1 Introduction to transport and urban planning in the developed world

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Cities are fascinating in many aspects. They grow in an oddly structured or organic fashion over time and are sometimes compared to living organisms in which different parts of a city perform different functions. Cities are of great economic importance as they provide employment and residence to large communities. The past decades have seen very strong urbanization in which many people have moved from rural areas to urban areas. According to the United Nations, more than half of the world’s population currently lives in urban areas and this is expected to grow.

All cities adjust their form and organization in response to changes in population, politics and fortunes. This is not expected to change. What is different is that as population increases so do demands for energy, transport, liveability and efficient infrastructure. These new stressors on cities require effective transport and urban strategies to keep cities functioning well. The interconnectivity of people, trade and traffic across cities means that underperformance and inefficiencies in the transport system can result in delays, congestion, and deepen social and economic divides – transforming cities quickly into a state of malfunction. With good transport and urban planning, cities can be made (and kept) efficient and pleasant to live and work in. This book provides an overview of relevant theories and concepts regarding transport and urban planning in the developed world. The book describes the state-of-the-art and best planning practices in cities around the world. While transport and urban planning also exists in developing countries, they are not as prominent and many of the developing country cities have evolved by reacting to different stimuli. Hence, this book focuses specifically on planning theories and practices in the developed world.

Transport and urban planning are closely related. Together they determine the form and efficiency of a city. Urban planning is concerned with land use in cities and urban environment and the allocation of functions to each area, for example, high- or low-density residential, industrial, commercial, or leisure. Transport planning involves the design and evaluation of infrastructures and transport services, for example, road networks and public transport, which allows people in the city to move between areas and perform activities. Increased urban development requires additional infrastructure, while more infrastructure makes an area more attractive and may lead to more urban developments. This dynamic and continuous interaction, in which the concept of accessibility plays an important role, makes cities grow and evolve in interesting ways.

This book consists of six parts, namely (I) Overview and historical perspective, (II) Issues in the developed world, (III) Policy making and strategy, (IV) Appraisal and financing, (V) Planning and design, and (VI) Management. The following sections describe each part in more detail.
PART I: OVERVIEW AND HISTORICAL PERSPECTIVE

There is no truer saying in urban planning that we are where we have come from. Part I therefore provides an overview of discipline history from the three perspectives of urban development, transport planning and the role of accessibility in urban and transport planning. These three perspectives together bring us to where we are in transport and urban planning.

This part opens with an overview of urban development. As Betancur identifies in Chapter 2, urban planning is as old as cities but its development into a discipline and professional practice is much more recent, starting from the early twentieth century for practice and consolidation into an academic discipline in the mid-1950s.

Betancur traces the different planning paradigms which have operated over time at different scales – whether the city or neighbourhood scale – and identifies frustrations associated with an inability to provide universal solutions. Of course, this should not be surprising as a city is ‘work in progress’ and what works in one place will not necessarily transfer somewhere else. Perhaps most importantly, this chapter shows how the historical perspective has driven the multidisciplinary nature of urban development and the need to understand complexity of cities and the way our planning system institutionalizes – whether intentionally or not – a system in which there are winners and losers. Betancur appropriately ends with identifying the tension between theory and practice which, together with the hopes, good outcomes and failings, provide an important starting point for understanding the dynamic nature of urban planning.

In Chapter 3, Stopher provides a synthesis of history and theory in transport planning. He defines transport planning as planning for entire urban areas for the foreseeable future, taking account of known changes. In contrast to urban planning, transport planning at this scale began after the Second World War with the early development of computers, even though methodologies for forecasting were not yet apparent.

Over the 55 years covered by Chapter 3, Stopher points to the foundations of our current methodologies and shows how many of the problems have been overcome and yet some still remain. As with urban planning, transport planning has moved forward with an integration and interplay of ideas between theory and practitioners. The basic unit of the trip is a good example: theory has shown the soundness of using the ‘tour’ or activities as the basis of modelling and yet, in many cities, the use of a trip is maintained since it is simple and has familiarity understood by policy makers and practitioners. However, it is issues around forecasting which continue to be of concern. While post-war computing power was significantly greater than that which preceded it, new methods are increasingly possible because computing power continues to grow at an increasing rate. Stopher ends with what he sees as the dilemma of policy makers – that the new methods will produce forecasts much different from earlier forecasts. How to develop and introduce new methods that give real improvements without discrediting the past is an important message coming from this historical perspective.

