

Institute for Mobility Research

1998 - 2003

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How it All Started ...

At the invitation of the BMW Group, a representative of Deutsche Lufthansa, a representative of German Railways, and four researchers in various disciplines – a Professor of Economics, a Professor of Theoretical Psychology, and two Professors of Engineering – met in Charlottenstrasse 43, Berlin-Mitte, Germany, on 3 February 1998. Three representatives of the BMW Group were also there on the occasion: The Director of BMW's Science and Research Division, the Director of the Transport and Environment Division, as well as the Director of Corporate Communications and Political Affairs.

That date now lying six years in the past in 2004 is acknowledged in the eyes of the parties involved as the official start of a unique commitment, a unique initiative within the German automotive industry: it marks the establishment of the Institute for Mobility Research. For this meeting was no more and no less than the Constitutive Session of the Founding Members of the ifmo Board of Trustees.

The motive initiating the establishment of the Institute was the commitment that BMW, having built motorcycles since 1923 and cars since 1929, should now take a closer look at the conditions of and requirements for mobility in the future. The intention was not to promote our products through some kind of clandestine advertising or to test promising new business areas for the BMW Group at an early point in time. No – the driving power was the general feeling of responsibility of the BMW Group for the future of our society. For mobility is an essential prerequisite for prosperity and the well-being of our society as a whole as well as each and every individual – indeed, this has been the case not just since the introduction of the motor vehicle. Even in the Constitutive Session, some Members of the Board of Trustees stated clearly that this overall objective embracing society as a whole was crucial to the Institute's long-term focus and conditional to their own membership.

The initial challenge we encountered in our work was to create and introduce a viable concept with the right features and contents. We then soon initiated our first projects, step-by-step introducing a growing range of activities taking on increasing shape in the course of time and now appropriately defined as oriented to the future, inter-disciplinary and inter-modal, that is encompassing several means of transport.

Almost exactly one year after the Constitutive Session, we presented the Institute to the public at a major event at Hamburger Bahnhof in Berlin.

Since then a wide range of activities has served to give the Institute for Mobility Research a powerful profile and an equally strong reputation in the world of mobility.

With this in mind, we have decided to publish an Institute Report regularly in future, first presenting the activities of the Institute for Mobility Research, second informing a selected group of interested readers on the issues and challenges we have taken up with our focus on mobility of the future. Indeed, perhaps this report will motivate some of our readers to enter into a dialogue with us on issues, opportunities and challenges relevant to the future.

Dipl.-Ing. Detlef Frank
Munich / Berlin 2004
Chairman of the Board of Trustees
of the Institute for Mobility Research



Detlef Frank

The Institute for Mobility Research (ifmo) – a Profile

The Institute for Mobility Research was established by the BMW Group in Berlin in 1998 as an independent research facility. Cooperating closely with representatives of science, politics and the business world, ifmo selects specific issues relating to various aspects of mobility, refers these specific topics to experts for their research and perusal, and presents the results to specialists and the public alike for further debate. Road traffic, therefore, is only one of many topics considered, mobility provided by the car only one of numerous different aspects. The focus is above all on issues and developments bound to face our society in the foreseeable future. Typical examples of such processes presenting challenges still unsolved or unforeseeable repercussions, and, at least potentially, with an influence on mobility in the long term, are demographic developments or alternative fuels. These processes and developments must be made clear and transparent in the interest of all parties involved, debates on these issues must be clear and straightforward, and the overall context of society must be taken into account in all cases.

The Institute's Mission: Research in the Interest of Mobility

Mobility is a basic need of mankind. Only mobility enables us to experience other cultures and spheres of life. Without mobility, it would be impossible for us to live the way we do, to pursue our professional and leisure time activities, and to maintain our social relationships. Mobility of people and goods is also the prerequisite for every well-functioning economy and provides the foundation for both education and prosperity not only for the individual, but rather for society as a whole. Adequate mobility is indeed key to the economic success of the Federal Republic of Germany – without such mobility, we cannot create values in production, trade and services. Ensuring mobility also in future is therefore absolutely essential to the success of our economy.

It would appear that there is now a consensus within society that mobility must be compatible with our social system and the environment, and at the same time fit and secure for the future. There are however still major differences in opinion as to how and in what way these objectives can be reached best. This

is where ifmo wishes to ensure a straightforward and down-to-earth debate on the future of mobility, integrating the various perspectives of society in order to secure a system of sustainable mobility in the long term. The issue, therefore, is to ensure, not to prevent, mobility.

Mobility Research Focuses on Mankind, Technology and the Environment

The only way to successfully meet the challenges facing mobility in future is to integrate all transport providers and systems into the overall course of development. Hence, auto-mobility is only one element within a broad scope of mobility research.

