburg trunk road. The road network in the latter zone has sufficient capacity, except for saturation of the coastal road. In a final part, the author discusses a few variations of the model.

In Chapter 5, Paaswell and Berechman set out specific policy conditions for the evaluation of promising transit projects in New York City, that is, following the September 11 events in 2001. However, these tragic events resulted in severe transportation dislocation in lower Manhattan. However, the transit projects that were developed immediately afterwards not only included the rebuilding of what existed before, but also plans for new connections and linkages, increasingly outside the environs of Ground Zero. Thus, the planners began to put a much broader range of projects on the agenda. In this chapter, the authors set out the basic transportation, economic and demographic characteristics of the New York region in order to increase understanding of the environment in which models were developed to evaluate the proposed transport projects. They then briefly discuss the formal and informal planning and decision-making processes, particularly the roles of the planning organizations and the regional transportation agencies. It is notable that none of the projects originated from a single agency and nor were they connected with a regional Master Plan based upon regional overarching objectives. Thus, each single project was meant to impact a specific concern in a localized area. In a more conceptually-oriented Chapter 6, Van Geenhuizen and Thissen address uncertainty in policy making for transport technology in a new way, that is, using a systematic and comprehensive approach in order to identify and qualify different types of uncertainty. On the basis of a systems approach to policy making, they identify various generic classes of uncertainty, such as concerning the definition of the boundaries of the system; the future external factors that are beyond the control of policy makers; and the system response to these external influences. All these uncertainties culminate in uncertainty in policy making, which affects the design of effective policies and the choice of the best policy. The authors proceed with an analysis of the causes of uncertainties. Next, they apply this framework to policy making concerned with the design and implementation of Intelligent Transport Systems. According to the authors, a preferred strategy when dealing with the uncertainty involved combines further knowledge acquisition and learning using an adaptive policy.

In Chapter 7, Givoni estimates the substitution benefits arising from a mode shift between aircraft and high-speed train (HST). The substitution deals with airline and railway integration, that is, the airline offers its services on board the HST (tested on the London Heathrow to Paris route). The airlines benefit from the substitution, in spite of increased operational costs, but these would be compensated by the value of freed airport slots which can then be used for flights to other destinations. The benefits for passengers from this substitution include a
shorter travel time by HST and better travel conditions (a lower disutility), whereas the major benefit for society is a reduction of air pollution. On the methodological side, the author concludes that complexity increases with the consideration of more than one mode within one journey. Also, it appears that the current knowledge is not sufficient to estimate the exact environmental impact of one airline flight or one HST-journey. The methodological recommendations include using financial analysis to evaluate financial benefits to airlines and to use multi-criteria analysis (rather than cost-benefit analysis) in the other cases.

Chapter 8 focuses on an element that is often used in CBA relating to new traffic infrastructure, that is, the value of travel-time savings (VTTS). First, Zamparini and Reggiani discuss the analytical background and basic formula adopted to calculate VTTS. Unlike VTTS in passenger transport that is approached as maximizing a utility function, VTTS in freight transport is approached as maximizing a profit function. In the latter case, VTTS may be part of the profit function of the forwarding firm, the receiving firm or the consumer, a situation that increases the complexity of the measure. The authors proceed with a discussion of the advantages and drawbacks of revealed preference and stated preferences approaches. Because of the strict requirements necessary for a revealed preference study, most researchers are forced to apply stated preference methodologies. Following a review of empirical studies in different countries in the EU, Asia and the US the authors conclude that there is no uniform VTTS, due to the influence of various intervening variables, such as trip length, transport mode, area-specific spatial circumstances, and hidden economic and social factors. However, the freight transport studies in the EU show an average VTTS close to the one obtained in the US. Further, the authors identify important differences between the VTTS in freight transport and the VTTS in passenger transport, and stress the need to combine revealed and stated preference approaches.

1.4.3 Part II: Transport Policies and Regional Network Integration

In Part II, the focus is on the actual (potential) impacts of transport infrastructure policies: for example, accessibility impacts on the economic performance of companies, cities and regions, and on the integration and convergence of regions.