The final chapter of the overview is provided by van Wee and Geurs. Chapter 4 looks at the development of the concept of accessibility and how this has been used in transport and urban planning. Accessibility is an important component of urban planning since most transport policies at all scales (from a neighbourhood to a supra-national level) aim to improve accessibility. This relies on an understanding of how to measure accessibility
and the pros and cons of different measures, and how these feed into an evaluation of policy. In the transport context, accessibility is important since travellers rarely travel for the sake of it, more to consume or carry out activities at the destination. So emerging trends need to take account of how substitutable travelling may be (for example, how availability of information and communication technology might substitute for some activities). Or in other cases, how accessibility measures can be used to identify particular policy issues, such as social exclusion, or be developed so that understanding accessibility to activities by modes other than car or public transport is meaningful.

In common with Betancur and Stopher, Van Wee and Geurs identify some tensions which frustrate the implementation of accessibility improvements. In this case, it is the tension between the transport planning and infrastructure professionals, often dominated by engineering-discipline backgrounds, and spatial planning, dominated by planners who often have different objectives and a different language to identify problems and solutions. But successful accessibility planning needs these disciplines to combine for a truly successful outcome.

**PART II: ISSUES IN THE DEVELOPED WORLD**

This part discusses several important issues that increasingly affect cities in the developed world. As a result of changes in demographics, changes in technology, and changes in the way we use the transportation system, transport and urban plans may need revision and cities may need reshaping. There is no shortage of issues that could be discussed in this book but five distinctive issues that relate to the changing characteristics, distribution and demands of urban populations in the developed world are brought together in this part. The chapters in Part II will be of particular interest to those involved in future-proofing transport and logistics systems to support ongoing efficiency and viability of cities that are, by nature, in a constant state of flux.

In Chapter 5, Metz begins by highlighting that planning urban transport provision and urban function is more than considering changes in population growth. Choosing the right level and type of transport investment also needs to take into account how the changing characteristics of the population will place varying demands on the transport system, including the emergence of travel trends that suggest there may be limits to continued growth in private car travel.

Metz notes that ‘successful cities’ in Europe and the USA are again attracting inhabitants, but the trend of counter-urbanization which saw the decline of city populations in favour of life in the less crowded suburban and rural locations still has an influence in the developed world. Moreover, the age profile of populations by age, health and economic independence is changing thanks to increased life expectancies, the deferred maturity of young people who spend more years as students ahead of entering the workforce, and the housing market. Metz discusses these challenges in relation to the relationship between mobility and quality of life – a growing area of research interest particularly with the growing numbers of older people raising concerns about fitness to drive and availability of accessible transport, as well as UK evidence of cessation in growth of average distance travelled. The magnitude and pattern of travel demand changes has implications for policy, and these are discussed by Metz.
A book on transport and urban planning in the developed world cannot ignore how communication technologies are expanding the types, sources and speed of information and the subsequent repackaging of these for different audiences. It is also particularly challenging in light of the constant state of change. Austin rises to the challenge with Chapter 6 on the potential of technology and social media. This chapter is structured to provide a wide coverage of social media-featured web-based service developments and how public transport operators and authorities, as well as transport and urban planning professionals, can engage with it to enhance their business activities.

Austin discusses how the generation and distribution of user-sourced and location-specific content that has value in real-time to travellers and operators is related to contemporary thinking of the ‘smart city’. In providing examples of how social media is already acting to improve and challenge the delivery of transport services, Austin makes this a highly useful guide for those wanting to embrace the opportunities and apply the learning. Austin argues that increasing more public transport operators need to be agile and adapt to a new powerful and informed customer-base. This is likely to be of increasing importance as the emerging information market becomes controlled by Google-like organizations which can challenge traditional governance arrangements about the ‘right to know’.