The Institute thus focuses on physical mobility and its underlying conditions in the broadest sense of the word. Whether this is mobility on water, on land, or in the air, and whether it is mobility on our own power or with the help of technical systems, is irrelevant. Information and communication technologies influencing mobility directly or indirectly also have to be considered. And, not least, personal attitudes and needs or the general stance within society as a whole in the context of mobility and its underlying conditions are likewise crucial factors to be considered.

How We Work, How We are Organised

Given the wide range of issues following from this broad understanding of mobility and the Institute's mission, an interdisciplinary approach cooperating with partners from a wide range different areas is obviously essential. ifmo therefore sees itself as an initiator and promoter of research activities on issues revolving around mobility as well as a facilitator in the mobility debate by

- coordinating or participating in research projects,
- organising interdisciplinary expert workshops,
- organising panel discussions or conferences on issues relevant to mobility.

It is our specific objective to establish a dialogue with the interested public and improve the exchange of views among all parties involved in the world of mobility. ifmo thus publishes the results of research projects

and events in an attempt to reach the appropriate target groups, encouraging them to give their attention to the respective issues. Ensuring good and effective cooperation on an interdisciplinary level, we wish to help solve the issues relevant to mobility in terms of society, the economy, and the environment.

Selecting the appropriate topics of interest, ifmo is able to operate largely independently of the usual restraints of everyday routine and specific corporate standards. In this process the Institute is supported by a Board of Trustees made up primarily of external experts. This group is able to consult ifmo in choosing its main activities and selecting specific projects and areas of study. At regular intervals the Board of Trustees defines issues then considered by ifmo in greater detail. This ensures that the subject matter considered in each case duly reflects the interests of all transport providers, the overall political spirit and, accordingly, the needs of society.

Experts from the worlds of science, politics and business are requested to contribute to the various projects and events, depending on the specific subject matter involved. They come from German and international universities or research centres, from companies and associations covering virtually all important areas affecting and involved in future mobility.



Foundation of the Board of Trustees on 3 February 1998.

Participants in the Constitutive Session (left to right):

Detlef Frank, Dr. Franz Steinkohl, Prof. Dr. Hans-Jürgen Ewers, Dr. Walter Hell, Richard Gaul, Prof. Dr. Hans-Hermann Braess, Christoph Huß, Prof. Dr. Hermann Appel, Dr. Ingo Bretthauer, Prof. Dr. Dietrich Dörner, and Ulrich Schulte-Strathaus, also Founding Members of the Board of Trustees, are not shown in this photograph.

Kick-Off Event of the Institute in Berlin: Research for a Mobile Future



Dr. Walter Hell

On 28 January 1999 the Institute for Mobility Research was presented at a festive opening event. Addressing 300 invited guests from the worlds of business, politics and science, the then Commissioner of the EU for the Environment and Nuclear Safety, Ritt Bjerregaard, the then Governing Mayor of Berlin, Eberhard Diepgen, the late Professor Hans-Jürgen Ewers, President of Berlin Technical University and the Chairman of ifmo's Founding Board of Trustees, and Bernd Pischetsrieder, at the time Chairman of the Board of Management of BMW AG, took the floor on the occasion at the historical Hamburger Bahnhof, now the Museum of Contemporary Affairs. On the following day the Institute presented its first projects in a scientific colloquium and discussed the need for research in the area of mobility in a plenary session.

Research Outside of the Ivory Tower – on Behalf of, not in the Service of, the Automotive Industry

Given this mission, the event was characterised from the start by the clear will to maintain an open dialogue with the public at large. Indeed, Dr. Walter Hell, the Director of ifmo, emphasised himself that such a dialogue was one of the Institute's fundamental intentions. In his address he outlined the most important principles guiding the Institute in its work and public stand. This also means involving all parties concerned and the right experts in the work done and intentionally taking public interests into account by exchanging views with the public. And this also means finding answers to issues relevant to mobility from an overriding, inter-disciplinary perspective and consistently developing the results in discussions with all parties involved.

Clearly, therefore, ifmo does not wish to pursue or finance any kind of research in an ivory tower, but rather maintain the role of a facilitator, an enlightener. ifmo's commitment is to present even the most complex issues in the area of mobility in clear and transparent terms, and to create an information base for public debate.

This quest for a well-informed dialogue on the subject of mobility not only characterises the issues considered by ifmo and the Institute's modus operandi, but was also the principal motive of BMW as a car ma-

ker to establish the Institute in the first place: ifmo is not to serve as the extended arm or the ambassador of a car company in any way whatsoever, but rather has the brief, through a multi-faceted exchange of views, to clarify and critically consider the need for action in the area of mobility research. It is only through the inclusion of all players involved in transport that one can find angles for improvement and create a better understanding of the complex issues revolving around the subject of mobility.

