CHAPTER ONE

INTRODUCTION: CAN A BILLION TRIPS BE REDUCED TO A FEW PATTERNS?

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The 413 million Europeans generate roughly a billion trips a day. In doing so, they consume vast amounts of time, energy and money, produce tons of air pollution and a myriad of safety hazards. Nevertheless, as individuals and as societies, they are willing to do that, in order to get to work, shopping or leisure activities, and to support the productive and consumptive life-styles they lead.

For present day Europeans, it is difficult to imagine how the world would have been in the absence of transportation services that facilitate mobility. Travelling to work may take approximately the same time as it did in the past, but the distance has increased tremendously. This opened new horizons for professional specialization, as well as opportunities to reside in a location fulfilling personal preferences. In the course of our leisure time, we travel to other countries to enjoy very different physical and social contexts, while maintaining contact with our homes and return to the routine within hours. We have also widened the scope of our consumption to include fresh products from afar, or documents typed daily in an off-shore office at the other side of the globe.

In order to facilitate a billion trips a day, European countries invest heavily in infrastructure, thousands of people are employed in the transportation sector, and even more in the production of automobiles, trains and airplanes. These industries play an important role in the respective national labour markets and economies.

While the assessment of whether all this is a blessing or a curse is subject to ideological conviction, there is no doubt that transportation, as shaped by a combination

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of technologies, economic conditions, governmental intervention (or lack of) and other realms have affected our daily lives to a great extent. Furthermore, European society is presently dependent upon its respective transportation systems. Paradoxically, despite the central roles that transportation plays in the economy, society and politics of each country, many of its problems arise from inconsistent policies, which in a “nutshell”, often encourage suburban life styles and attempt to reduce the social and environmental costs of automobile use.

Considering the wide range of both positive and negative impacts that the transport of people, goods and information have upon our lives, this book represents an effort to understand one fundamental aspect of transportation, namely the underlying behavioral patterns which generate the demand for transportation. Our underlying assumption (and motivation) is that only through an understanding of the behavioral factors of personal mobility, relevant and consistent solutions can be sought.

1. OBJECTIVES AND ORGANIZATION OF THE BOOK

We depart from the position that European mobility patterns are differentiated from those prevailing in other developed economies. This is substantiated, at a global, a cross-European and a micro level in the remaining chapters of Part I. The main objective of this part is to raise a series of possible explanations for the differences and similarities identified on the three levels.

Despite technological, political and economic similarities between countries of the advanced economies (North America, Europe and Japan), there are wide differences between the transportation systems and the travel patterns in these parts of the world. The very first objective of the book is to highlight these differences and to offer some possible explanations for them (Chapter 2). European public transport services, for example, are often a target of admiration by professionals from across the Atlantic. For the Europeans, an understanding of such differences may be instrumental in identifying the choice between alternative futures: Will Europe become an automobile-dominated society or will it maintain a balance between private and public transport, so as to preserve the character of its landscape and quality of its air resources? Understanding the factors which have led to the emergence of European patterns will be useful in devising policies to accomplish the desired futures.

But, even within what is becoming a “Single Europe”, a diversity of travel patterns have emerged. Chapter 3 addresses the intra-European variations in travel patterns at an aggregate level, and raises some hypotheses and explanations for their emergence,
including the role of wealth and consequent car ownership, relative prices and so on.

Chapter 4 presents the micro-level approach, which is underlying the general perspective employed by the authors of this volume. It addresses the basic factors which affect mobility, at the individual or household level. As these are not believed to be fundamentally different across European countries, the explanations must be sought in the differences generated by the context of the individual countries. The identification of these is another objective of this volume.

Thus, Part I of the book, a bird’s eye view of mobility, serves as a stage set for presenting the main hypotheses to be examined in the book. The following two Parts of the book provide explanations, along two different routes.

First, Part II provides a cross-national analysis of major themes related to mobility. Chapter 5 is devoted to the role of temporal structures, their effects on mobility and the potential of employing temporal policies to ameliorate transportation problems. Chapter 6 focuses on car ownership and use. The car’s role in transportation is increasing globally, and Europe is not different. The background factors which affect both purchase and use of the car are addressed. The single most important pattern of travel, which lies at the basis of the peak demand for infrastructure, are commuting trips. Chapter 7 discusses commuting patterns and variations across countries in policies which affect it. Americans often look to Europe’s virile public transportation systems, with images of successful high-speed rail and deregulated public transport systems. Chapter 8 addresses the question of whether in fact Europe’s transit systems are reviving or losing to the competition of the automobile. Chapter 9 focuses on international travel, serving both tourism and business related trips. Cross-border traffic in Europe is a source of increasing concerns with regard to air and airport areas' congestion and environmental impacts, as well as the economic viability of some European regions for which tourism is the main source of income.