In Chapter 7, Zunder et al. remind us that the various utopian views of city and urban planning all fundamentally rely on, but under-value, the freight distribution that make places function. Urban freight is often excluded from presentations of a liveable environment because of its negative contribution to noise, air pollution, road safety and congestion. Zunder et al. argue that if we want to achieve a sustainable urban freight system, then private operators need to be more involved in the planning and scoping of activities normally led by urban planners.

Zunder et al. present how this theoretical change of approach is being applied as best practice. Enhancing partnerships is an important component of many of the urban freight strategies presented, as, unlike passenger travel, there are various stakeholders involved in the decision-making process. Zunder et al. consider nine strategies in all, including the planning of urban distribution centres, the regulation of delivery times and the responses to the growth of e-commerce, and initiatives to make freight cleaner and greener. Efficient urban freight is, Zunder et al. argue, part of the essential machinery of a city, and should not be sidelined.

The public’s criticisms of transport systems often stem from a lack of appreciation of how fluctuations in demand and capacity can make it difficult to provide a consistent level of service. In Chapter 8, Kurauchi presents a clear and concise explanation of how reliability and robustness is used in transport network reliability analysis – beginning with the distinction of recurrent and non-recurrent factors and how these can influence the reliability of different component parts of the transport system. A central premise of Kurauchi’s contribution is that building understanding of how different indicators for reliability, vulnerability for punctuality, connectivity, and capacity can be used in routine monitoring and evaluation of the network helps in timely identification of issues. For this reason this chapter is particularly recommended for those who are unfamiliar with, but want to know more about, transport network analysis.

After presenting measures of transport reliability and robustness, Kurauchi discusses some recent developments in the literature that have value to practitioners. These include
new measures to assess accessibility vulnerability, connectivity vulnerability and capacity vulnerability, how game theory-based scenarios incorporating an ‘evil entity’ help to measure impacts on level of service, and approaches to quantify improvements to reliability so that they can be captured in economic valuations. While this chapter helps to transfer academic literature into the realm of practitioners, there remain important challenges for the future and several of these are identified.

There is perhaps no other transport issue that is more controversial and contentious than parking, which is the topic of Chapter 9. Urban planners now contend with the difficulty of meeting the unrealistic expectation of drivers that temporary storage of their vehicles should be made available as and when they need it, where they need it and at no cost. Ison and Budd use their chapter on parking to discuss the complexity of meeting these expectations when there are limits to the urban space available and too much demand.

Ison and Budd begin their chapter with an overview of the literature that examines the urban planning approaches to car parking management in relation to research on traveller behaviour, pricing mechanisms, and concerns about the environment and congestion, as well as considering how these have changed over time. A typology of car-parking facilities are defined ahead of a more detailed and critical look at the use of service parking, managing parking through regulation and pricing, and the application of modern technology.

PART III: POLICY MAKING AND STRATEGY

Since policy making plays a crucial role in creating efficient and liveable cities, this part discusses the various parties involved in the planning process, as well as institutional frameworks. In order for urban areas to remain functional in the future, sustainable strategies and policies are needed, which are also discussed in this part.

When we are so aware of the issues that need managing it can be perplexing why things are so slow to change. Good evidence-based transport policies do not automatically gain acceptance or traction, even when they solve an explicit community concern. In the developed world, decision making can be slow to respond to demands for transparency, accountability and stakeholder consultation. However, in an increasingly connected world, with anytime anywhere information, there are changing expectations on what is an accepted pace of change. Each of the chapters in Part III considers the changing conditions that are affecting policy making and strategy on transport and land use issues, and considers how these help or hinder the transfer of ideas and knowledge into policy outcomes.

In Chapter 10, Aldred begins with a focus on the influence of social media as a disruptor to previous understanding of media influence on policy and politics. The divergent voices using social media challenge views of who is the media, who are the ‘legitimate’ knowledge creators and the accepted experts. Aldred explores what effect this is having on shaping the politics of transport, using a case study of cycling in London.

Aldred writes about transport policy in relation to social change. She describes changes in how communities are participating and forming opinions on policy issues using social media. The definition of social media is broad. It includes forums and message boards,
sites which publish reviews and opinions, social networks, blogging and micro-blogging, bookmarking and media sharing. Her chapter considers the influence of this array of social media on traditional concepts of the media and institutional structures. It describes how empowered new voices can challenge types of knowledge used in transport policy, and who controls the public debate.