Hansen, in Chapter 9, reports on the impacts of the fixed links across the Great Belt and Øresund between Denmark and Sweden. Prior to the implementation of these links, there were two different expectations, that is, an increase in traffic flow due to the elimination of ‘friction’ caused by the ferry connections and an improvement of the planning and efficiency of the logistic organization in the chains involved. First, the author elaborates the concepts of distance, speed, frequency, and time-windows in a logistic frame, and then applies these concepts in an analysis of case studies of transport companies with different positions in the logistic chains. The results of the study indicate that the fixed links (amongst other factors) have contributed to a rise in the freight traffic across the Great Belt and Øresund, mainly due to the ability to organize more frequent deliveries and to
respond better to demands for greater precision in pick-up and delivery. So far, the observed impacts have been on the logistic decision level and the operational level of material and transport flows, not on the level of relocation of companies.

In Chapter 10, Martin, Gutiérrez and Román consider the accessibility impacts of the Trans-European Transport Network (TEN-T) – with special reference to railways – on European cities for the years 1995, 2005 and 2015. In doing so, they perceive accessibility as a multidimensional quality and use a geographic information system (GIS) to calculate four partial accessibility indicators. Next, they present Data Envelopment Analysis (DEA) as a tool to synthesize indicators and provide a multi-criteria decision support tool. The accessibility-DEA index is calculated as the inverse of the maximum proportional output accessibility (potential market and daily accessibility) that can be obtained for the indicated accessibility input (location). It appears that in 1995 Brussels, Lille, London and Paris were the most accessible cities of the EU. However, in the scenarios for 2005 and 2015, London is displaced by the German cities of Frankfurt and Wiesbaden. The DEA-index suggests that connectivity does not guarantee accessibility, as illustrated by some cities in the Iberian Peninsula. In a future-oriented analysis the authors conclude that the TEN-T contributes to increasing regional accessibility disparities in the period 1995 to 2005 and to decreasing such disparities later on.

In Chapter 11, Brunsma and Rietveld, examine traffic infrastructure in a general way. The focus is on its impact on productivity at the aggregated level (that is, regions) and at the disaggregated level (that is, individual firms), with an emphasis on the latter. In this context, the authors discuss the outcomes of revealed preference models and of stated preference models, and summarize the strength and weaknesses of different types of entrepreneurial surveys. In addition, they present a case study for the Netherlands in which they attempt to overcome some problems that occur with stated preference studies, that is, by estimating trade-offs between location factors. In a pairwise comparison, it appears that location factors with direct financial implications (price of land and investment subsidies) are the most important factors, and that distance to a highway access, to a large city, and to customers and suppliers are next in importance. Also, using logit analysis, the study of trade-offs between several location factors enables the calculation of the cost-effectiveness of various regional policy measures under restricted conditions.

In Chapter 12, Zembrzy explores changes in airline strategies, following the liberalization of air transport in the EU, as well as the impacts of these changes on the accessibility of the cities in the networks involved. The author observes that, despite the liberalization in the 1990s, Air France was able to maintain its position in the Paris-centred network. In addition, though small carriers were able to gain strong positions in regional hubs in networks bypassing Paris, a few years later they were dominated or acquired by Air France or Swiss Air. Next, the author discusses the concomitant emergence and partial closures of various regional hubs in France, for example, Montpellier and Saint-Etienne, and the emergence of low-cost carriers that primarily set up routes between French regions and foreign countries. In a summary of the developments since 1995, the author concludes that the many interrelated factors have contributed to their success.

In Chapter 13, Ekström and Westin, particularly in the context of call centres in Sweden, present findings from a study of highly intensive, automated, information-intensive, telecommunication traffic guided from remote areas to urban centres and back to remote areas within the new network, and examine the impact of the network.

In Chapter 14, the authors look at the city region of Hamburg and the Baltic cities of Western Europe. It is clear that there are differences in the development of the different but connected regions in Germany, and the Baltic region. However, in all regions, the Baltic capital, Copenhagen, plays an important role. Thus, the relative importance of the overall improvement in the Baltic cities grows, and there is a growing hierarchy between them.

In the final chapter, the authors present some empirical evidence on the tendencies in the regional structure in the Baltic countries, including an analysis of the impact of the new network, and they conclude that there is a new hierarchy between the regions.
the many interregional point-to-point connections established during this time have contributed to improving the accessibility of various French cities.