Not least, ifmo sees itself as a potential partner for politicians in discussing points of interest: Knowledge and insight developed by non-partisan third parties shall provide the foundation for regular dialogues with representatives of the political world.

This clearly places ifmo right in the middle of political, scientific and economic expectations and interests, a fact borne out from the start by the very choice of speakers at the event.

Mobility within the Triangle of Politics, Science, and Economic Interests

In his position as a Founding Member of ifmo's Board of Trustees, Professor Hans-Jürgen Ewers referred from the start to possible conflicts between ifmo's commitment to independent research and its affiliation to an economic enterprise, allaying any fears that the Institute might not be independent by highlighting the composition of the Board of Trustees: The Board is made up of acknowledged experts from both science and practical implementation and acts as both an advisory and a supervisory body. A further point he emphasised was that BMW, through ifmo, wishes to focus particularly on critical issues of mobility, wherever possible finding solutions and concepts pointing into the future.

Bernd Pischetsrieder, the Chairman of the Board of Management of BMW AG until February 1999, referred in his statement to the interaction of societal responsibility and economic success. Mobility, he said, was one of the decisive factors driving the German economy, second only to the know-how and skills of people in our country. But at the same time every provider of mobility, apart from reaping economic bene-



Prof. Dr. Hans-Jürgen Ewers

fits, also had to show a high standard of responsibility: The objective, said Pischetsrieder, was to meet society's demand for modern, long-term sustainable mobility. It was therefore in the interest of every car maker to look beyond the horizon and to study the development of society, modifying the demand for mobility and creating new options. And the prerequisite for providing mobility also in future, stated Pischetsrieder, was to obtain information on these needs and how they may change at the earliest possible point in time.

Future-Proof Mobility Calls for Technical Solutions – and a Change in Mind

Taking up precisely this point and contributing to future-proof mobility is indeed ifmo's No. 1 objective. Precisely this point was also emphasised in her speech by Ritt Bjerregaard, the Environmental Commissioner of the European Union in office in 1999, referring to the problematic aspects of growing automobile: noise, environmental pollution, road construction, destruction of rural areas, and growing traffic burdens. As a result, she said, all parties involved were coming under increasing pressure to take appropriate action. Mobility was slowly becoming a victim of its own success – coming to a grinding halt in traffic congestion instead of moving forward. Apart from technical solutions offering alternatives to our current mobility patterns, she emphasised in particular the need to change our behaviour and frame of mind. Discovering new options along these lines, conducting better research on the reasons and requirements for mobility, and providing initiatives for meaningful processes of change – this, she said, was one of the great tasks ifmo should pursue through and in its interdisciplinary research.

Setting the Framework for Mobility

On the next day of the Conference, Detlef Frank, in charge of the BMW Group's Science and Research Division in 1999 and Deputy Chairman of the Institute's Board of Founding Trustees, emphasised that it was equally important for the automotive industry to change their attitude and frame of mind. Now the Chairman of ifmo's Board of Trustees, Frank stated that the days in which car makers were able to concentrate exclusive-

ly on the production of cars were over. Today, he emphasised, they also had to consider how their products would be used in future, how the very framework of and for mobility was influenced by values, attitudes and lifestyles. This also means the different attitude of people to the automobile resulting from economic and ecological developments. But since most external factors potentially influencing people in their mobility behaviour are not of technical, but rather of economic and social nature, mobility research, he added, also had to focus on non-technical issues. The development of working conditions and the labour environment in general, changes in private households and personal lifestyles were only some of the factors to be carefully considered in their manifestations and developments.

Taking a New Approach in Transport Management

What makes this even more important is that mobility is a significant – perhaps even the most significant – feature crucial to human freedom. Any attempt to suppress the demand for mobility by simple means and without side-effects are therefore bound to fail. Mobility is and remains an issue crucial to any society or community, said Frank. Hence, we must expect a fundamental conflict of interests also in future between the risks of transport, on the one hand, and the potentials of mobility, on the other – and all this with a growing volume of traffic. This clearly calls for a new approach in order to cut back the negative impact of transport through consistent, sustained improvement. The question, ultimately, is not whether we will be mobile, but how we will live out this mobility. And precisely this, stated Frank in conclusion, was the issue that ifmo had set out to clarify.