Addressing the mismatches in how institutions operate and community expectations for integrated transport policy solutions is a focus of Stanley and Pearce in Chapter 11 on institutional frameworks. It is undisputedly a challenge to tackle land use transport policy and planning particularly at the city level when governments do not have, and are not expected to have, control over everything. The city is often made up of multiple jurisdictions, and the public, business stakeholders, and the whims of the market all have an interest in the shape of the city, as liveable places and the economic powerhouses for the region and nation.

Stanley and Pearce begin with highlighting the importance of the integration of land use and transport planning, not just on the grounds of joined-up, whole-government decision making but because increasingly affordable housing is associated with transport disadvantage. Defining clear bounds of what matters are in scope, who should be involved, and what outcomes are expected may make policy making easier although defining these can raise various issues, such as subsidiarity, participation, and power in decision making.

Stanley and Pearce demonstrate approaches to managing these dilemmas in their presentation of key principles for institutional frameworks for integrating land use and transport planning. They then go on to illustrate these principles in practice by looking at the institutional designs used for the cities of Vancouver, London, Zurich and Melbourne, and then national level involvement in Canada, the USA and the UK. Practitioners wanting to re-examine their institutional frameworks will benefit from the overview of most important criteria for enabling integration – definition of roles, horizontal and vertical integration, clarity of purpose, partnership, and participatory processes.

Greaves and Stanley complete this part by examining in Chapter 12 the characteristics of urban transport systems and services which are most likely to contribute to sustainable development. Sustainable development goals first set out by the 1987 Brundtland report and then further defined in relation to sustainable transport by the European Ministers of Transport in 2001, have helped create a common vision but progress in achieving these remains elusive. Greaves and Stanley focus their discussion on five high-level outcome goals they view as important for cities, and two process goals for achieving them. Cities should be places where increased economic productivity, reducing the ecological footprint, increasing social inclusion and reducing inequality, and improving health and safety outcomes are of equal importance, while having meaningful regard and processes for protecting intergenerational equity and community engagement.

Greaves and Stanley’s chapter on policies for a sustainable future includes an overview of how transport and land use relate to the key issues that remain a challenge in developed economies. These include productivity growth, congestion, energy security, greenhouse gas emissions, air pollution and noise from transport activities, social exclusion, traffic accidents and health. Seven policy directions predicated on integrated land use and transport planning are identified as being of importance. These include moves towards building more compact cities that can reduce greenhouse gas emissions from transport,
transport policy frameworks that prioritize access of key hubs and corridors without ignoring local accessibility needs, encouraging modal shift, increasing vehicle utilization, reducing emissions intensity, increasing connectivity and mobility, and pricing reform.

PART IV: APPRAISAL AND FINANCING

Infrastructure projects are arguably the most costly projects for society. Investments in infrastructure therefore need to be supported by good arguments and demonstrate value to the community. This part discusses the appraisal of infrastructure and the underlying economic principles of transportation. Further, public–private partnerships (PPPs) are discussed as a way to share financial risks of such large investments.

One of the roles of transport and urban planning is to assess the requirements of cities and city regions as to their infrastructure needs. Bringing these needs to fruition requires both appraisal and funding expertise. Developing infrastructure for cities is one of the most expensive and far reaching investment decisions that are made by today’s governments. The sheer size and scale economies of modern transport systems infrastructure is often beyond the funding ability of governments who are increasingly turning to the private sector for joint project implementation. This in turn means an understanding of the twin skills of appraising the options to ensure the best options are put in place with the best value of money for society and a consideration of how finance may be raised effectively to implement a project. Both are crucially important to the portfolio of skills for transport and urban planners. This is the role of Part IV of this book.

Kawamura opens Part IV with Chapter 13 on transport economics, looking at theoretical models of transport–land use interactions as a background to understanding the microeconomic framework that underpins our understanding of travel behaviour. Unlike typical consumer products, transportation of people and goods is a derived demand in which utility is not derived from its consumption, but rather from participation in activities at the destination. Supply, on the other hand, consists of infrastructure and transport services, and unlike physical goods, unused supply (such as road capacity and empty seats on a bus) cannot be stored for later consumption. Understanding travel behaviour in the context of supply and demand leads to a more detailed discussion of transport and travel costs on the one hand and transport pricing on the other – both of which have political dimensions which have coloured policies examined elsewhere in this book. Kawamura also identifies that a key part of our understanding, and an area of contemporary research, is the role of perceptions in driving how much travel individuals seek and hypothesizes that this is an area where the contribution of transport economics will not diminish.