In Chapter 13, van Geenhuizen addresses the integration of relatively remote regions in the national economy in the era of modern telecommunications, particularly integration, as witnessed by the emergence of more or less innovative activities in those regions. In exploring this issue, the author uses a multiple-evidence approach from the Netherlands. The findings about the location strategies of highly innovative companies – weak signs of an increased footlooseness – and the findings about the great importance of agglomeration economies for advanced call centres provide no support for the likeliness of a high-order integration of remote regions. However, particular remote regions are able to ‘escape’ the digital divide, by utilizing their remoteness (emptiness) as a positive asset in developing information-intensive research facilities. Thus, the development of facilities for astronomical research (observatories), nuclear research, earth observation, air-traffic guidance, and the like, may be seen as an important strategy to connect remote areas with the highest bandwidth in the national telecommunication network, and to help develop clusters of local research companies in such regions. In Chapter 14, Nilsson identifies the dominant spatial interaction patterns between the city regions in the Baltic Sea Area. It appears that the capital cities of Poland and the Baltic States have increasingly turned towards the Nordic countries and Western Europe at the expense of the Former Soviet Union. Further, it becomes clear that the changing interaction in the Baltic Sea Area takes place within four different but connected subsystems: the Nordic and Baltic countries; Russia; Germany; and Poland. In these subsystems, the leading city regions, such as Frankfurt, Warsaw and Moscow, have an important role in trans-border interaction, but are partly located outside the Baltic Area. In addition, the small Baltic capital cities cannot play an independent role in international networks, and thus undertake internationalization through some larger Nordic regions. The overall impression is one of fragmentation instead of integration. The city regions in the Baltic Sea Area are strongly tied to their national contexts, meaning that there is a mixed structure: a network of city regions where the national city hierarchies have a very large influence.

In the final chapter (Chapter 15) Percoco, Dall’erba and Hewings present empirical results about the role of national structural changes in convergence tendencies in the EU. In particular, they explore ways in which the changes in structure in one sector or country penetrate the rest of the EU. An empirical analysis of changes in the production structure of five European economies is followed by a description of the model used to evaluate the structural convergence process. The empirical results covering 1965–85 indicate that both sectors and economies are becoming more similar but that sectors at the European level are becoming more similar than the national economies as a whole. However, spatial disaggregation is needed to explore how structural properties manifest themselves in the regional economies involved. In their analysis of transport policies, the authors point to the role of infrastructure investment and deregulation of
transportation industries in stimulating economic convergence by reducing friction due to transport costs. The technical coefficients in the approach used can be seen as functions of the transport costs that determine interaction between economies.

1.5 Future Research

The future research paths that emerge from this volume arise from the increased complexity in transport policy and follow five main directions. The first is of a technical nature concerning a further improvement and testing of quantitative models as decision support tools: for example, to deal with the distributional aspects in the reference case in methods to incorporate equity issues in Cost-Benefit-Analysis (Chapter 2); to determine, for different assumptions, the sensitivity of simulation results on network capacity in short-term evacuation (Chapter 4); and to use advanced meta-analytic approaches in review studies, like the one on travel-time savings (Chapter 8). A second research path is to extend the mapping of uncertainty in transport policy with measurements of different degrees of uncertainty and to include a comparison of different (urban) regions with different policy settings. This connects with a third path that follows from the dynamic multi-actor situation in transport policy. This situation means that potential transport projects need to be evaluated taking into account the interests of opposing stakeholders. New ways of assigning weights in Multi-Criteria Analysis may be helpful, but Data-Envelopment-Analysis also seems promising. However, it is important to note that the political decision-making process may follow a different rationale than the one in decision-support models. Accordingly, there is also a need for systematic studies on the actual use of decision-support outcomes in the policy arena, to identify which other factors play a role in selecting transport infrastructure projects that might lead to cost overrun or wasting money in useless projects (Flyvbjerg et al., 2003; Priemus et al., 2004). A fourth type of possible future research concerns a further elaboration of the relation between accessibility and economic development. Increased accessibility does not automatically lead to economic growth (for example, Vickerman et al., 1999). However, it is not known under which conditions an increase of accessibility leads to positive impacts and which conditions may cause negative impacts. There is a need for further systematic comparative research of different regions, covering core regions and peripheral regions, small and large economies, regions with different population densities and different economic structures, and so on.

Finally, we mention research on transport policy connected with man made or natural hazards. There is a need for studies that assess the match between the capacity of existing traffic infrastructure and traffic flow in an emergency evacuation situation, for example, using simulation studies and practical experiments. This may apply to cities and regions vulnerable to nuclear disasters, volcanic eruption, flooding, and terrorist attacks. Aside from the immediate traffic flow away from the site of the event, there is also the issue of the reconstruction of the damaged transport network, whether the previous events could serve as an example for various transport.

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the damaged transport infrastructure afterwards (Chapter 5). A major issue is whether the previous infrastructure should be merely restored or whether the tragic events could serve as a springboard to enable major qualitative jumps in the various transport networks.

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