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Introduction to *The Transport System and Transport Policy*

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This book aims to give a general introduction to the transport system, the factors that drive it and its impact on accessibility, safety, the environment, health and well-being. It also covers aspects related to transport policy making and evaluation.

The target group of this book are students at universities and colleges (bachelor's and master's level), as well as professionals who already have a degree in another area and need an introduction to the transport field. In addition, we address Ph.D. students who may have started research in transport while having a background in a different field. In fact, we consider such a migration to the transport field as beneficial. We think that the transport system and its impacts on society can best be understood by combining the insights from multiple disciplines, including civil engineering, economics, psychology and geography. As a result, this book is multi-disciplinary. The background of the authors contributing to this book reflects this basic principle.

Here's a short explanation of the way we have organised this book. After this introductory chapter, Chapter 2 summarises the structure of the book via a conceptual framework. This framework shows how transport system components shape travel behaviour and how the resulting transport flows impact the environment, accessibility, safety, health and well-being. It explains, for instance, how factors like the wants and needs of people and companies, the land-use system and the overall resistance to travel (in terms of travel cost, time and effort) interact, and jointly with technology and the driving behaviour determine the characteristics of transport flows.

Part I (Chapters 3–8) introduces the core components of the transport system. Chapter 3 explains how the wants and needs of people drive passenger transport. It explains that most people's trips result from them wanting to participate in activities located in different places. Activity and travel patterns result from the wishes, possibilities and constraints of people. Chapter 4 is the counterpart of Chapter 3 for goods transport. It describes the needs of companies to transport goods. It concludes that goods transport is very diverse: all kinds of goods, ranging from computer chips to raw materials, have to be transported for all kinds of markets using modes such as lorries, vans, barges, pipelines, aircraft and sea-going ships. Those goods are produced by all kinds of producers, and bought by a wide range of clients, ranging from

other producers to customers. The huge heterogeneities result in complex relationships between the economy, society and logistics. Chapter 5 focuses on the impact of the land-use system on transport. It explains how transport is shaped by dominant land-use factors, such as densities, the level of mixed use, neighbourhood design and distances between origins and destinations, and the distribution of public transport nodal points such as railway stations. Chapter 6 introduces the reader to how transport resistance (time, costs and effort) influences transport. It explains how changes in infrastructure, prices and other resistance components steer passenger and goods transport. Chapter 7 then focuses on traffic flows, and it explains how traffic flows, the capacities of networks, demand and congestion levels are all interrelated. Finally, Chapter 8 discusses transport technologies as they have substantial impacts on accessibility, the environment, safety and health.

Part II, Chapters 9–12, discusses the impacts of the transport system on accessibility, the environment, safety and health respectively. Chapter 9 presents a definition of accessibility and several accessibility concepts, including their pros and cons, which depend on the purpose of use. Chapter 10 gives an overview of all important environmental impacts of the transport system, with a focus on climate change. Chapter 11 discusses transport safety as well as factors that have an impact on safety, of which the most important are infrastructure, the users of infrastructure and vehicles. Chapter 12 explains the multiple ways in which the transport system has an impact on the health of people, ranging from travel as a form of exercise, to exposure to pollutants, noise, and risks, and finally the complex relationships between travel and well-being.

Part III, Chapters 13–16, gives an introduction to transport policy and related research. Chapter 13 introduces the reader to the reasons why governments develop transport policies, and how policy tasks range from local to (inter)national governmental bodies. Chapter 14 gives an overview of methods to explore the future, including the area of developing scenarios via forecasting and backcasting, and exploratory modelling. Chapter 15 discusses evaluation methods, including cost–benefit analysis (CBA) and multi-criteria analysis (MCA), the two most important methods to evaluate candidate policy options *ex ante*. To conclude, Chapter 16 discusses transport models and their applications, models that are widely used *ex ante* to evaluate changes in travel demand and travel times that result from policy options such as changes in infrastructure, land use and pricing. Such changes in travel demand and travel times are input for the evaluation methods, such as CBAs and MCAs, discussed in Chapter 15.

In summary, the parts and chapters of this book proceed in a logical order: firstly the transport system is described, next the societal effects of the system, and finally, the research on transport policy that aims to maximise the positive and minimise the negative societal impacts of transport. Readers can read the chapters independently and not necessarily have to read all preceding chapters. To avoid overlap we cross-refer between chapters.