In Chapter 14, Chung and Hensher discuss PPPs as a way of enabling the funding of large transport infrastructure projects which might not otherwise have been possible at the time they are implemented and which society is too impatient to wait for available public funds. Public–private partnership contracts in the transport sector have not had a happy history and this chapter is predicated on isolating the factors which should be of concern in designing a PPP and, perhaps more importantly, identifying how PPPs could be more successful. Public–private partnerships are examined from a contractual economics perspective and the chapter discusses how this illuminates the behavioural
aspects of contracting. Beyond the theory, the issues are discussed in the context of a case study of the first PPP that has successfully reverted back to government ownership in Australia. This highlights the role of risk and the way in which PPPs bring together partners who have inherently different perceptions of risk, and how the contractual economics perspective model incentivizes risk-sharing between these partners. The chapter also discusses and illustrates the other major issues relating to PPPs: these include how to address the links between uncertainty and contract incompleteness and the nature of governance relationships that appear to foster good outcomes. This chapter is an essential prerequisite for understanding the difficult issues governments face as they seek to implement large projects with constrained budgets in partnership with the private sector.

The final chapter of this part, Chapter 15, is provided by Bristow. This chapter provides insights into the appraisal process which is used to judge the value of a publicly funded infrastructure investment to society. This requires a far broader assessment than would be required by a private company evaluating the financial impact of an investment on itself. This broader assessment is provided by social cost–benefit analysis which takes account of the many impacts of transport investments which do not have an observable market price. Bristow looks at how social cost–benefit analysis typically sits within a framework that includes both qualitative and quantitative elements where the former contribution is for aspects of the investment which are not possible or not easy to monetize. However, many of the non-market goods have a respected methodology for their valuation and the state-of-the-art valuations discussed in this chapter include the valuation of travel time savings, valuations of safety, and the valuation of environmental impacts such as noise and air pollution. Beyond the state of the art, this chapter identifies some of the more difficult topics of evaluation such as optimism bias and wider economy benefits, and highlights how these and other valuations remain the key future challenges in this field.

PART V: PLANNING AND DESIGN

Planning and designing urban environment transport systems has long-term impacts and needs to be done carefully. There are many aspects to take into consideration, such as the heritage of existing facilities, ensuring that urban areas provide happiness and well-being, and that the distribution of goods can be efficient. In this part these aspects are discussed, as well as methods to understand and forecast travel behaviour and traffic flows as a result of the built environment. Furthermore, it is shown how mathematical optimization procedures can assist in designing transport networks.

Transport and urban planning in the earlier parts of this book expose the complexities and interrelationships between the different aspects of the urban environment. The design and development of cities in developed economies requires significant planning with outcomes which persist well into the future. This part considers some of the complexities of strategic land use and transport planning and design aspects.

Klementschnitz opens with Chapter 16 which highlights issues relating to heritage and urban development. Many of our cities have existed for many years and plans and designs have to take account of the existing layouts of cities and make a judgement call as to whether to plan to retrofit into the existing layout or to redevelop starting with a clean
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Sheet. In practice it is not as simple as comparing the costs of each alternative since in many cases heritage issues need to be considered or heritage issues mean that particular, more expensive, strategies need to be implemented.

While constraints to urban and transport development are challenging, Klementschitz argues that these conditions provide the opportunity to be innovative and provide solutions which are robust but might not be part of existing planning guidelines. Examples of how attractions can be retained or developed, often with a less car-centric outcome than modern cities are used to, are central to this chapter. Clever forms of development also involve all stakeholders, and a willingness to invest is one way in which citizens who identify with the historic nature of their city can be persuaded to support change.

