Book Review

David A. Hensher and Kenneth J. Button (eds.) *Handbook of Transport and the Environment*

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EJTIR, **7**, no. 1 (2007), pp. 63-66

Nowadays, any transport policy which does not account for its environmental implications should be considered inappropriate. Therefore any decision making regarding the transport system must reflect and consider the likely environmental consequences it might have. Moreover, many changes to the transport system are nowadays proposed not to improve transport operation but to reduce its environmental impact. In these settings, the *Handbook of Transport and the Environment* brings together the up-to-date knowledge we have on the interrelationship between transport and the environment. The word *Environment* is used here in its broader sense although naturally the focus is more on the core problems of climate change and air pollution.

The environmental impact of transport has been on the agenda as long as transport has (for example, the editors note that "the Romans banned traffic in cities at night to reduce noise" – p. 1), yet the subject gained much more attention and importance after introducing the notion of sustainability. Despite the above and extensive research on the subject, still, more is unknown than known about how transport, and in more general terms other human activities, impact and alter the environment. In this context, the book tries to contain in one volume all that we know on how transport pollute the environment and what we can try to do to reduce it. For this, 45 chapters and more than 800 pages are needed.

The 45 chapters of the book are divided into four sections. Following an introduction by the editors where they outline the book's aims and purposes, the next nine chapters include the first section which is on *concepts*. Attention is given to the core issues with respect to transport and the environment: climate change, air quality, noise, safety (somehow a misleading title as this very well written chapter is about the transport of hazardous materials only), amenity and severance and three chapters on alternative fuels – the last of which, on "cleaner vehicles" (chapter 10), is the most recommended to read.

The next section is termed "sectoral overviews" and it contains six chapters. A general chapter on Carbon Dioxide emissions from transportation is followed by chapters devoted to

busses, urban public transport, aviation, shipping and rail. As stand-alone chapters all the chapters provide a good coverage of the specific sector. The chapter on “the environmental impacts of shipping” (chapter 15) is especially well written with ample and appropriate references, which is even more important in this case as shipping very often is getting less attention in comparison to other (land) transport modes. Considering the nature of the book, the choice of an industry representative, rather than an academic, to contribute the chapter on aviation (chapter 14) is somewhat odd, especially given the sensitivity of the air transport industry to the subject. This choice leads to a conclusion that air transport damages the environment less than rail transport, which is usually not supported by the academic literature. Also the relatively long focus on how British Airways acts to reduce its impact on the environment does not seem to belong in this book.

The third section deals with “appraisal and valuation” of environmental issues. Nine chapters look on the subject from different angles including both the monetary and non-monetary evaluation approaches. The section covers all the main issues involved including the theoretical background, the empirical application, the effects on human health and non-health effects (e.g. effects on wildlife/ecosystems). One chapter is devoted to the valuation of location externalities (chapter 25), underlying the editors efforts for a comprehensive coverage of the subject (this chapter however is analytical in nature and thus deviate from the general approach of the book). The third section succeeds in presenting the right balance between the level of current evaluation practices and the useful information it provides and the still high level of uncertainty associated with such an evaluation. A very good contribution in this section is on the valuation of safety (chapter 24). The chapter provides a very clear introduction to the main concepts and rational (supplemented with empirical evidence) of valuing safety, the complexities involved, and how these are overcome. Although it is not clear that safety issues belong in a book on transport and the environment the nature of valuing safety externalities is useful in understanding how we should approach evaluation of (other) environmental externalities.

Appraisal and valuation of environmental impacts is paramount to the subject of transport and the environment – it is the prerequisite for any discussion on the subject and therefore it is natural that large part of the book is devoted to it. Almost all the chapters in the book report estimates of environmental impact at two levels: quantities of emission and cost of impact. The “impact pathway approach” presented in the chapter by Quinet on “Evaluation of environmental impacts” (chapter 19) allows to put results at these levels in perspective. The cost estimates are the last stage in the pathway and while they are the most easy to grasp and use (for example to compare between different environmental impacts and different (environmental) costs and benefits) they should be considered as the least robust due to the limitations/uncertainty in obtaining the results of previous stages. These uncertainties are usually dealt with through different assumptions. In contrast, emission estimates are considered more robust (the second step in the pathway after determining the level of transport activity) but often they do not provide much information since different gases and pollutants have different impact on the environment. Accordingly, summing up emission of different gases/pollutants is like summing up different currencies without using an exchange rate. The problem is well demonstrated in the following sentence: “Diesel engines tend to produce much lower levels of carbon monoxide and hydrocarbons than gasoline engines, but much higher levels of nitrogen oxides (NOx)” (Chapter 10, p. 189). So which engine is better? In this respect, the book highlights the need for 'conversion factors', which are not monetary units, to allow comparison of different gases/pollutants. Such factors will allow to