Following these topical chapters, Chapter 10 focuses on policy. If relatively similar cultural, social and economic contexts give rise to very different travel patterns and transportation systems, the difference, and the opportunities, lie in the policy arena. Europe can thus be viewed as a grand laboratory in which transportation policies are experimented upon, with the objective of finding the most efficient solutions from social, economic, environmental and political perspectives. In a way, Chapter 10 is a presentation of practical conclusions that can be drawn from this book.

A different perspective for understanding the cross European differences is employed in Part III. Fourteen national reports were produced by experts from respective countries, to present the “inside stories” of mobility and its background in member countries. This path is useful for identifying context-specific factors and lessons which
can be drawn from experience and experiments in different countries.

This Part fulfils another objective, namely to serve as a reference for readers interested in the particularities of individual countries. Using a unified chapter structure, it is possible to observe how similarities in some determinants of the transportation system result in the evolution of a variety of systems.

The national chapters augmented by other sources, served as input for the authors of the preceding chapters of Part II.

In summary, the book can serve various purposes. It is a reference for the particularities of mobility in a diverse group of European countries (Part III). It presents hypotheses for explaining the differences (Part I), and finally it provides a discussion of the factors which may explain the differences (Part II). As such, it can be used by students of transportation attempting to devise policies which will increase the system's efficiency while, hopefully, reducing the costs it imposes on society. Specifically, we suggest that the rapid changes taking place in Eastern Europe may be better understood and managed by learning from the experience of Western Europe.

2. THE APPROACH

The topics of travel and transportation include a very wide range of issues. We have taken a course of addressing the basic behavioral questions pertaining to why and how people travel. Indeed, transportation systems involve broader issues than mobility alone. The transportation system's impacts on the environment, economy, and safety, its interactions with social and technological (and specifically telecommunications) changes, are of paramount importance and should not be overlooked. However, we depart from the assumption that the analysis of travel behaviour is a prerequisite for further analyses on the various aspects of transportation which are not covered in this book.

Thus, our view of transportation is not a technological one, but rather a behavioral approach. We focus on human behaviour as individuals and as groups, trying to understand how similar problems are dealt with in different countries and why the outcomes differ in various countries.

Mobility is a complex and multidimensional concept. In this volume, we follow Jones (1987) and use the concept to represent the individual's actions, manifested in travel (not necessarily vehicular), the potential actions which the individual would like to pursue but is constrained by either supply or personal factors, and the freedom of action, namely the knowledge that he/she can pursue an activity if desired. Thus, mobility is the revealed behaviour of individuals, which is carried out in response to a set of needs and
desires related to work, maintenance and leisure activities.

There are different ways in which mobility can be measured and evaluated [Jones, 1987]. Travel based measures emphasize the actual movements and quantify those aspects of travel which enable to compare across individuals. For example, the number of trips, the length or duration of trips, etc. These are commonly obtained from travel surveys. Alternatively, one could emphasize the supply side, by quantifying the availability of various modes and levels-of-service offered to population groups. These measures are crude proxies for the potential travel, but are an outcome of policy and hence not valid explanatory measures of mobility as taken in this book. The third type of measures are based on accessibility. These have the advantage of combining the supply of transport services and the nature of the activities which can be performed at various distances or efforts.

The availability of mobility data varies widely across countries. Even in developed countries, the quality and quantity of statistical data on mobility is rarely consistent and comparable with that of other countries. Consequently, a serious constraint is imposed on our ability to analyze mobility in different contexts. In chapter 4 we briefly describe the data availability issue.

The context from which we view European mobility is both historical and prospective. Personal mobility in Europe has developed more or less along the same lines in all countries, though not at the same pace. An interwoven set of demand and supply driven factors were responsible for the enormous growth in travelled distances of the Europeans over the last one and a half centuries. The rise of mobility started with the widespread adoption of railway technology in the nineteenth century but it received a decisive momentum with the introduction of the automobile after World War I. After having built extensive railway networks, the European countries invested heavily in even more dense road networks offering accessibility to nearly every inch of land. Nowadays, aircrafts add an additional growth to the radius of the action space of mobile people. These ever faster modes of travel did shrink space together and allowed people to cover ever larger distances within a limited time span.

On the demand side, growing personal incomes and general welfare was the paramount factor behind mobility. Higher incomes not only allowed owning an automobile and travelling more, but it was also one of the factors together with better infrastructure that caused spatial deconcentration of housing and employment after World War II, giving rise to ever increasing separation between places of activities (urban sprawl). Mobility patterns gradually developed from an intra-city orientation towards an inter-city orientation. This shift does not seem to have reached saturation. Nowadays, travel patterns in different countries show remarkable similarities and diffe-
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References, as will be described in the following chapters. The differences stem partly from demand and supply conditions that emerge from the different states of each country's demographic, economic and socio-cultural development.