In Chapter 17, Curtis explains that our cities, in their planning and their design, are places where activities or land have specific use. Transport and urban planning needs to emphasize the role of place because the historical approaches have been more concerned with the movement of vehicles and, accordingly, providing road space. Curtis argues that the concept of place is at the heart of integrating transport and land use, and should be included at all spatial levels if transport and urban planning is to be successful.

Curtis builds on the historical framework of Part I to show how the role of traffic function and the role of place in the transport-planning process has changed over time. Until the 1990s, interest in traffic dominated but, since then, new paradigms have led to a heightened interest in place. The chapter shows how this has led to the development of innovative policies and ‘places’ quite different from the developments of the past, particularly with the emergence of ‘place’ not dependent on motorized traffic. These new planning paradigms have succeeded because of understandings developed by the different disciplines in the urban design and planning domain, and the recognition of the need to involve community. Curtis concludes that, while engineers continue to retain their control over road space, it is more difficult to promote designs and plans which promote place over traffic.

Willumsen and Ortúzar’s Chapter 18 is concerned with transport planning and the way in which modelling can be used to provide an evidence base for this government activity. As Bristow’s chapter identified, the identification of likely demand for new infrastructure requires a careful process of estimation and forecasting. This is reiterated here as transport planning decisions will have a long life, be expensive and, ultimately, shape the urban form of the city and determine its liveability.

Transport planning underpins the expensive, long-term decisions made in cities and, as Willumsen and Ortúzar point out, the role of modellers is ‘to achieve a more thoughtful and efficient set of interventions in a city or region’ rather than to provide a final outcome. Models need to recognize elements that change over time: an example here might be the increase in active travel in many of the large cities of the developed world. While perhaps a small proportion of total traffic, this growing community needs to have their behaviour embedded in the transport planning of the city. Transport planning is also about addressing contemporary concerns, whether this is about how congestion might be affected or how a particular proposal might provide a particular set of winners and losers.

Interestingly, Willumsen and Ortúzar suggest that knowing the spatial layout of the city and the connections between existing transport and land use aspects are a prerequisite for good models. Their recommendation is to explore the city as, arguably, ‘the best
tools to improve transport modelling are an open-minded curiosity and a comfortable pair of shoes’.

In Chapter 19, Sarvi et al. look at the topic of transport network design from a mathematical perspective. Utilizing transport models as discussed by Willumsen and Ortúzar as a lower-level description of travel behaviour and traffic conditions, network design aims to optimize infrastructure and transport services as a higher-level objective. This chapter first provides a brief introduction into network design problems and then discusses in more detail the problem of optimizing transit priority lanes. Private and public transport modes typically share the same road infrastructure. In some cases it may be beneficial to provide certain modes exclusive access to infrastructure, for example, dedicated bus lanes.

Sarvi et al. formulate the transit-lane design problem as a mixed integer bi-level programming problem and illustrate how algorithms using the generalized Benders decomposition, outer approximation, and branch and bound techniques can solve such challenging problems. This chapter is of particular interest to transport modellers interested in the state of the art regarding mathematical optimization techniques in network design, which remains very challenging in practice.

As pointed out by Zunder et al. in Part II, urban freight should not be sidelined. In Chapter 20, Taniguchi looks at city logistics, which aims to create more efficient and environmentally friendly transport systems to distribute goods in urban areas. Taniguchi identifies three main elements of importance, namely, applying innovative information and communication technology, greener mind-sets of logistics managers, and PPPs. He recommends careful procedures for planning and management of urban freight transport, consisting of design, assessment, implementation, and evaluation stages. It is also recognized that city logistics models are useful tools to evaluate policy measures and analyse the behaviour of actors. Similar to transport models discussed by Willumsen and Ortúzar, these models consist of demand models, supply models, and impact models. Taniguchi concludes by discussing future trends, such as humanitarian logistics in case of natural disasters, home health care issues due to an ageing society, and co-modality in which different modes of transport are combined.

Van Acker concludes this part by looking at the role of the built environment in urban and transport planning, in Chapter 21. Motivated by attempts to reduce private car travel, policy has shifted from the predict-and-provide approach to an approach that looks at travel behaviour demand and the way in which it might be changed in different urban environments. Considering the impact of the built environment is naturally part of this exploration.

