

An Integrated Model of Transport and Urban Evolution

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Wolfgang Weidlich · Günter Haag (Eds.)

An Integrated Model of Transport and Urban Evolution

With an Application to a Metropole
of an Emerging Nation

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With 44 Figures
and 25 Tables



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Foreword

Gone are the days when mobility was nearly always a question of having a vehicle. Today the issue of road capacity is becoming ever more pressing. Even the safest, most comfortable and 100% emissions-free vehicle is only of limited use if it is stuck in a traffic jam. Mobility is a key human need and an important factor in the economy. It is a matter of logic that a company like DaimlerChrysler should make every endeavor to safeguard mobility, thereby fulfilling humanity's economic, social and environmental needs.

Nonetheless, traffic and mobility problems are the inevitable result of a concentration of people and markets. Bombay, Lagos, Shanghai, Jakarta, Sao Paulo, Cairo, Mexico City – virtually half of the world's population is urban-based, and the majority live in the metropolitan regions of the Third World. The mega-cities in the so-called developing nations are facing a dramatic increase in traffic levels. Gridlock looms on the horizon. Should traffic-choked streets become a permanent and daily occurrence, economic development will be held in check and pollution will spiral.

There can be no discussion as to the extremely high importance of these problems for society. DaimlerChrysler is certainly well-equipped to meet the challenges posed: As a global corporation, our products cover all transport areas. We have therefore seized the initiative by means of this study "An Integrated Model of Transport and Urban Evolution", which does not deal with purely commercial matters. Whilst emphasizing DaimlerChrysler's competence in the core area of mobility, the study is also the manifestation of a corporate philosophy in which worldwide social responsibility is accorded a central role.

Once more, here is one of the focal questions: How can the requirements for mobility be guaranteed and optimized to ensure sustained effectiveness? Scrupulous research into the role of traffic in metropolitan infrastructure development is the first step toward an answer.

I am convinced that one of the outstanding features of this study is its comprehensiveness. The traffic situation and the related factors were identified, recorded, sifted and reported in an expert manner. Dynamic mathematical models helped to ascertain the links and processes of interaction between traffic, demographic, economic, resource and environmental development factors. I might rightly add that we helped towards the success

of the venture by bringing our wide-ranging knowledge and competence in traffic research and development to the shared project. Prior to this, DaimlerChrysler had already been intensively engaged in designing traffic concepts for urban clusters. The experience we had gained from very similar ventures in Berlin, Athens, Bangkok, Hanoi and Cape Town stood us in good stead.

The current study supplied us with fresh realizations and much food for thought, all of which were invaluable. Nanjing has yielded decisive progress – we now know for certain that these results are of tremendous relevance for places far beyond the South Chinese metropolis. In theory, the same procedure may be applied to other cities.

Having stressed the purely scientific success of this study, I should like to point up another key aspect, namely the successful combination of science and economics. The study has proven something of a textbook example for science sponsorship – and even the sponsorship itself reaps the benefits. This instrument is becoming increasingly attractive.

There is another feat which should not be overlooked, namely the trouble-free coordination of scientists from various specialists fields, from different divisions of a large corporation, and operating from locations in Russia, Belgium, The Netherlands, Italy, China and Germany. The following pages will show just how productive this mixture of expertise really was.

I would like to take this opportunity to once again thank all those who made the study such a success. I should like to mention first Prof. Weidlich from the Institute for Theoretical Physics at the University of Stuttgart and Prof. Haag from the Steinbeis Transfer Center for Applied Systems Analysis for their exemplary dedication in coordinating and implementing the project. Special thanks are also due to Nobel Prize winner Prof. Prigogine in Brussels and to Prof. Haken from the University of Stuttgart. Furthermore I would like to thank the Professors Nijkamp from the Free University of Amsterdam, Reggiani from the University of Bologna, Englmann from the University of Stuttgart and Popkov from the Academy of Science of Russia. Last but not least, special thanks go to Prof. Wang Wei and Prof. Deng Wei from the Southern University of Nanjing for their cooperation in the project and provisions of indispensable data.

Dr. Uli Kostenbader, DaimlerChrysler AG

Preface

It is a privilege to write a short preface at the occasion of the publication of the project "*An Integrated Model of Transport and Urban Evolution*" due to Professor W. Weidlich and his co-workers. It gives me the occasion to come back to problems which the late R. Herman and I have studied decades ago. Of course time is going and this project contains many new aspects.

The importance of the problems studied in this book is obvious. The interaction between transport and the spatial activity systems is critical in shaping urban and regional economic and social development. Understanding such interactions and the associated evolutionary patterns should guide infrastructure investment decisions and the development of policies regulating the operation and use of the transport systems, as well as measures that affect the amount and nature of spatial activity. Such actions can have profound economic, social and environmental consequences, especially in rapidly developing contexts such as the Nanjing urban region in China. This context is highly dynamic, and the land uses transport system may evolve in dramatically different ways depending on exogenous as well as endogenous forces under different policy actions.

The difficulties to treat such problems are enormous. I think that the authors would agree that much remains to be done. However, the project presented here is a promising starting point and the results already obtained allow us to conclude that additional progress may be achieved in the near future.

Stuttgart, July 1999 Prof. Dr. Dr. h.c. mult. Ilya Prigogine

Preface

This book summarizes the results of a study that was sponsored by the Daimler-Benz AG (now DaimlerChrysler AG) and that was performed under the guidance of Prof. W. Weidlich, University of Stuttgart, and Prof. Haag, Steinbeis-Transferzentrum Angewandte Systemanalyse, Stuttgart. The aim of this project is to provide emergent nations with scientific support on urgent problems in traffic and city development.

The project presented here is largely based on theoretical concepts developed by Haag and Weidlich in Stuttgart, whereby the international cooperation with further centers proved very helpful. The city of Nanjing, the former capital of China and an important traffic junction, was chosen as the subject of study, whereby both the data provided from the Chinese partners and discussions with them proved to be important. The researchers involved in this project must be congratulated for the excellent job they did.

The study presents several scenarios on traffic and urban development in Nanjing. As a result of these scenarios, some concrete recommendations for the further development of Nanjing are given, and I am sure that these will be of great help for the planners and decision makers in China. Thereby, it must not be forgotten that because of the very many economic, social, ecological, and other aspects, such decisions are, eventually, political.

Stuttgart, July 1999 Prof. Dr. Dr. h.c. mult. Hermann Haken

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