In all European countries, the growing personal travel demand gave rise to the same typical problems: declining quality of urban life, urban and suburban congestion, environmental pollution, heavily subsidized public transport, etc. These forced politicians and planners to look for counter-measures. Nowadays, there is general acceptance in European cities for a variety of car-restraining policies and improving alternatives to the car such as bicycling, public transport, car-pooling, and the like. Gradually, inner cities are becoming freed from automobiles and are given back to the pedestrians and cyclists.

The future will bring contrasting developments with regard to mobility. At the urban level, policies towards car-restraining, re-urbanisation and higher densities will, among other things, limit urban mobility. Also the gradual introduction of correct pricing strategies with respect to all forms of transport (e.g. road pricing) within and outside cities all over Europe will most probably temper the growth of traffic. However, at a long distance and international scale the opportunities to move are constantly being improved. Missing links in European rail and road networks are being removed and remote regions will receive better access to Europe's central areas. European (very) high speed road, rail and Maglev networks are envisaged connecting the bigger centres of the different countries. This certainly will encourage people to travel more and farther away. Such high speed connections may change the relative distances, putting big cities closer and small cities at relative longer (time) distances.

European countries can no longer develop their own transportation policies. There is a strong influence from the European government in Brussels. Increasingly, EC-rules determine the conditions for travelling in all member countries. In the future, liberalisation and harmonisation policies (e.g. concerning car and fuel taxes, rail operations, road tolls, safety and technical standards) will shape a more homogeneous situation for the European traveller in the various countries. It is however not at all clear whether this will lead to smaller differences in travel behaviour than are apparent now within Europe.

European mobility patterns will also be strongly influenced by geo-political developments: the East-West opening, the building of the European Economic Space, the inclusion of new EC-member states, the Political Unification, etc. In this respect, the book is prospective in having included information from a diverse as possible set of European countries, ranging from EC-countries via EC-applicants to non-EC-countries.
3. SOME KEY FINDINGS

Some readers may use this book as a reference. It provides empirical descriptions of travel patterns and supply under a wide range of national contexts. Others may be more interested in the relationships that are identified through the comparative perspective taken in Part I and in the synthesis chapters of Part II. To demonstrate the nature of such findings, some highlights are briefly described below.

The temporal structure of activities, it is emphasized in Chapter 5, is a major determinant of travel patterns. There are still differences in this respect between the European countries, though a gradual convergence in time structures can be observed. Time is intertwined with travel in multiple relationships. As travel demand is derived from the demand for activities, the time constraints acting on the ability to engage in particular activities affect travel patterns and are at the basis of the peaking phenomenon. And yet, there is also an opportunity to influence travel by devising temporal policies, such as the elimination of lunch breaks, flexible work hours and restructuring of vacation times. Such measures are of interest to transportation professionals, but are not under their “jurisdiction”.

Cars, as is evident from the analysis in Chapter 6, are the most popular and fastest growing mode of transport in Europe, as in most other parts of the world. But, in the developed countries, as penetration levels off, income affects the type of car owned and the level of usage. There is a greater diversity of car types and a trend towards specialization of car types in the growing segment of the market (roughly 20%) of households holding more than one car.

The popularisation of the car is associated with suburban living, where public transport is relatively inefficient, and hence greater dependence on the car is fostered. The comparative perspective facilitated the identification of a market segment, often disguised by commonly available statistics: about 25% of the households, in most advanced economies, do not own a car. This implies that certain spatial options may not be available to this segment, believed to include elderly people and low income households.

With increasing numbers of elders who have grown up with the automobile, one faces the question of how the maturing population will maintain mobility? On the one hand, car dependence is widespread (and consequently public service availability is limited), while on the other hand, age-related constraints may reduce the ability to drive.

Another contribution of the comparative perspective is the analysis of car costs. Different countries have devised a rich variety of tax mechanisms which affect either ownership or usage. Both fixed and variable car costs differ by more than a factor of two within the set of analyzed countries. Depending on the social, economic and
environmental policy objectives, alternative costs structures may prove instrumental.

An important segment of travellers are commuters whose travel patterns coincide in time, and often in space, and hence are responsible for the costly peaking phenomena. Chapter 7 takes an integrated view on commuting. Suburbanization of residences and employment typifies most European countries, thus increasing the reliance on cars. Labour force dynamics further support reliance on cars. Specifically, the growing share of women in the labour market, and the fact that women still bear the lion's share of responsibility for household chores, increases the pressure for second cars or for shared use of a car. Simultaneously, greater demand for specialised occupations results in a tendency to seek and accept jobs further away from home. Paradoxically, aggregate trip length may be decreasing because of the greater share of short trips made by female commuters.

The classical centre-oriented radial commuting flows are becoming of lesser importance whereas reverse commuting (from the centres to the suburbs) and between suburbs gain significance. Thus, complex patterns are becoming common.