Van Acker identifies that examining the links between the built environment and travel behaviour is more difficult than anticipated. She explains this as a shift from the modelling of transport demand to an interest in the modelling of the less concrete concept of travel behaviour which is influenced not only by the ‘hard’ factors of where activities are based and the price of transport, but also by the ‘soft’ factors of attitudes and preferences. Van Acker discusses how the study of the links between the built environment and travel behaviour has been hampered by methodological and data issues such as those relating to self-selection – do people live in walkable neighbourhoods because they like walking? Research findings that include information on attitudes and preferences challenge the established views on the connections between transport and the built environment, and provide a new evidence base for urban and transport planning.
PART VI: MANAGEMENT

While the previous part looked at long-term planning and decision making regarding the built environment and new infrastructure, this final part assumes that such strategic decisions have been made and looks at ways to more efficiently manage such projects and transport systems in the shorter term. In particular, this part focuses on the management of large infrastructure projects, management of existing road infrastructure and public transport services, management of mobility of travellers, and the influence of vehicle automation and driving assistance on transport system performance.

Beck, in Chapter 22, acknowledges that many infrastructure projects are mega-projects that need careful managing. These projects are not only getting larger over time and more complex, but also have increasing consequences if they fail. Failure can be defined in terms of schedule or cost overruns. Beck provides an overview of reasons for failure of mega-projects, such as technical, physiological, and political explanations. Several ways of avoiding failure are discussed, including proper planning and design, risk management, good governance, better forecasts, and good relations management. In particular risk management is required owing to many sources of risk, such as technical risk, schedule creep, cost risk, human resourcing risk, safety and security risk.

In Chapter 23, Bliemer discusses two ways of improving traffic conditions without building new road infrastructure. First, mobility management, also referred to as travel demand management, aims to decrease the number of cars on the road during peak hours by encouraging drivers to make alternative travel arrangements. Government can stimulate using taxes or educate by information provision, while employers can offer more flexible work arrangements. Secondly, traffic management, often part of what is referred to as intelligent transportation systems, aims to use the current road infrastructure more efficiently with traffic controls and variable message signs. This chapter provides an overview of many existing mobility and traffic management measures implemented in many countries in the developed world.

Nelson and Wright, in Chapter 24, look at more flexible ways of offering transport services. Such services differ from conventional public transport in that they do not follow predefined routes and timetables but, rather, are targeted to selected groups of travellers. This chapter provides an overview of different flexible transport services, including open-access, public-demand responsive transport, specialist transport for the elderly and the disabled, community transport services, but also carpooling/Liftshare and on-demand car services such as Uber. Nelson and Wright believe that the latter two forms of flexible transport services in particular have the potential to disrupt existing business models in the passenger transport industry.

More traditional road-based public transport services are considered in Chapter 25 by Currie. This chapter reviews the current state-of-the-art approaches for better managing such services, in particular buses and trams. Currie addresses many operational issues that motivate management, including traffic interference, reliability, vehicle utilization, vehicle access and size, route productivity, and passenger comfort and safety. Further, this chapter distinguishes road space priority (for example, bus lanes) and road time priority (for example, traffic signal priority), and different measures for providing such priorities. Currie concludes with spotlighting the lessons learnt from the good and the
bad experiences. As such, this chapter provides many practical recommendations for road-based public transport management.

Finally, in Chapter 26 Correia et al. discuss vehicle automation and possible impacts on transport system performance. First, they define different levels of vehicle automation, from driver assistance (such as adaptive and cooperative adaptive cruise control) and partial automation at the lowest levels of automation, to full automation at the highest level. Correia et al. introduce the ‘ripple effect’ model to analyse the possible disruption in car driving. This leads them to discuss the short-term impacts such as traffic, travel costs, and travel choices, the medium- to long-term wider implications with respect to vehicle ownership, emissions, health, safety, as well as impacts at the spatial level of traffic and transport systems. So, will automated vehicles influence urban form? Possibly, but the impact on cities is still relatively unexplored territory.

Looking into the future, we anticipate that the field of transport and urban planning and practice will not be able to resolve the challenges as fast as they appear. Our aspiration is for this book to help pave the way for practitioners and new researchers to take stock of best practice and current challenges and to contribute to important and exciting developments in the future.