better estimate the physical environmental impact before starting to estimate the economic impact (which is subjective by nature – e.g. when based on willingness to pay). For air pollution and climate change impacts the use of toxicity factor and CO_2 equivalent units respectively is an example of useful conversion factors. Because of the importance and usefulness of estimating the cost of environmental impacts a chapter on the methods used to derived these must have been included in the book. An excellent summary of this appears in a previous book in the series of *Handbooks in Transport* in a chapter by Daniels and Adamowicz (2000). This chapter should have been replicated here for a complete coverage of environmental valuation; indeed many of the contributors in this book refer the reader to Daniels and Adamowicz (2000).

The fourth and last section of the book covers, in 20 chapters, a variety of issues and the broad theme of the section is "policy issues". The different subjects dealt with in each chapter demonstrate the breadth of issues related to transport and the environment and the complexity of dealing with the subject in a policy context. This is evident especially in the chapters on environmental legislation, pricing policies, public attitudes, planning and design of streets, travel behavior change through individual engagement (a relatively new approach to mitigating the impact of transport on the environment), and the very good chapter on the unintended effects of policies. The fourth section also demonstrates the difficulties in moving from the theoretical to the empirical/practical treatment of transport impacts on the environment. Readers new to the subject might be disappointed not to find a prescribed solution to the environmental problem of transport operation, but in reality there is still no such prescription (other than, perhaps, reducing car use). Instead, the book provides a good summary of what we know about transport and the environment, how we can evaluate it and what we can/should try and do about it. This is best illustrated in the case of alternative fuels for use in road transport. Although there is an agreement that this is the solution, the chapters covering the subject shows that there is still no consensus as to which alternative fuel is the best alternative. These chapters also demonstrate the importance of the economic aspect of developing alternative fuels along side the technological/scientific challenge. The book does give the impression, however, that fuel cells technology is probably the best candidate to substitute the combustion engine. Overall, the book, and especially the last section, succeeds in passing the message that to tackle the negative environmental impacts of transport, technological development and behavioral changes are required, and each alone would probably not suffice.

The *Handbook of transport and the Environment* certainly delivers. It is a very large volume that manages to cover the complexity of the subject and its multi-facet aspects and it is doing so in a very accessible way. The editors manage to keep the overlap between the 45 chapters to a minimum, the level of the book is relatively uniform across the chapters and most chapters, but unfortunately not all, provide a very good and appropriate list of references (e.g. mostly academic and accessible as opposed to gray literature which is often harder to access). A handbook is often the first point of learning about a new subject and users of a handbook are expected to select individual chapters each time they consult the book. Therefore, more efforts should have been made in preparing the table of content (a brief table of content with only the chapters' titles and with the division into sections would have been very useful as an addition to the current 10 page long table of content). Giving to chapters titles which better describe their content and how they differ from other chapters would have also facilitated the use of the book.

In conclusion, the book is highly recommended as a starting point for anyone new to the subject of transport and the environment and to those who wish to broaden their knowledge of the subject. The book is highly recommended for any library in an institute related to transport – whether a teaching, research, public policy or consultancy institute, no matter on which discipline the institute focuses. In most cases, books are reviewed by experts in the field which do not always provide a good indication of how a book will be judged by non-experts and especially newcomers to a subject. The chapters which covered issues I was not familiar with before proved to be very good introductions with good references for further reading and very accessible and enjoyable to read. These chapters are evidence that the editors and the contributors 'passed the test' and fulfilled the book's aims.

References

Daniels, R. and Adamowicz, V. (2000). Environmental valuation. In: Hensher, D.A. and Button, K.J. (eds.) *Handbook on transport modelling*. Elsevier Science Ltd., Oxford.