Home ownership patterns and multiple workers per household introduce a restraint or a delay in the possible adjustment of home location to job relocation or vice versa. Furthermore, in many of the countries, tax allowances for home purchase and for commuting expenses encourage suburbanization and longer travel, being detrimental to transportation policies and environmental objectives. In many countries, employers are affecting transportation too by providing company cars or assisting in car maintenance and parking costs.

Chapter 8 is posing the question of whether or not European public transport systems, often a target of envy of Americans, are moving the masses efficiently? There is a wide variation in the technologies, organizational structures and operations strategies across Europe. Subsidisation is commonplace, under the assumptions that public transport serves deprived groups and has positive impacts on congestion and environment. Subsidization levels differ strongly between countries but show no relationship with levels of public transport use. Hence, in most countries public transport is increasingly a budget burden.

While improvements in the level of service offered lead to increasing ridership, it is not clear whether this is affecting congestion. Across Europe there are increasing or stable readership levels but decreasing shares. The competitive edge of public transport is realised only in severely congested central cities, where improvements of level of service are introduced.

Mobility on a different time and space scale, that of cross-border travel, has also increased dramatically in Europe of the car era. Chapter 9 focuses on these flows,
which include border area commuting, international business travel, and most notably, because of its seasonal peaks, tourism travel. While air traffic (and land-side airport congestion) are the common scopes of this type of travel, car and to a lesser extent rail, carry the larger parts of cross-border mobility. Increasingly, with the relaxation of border controls, it is becoming more difficult to monitor international travel, and hence data available is subject to numerous limitations. Nevertheless, the transport system’s sensitivity to temporal peaks on particular facilities, and the economic importance of tourism warrant the attention to the growing international travel. In contrast to daily mobility, international travel is sensitive not only to transport costs but also to accommodation costs. In addition, it is also affected by language barriers.

What can be learned from the diverse problems and attempted solutions in the policy arena? Chapter 10 demonstrates that significant variations exist in transport policies between countries. We can find contradictory views as to whether it is better to regulate or deregulate the public transport market, or to fund new inter-urban roads through tolls or from general government revenues. The widespread problem of traffic congestion is tackled through various measures such as strict parking controls, public transport priorities, or different forms of restriction on car access. Europe thus represents an interesting laboratory in which we can observe the effectiveness of policy options.

4. A BILLION TRIPS REDUCED TO A FEW RELATIONSHIPS & PATTERNS

The attempt to reduce the complex patterns generated by 413 million people who travel three times a day, may be presumptuous. The three routes taken in this book: national perspectives, comparative syntheses along major dimensions and a global perspective, serve to identify patterns and factors which lead to similarity. But, diversity of patterns between countries, within countries and among individuals who share similar socio-economic traits is conspicuous.

Aggregate mobility measures can be correlated with a variety of explanatory factors, and yet, mobility may be viewed as a personal response to motivations and environmental contexts which are too complex to be reduced to a few rules. The analyses brought forward in this book demonstrate that despite diversity, lessons can be drawn.

While some of the driving forces of developments in mobility are similar in most European countries (e.g., car ownership, the growing dependence on the car, suburbanization, decreasing share of public transport, increasing environmental concerns), diversity is currently still the prevailing characteristic. For example, a clear North-South divide can be observed with respect to levels of personal mobility
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(expressed in distance travelled per person). When we adopt the notion of an S-curve to describe a country’s development of personal mobility then the Southern countries (except Italy) are at the beginning of the steep growth stage. This is conditioned by the prevailing personal incomes, transport network densities and economic structure in these regions. This is changing quickly however. At the other end of the S-curve, near saturation, we find countries with high car ownership levels, mature high-speed rail and road networks, high levels of labour participation, etc.

If we look along another dimension, clear differences can be seen with respect to pricing of personal transport. Car and fuel prices, as well as public transport fares, differ significantly between countries, partly as a result of wide differences in taxation regimes. Also, the country context appears relevant. As indicated in Chapter 6, the existence of car manufacturing in a country plays a dominant role here.

Another clear difference can be observed with respect to public transport provision and regulation. Whereas some countries (France, Germany) already started 25 years ago with heavy investments in regional public transport, other countries are just starting to stimulate the use of public transport. High-speed rail, is one example where some European countries take the lead, and others may follow. In this particular case, “Learning from Europe” [Masser, 1992] may be the name of the game.

It may be expected that European mobility patterns will demonstrate greater convergence as a result of policy actions as well as market forces. Directives promulgated by the Community and measures initiated by individual countries, can lead to a reduction of the divergence of policy measures. Also, it can be expected that economic conditions which affect travel patterns will converge to some extent. The comparative perspective provided by this book, is offered to serve as an instrument for understanding such changes in Europe (and elsewhere) and identify means to affect them.