A complete documentation of all statements is available in ifmo's series of publications under the title : „Auftakt in Berlin: Forschung für die mobile Zukunft“ (“Kick-Off in Berlin: Research for a Mobile Future”) free of charge at: institut@ifmo.de



Ritt Bjerregaard

Mobility: Politics, Ethics, Environment

Discussion Series

Auto-Mobility as a Challenge to Society

The history of the Federal Republic of Germany following World War II is characterised by the victorious development of the automobile and individual mobility. The success of the automobile as a means of mass transport was and, indeed, still is the driving force for economic development in Germany: One out of 7 jobs depends on the automobile – and adding indirect jobs, the ratio is even one out of every three.

But there is also a downside to this success: day in and day out we hear and read about traffic congestion, accidents, noise, and emissions. And very often the attitudes and viewpoints expressed are quite irreconcilable: Some just see the negative consequences of auto-mobility and wish to impose the toughest conceivable restrictions. Others regard every attempt of this kind as a threat to their individual freedom and right of self-determination.

A series of discussions involving BMW, the Technological-Theological Science Institute (TTN) of Munich University, and the Institute for Mobility Research starting in May 1998 and ending in February 1999 focused precisely on these contradictory views and assessments. The subject was mobility as a dichotomy between economic and ecological interests, as well as the ethical issues arising therefrom. The papers providing the basis for the individual discussions have been published under the title: „Auto-Mobilität als gesellschaftliche Herausforderung“ (“Auto-

Mobility as a Challenge to Society”) and describe the points presented as well as the items discussed.

The first point was to clarify one's own position in communicating with others. In this process the advocates of auto-mobility emphasised the significance of being mobile for civilisation as a whole, for our culture and economic world, presenting a vision of the future based on automobiles with a higher level of energy efficiency and running on new fuel concepts. This was countered by legal considerations on the risks of modern mobility, a process of weighing the pros and cons of individual and collective mobility in establishing a balance of quality of life, and a vision of the future seeking to find an equilibrium of ecological and social factors, on the one hand, and the individual need for mobility, on the other. The dialogue quickly showed that the views expressed by one group often cancelled out the justified wishes and demands of the other group. But ultimately the debates culminated in a process of mutual understanding and appreciation, presenting ways and means of overcoming the conflict and pointing at possible solutions.

An ethical approach to transport thus shows that any responsible focus on transport problems represents an overriding task for society as a whole. In terms of transport policies, this means we are facing an interdisciplinary responsibility bringing together environmental, social, health, economic and educational policies in one common synthesis.

Marking the publication of the papers discussed, a panel debate on the subject matter was held in Munich on 10 June 1999, attended by representatives of the church, industry, and science.

Franz Steinkohl, Nikolaus Knoepffler, Stephan Bujnoch: *Auto-Mobilität als gesellschaftliche Herausforderung. (Auto-Mobility as a Challenge to Society)* ifmo – Institute for Mobility Research (Publisher), Berlin 1999, Herbert Utz Verlag. ISBN 3-89675-917-5

For a free copy of this publication, contact: institut@ifmo.de



Auto-Mobility as a Challenge to Society at the FIZ Forum (left to right): Horst Teltschik (Member of the Board of Management of BMW AG*), Horst Rauck (Member of the Board of Management of MAN Technologie AG*), Church Councillor Erhard Ratz, Klaudia Martini (State Minister for the Environment and Forestry of Rhineland-Palatinate*), Prof. Dr. Hermann Lübke (Philosopher), Prof. Dr. Ulrich Steger (Economist).

* Function at the time of the event

Effects of Political Decisions on Transport and the Environment

Motorised transport on roads, rail and in the air is increasing incessantly – regardless of all political demands for greater environmental awareness, preservation of resources, and sustained development. The many forecasts on ways and means of cutting back transport have never become reality – either because the action plans resolved were never implemented in practice or because the results people had hoped for never materialised. And no matter how different the various forecasts on transport happened to be, the feature they all had in common is that they were all overtaken and outdone by the real world.

What are the reasons for these incorrect forecasts in the transport sector, and why have most attempts at limiting the growth of transport failed? To answer these questions, we must know more about the generation of and reasons for transport. For to be successful, any intervention in the transport system must come in where transport is generated in the first place.

Proceeding from these considerations, ifmo requested the Institute for Transportation and Transport Construction of Essen University (Prof. Dr. Jörg Schönharting) in 1999 to conduct a study looking into the reasons for the ongoing growth of transport and considering data so far neglected in the various scenarios. Is it possible that transport is created in areas conventional transport forecasts fail to consider?

In particular, the study focuses on the effects of specific political decisions on transport and the environment, looking above all at such decisions on the level of the European Union and, in Germany, on the levels of the Federal Government, the State Governments in the German Länder, and the community authorities generally not considered in studies of this kind, since the general belief is that they do not have any particular impact on transport and the environment, anyway.

The study reviewed political decisions taken in 1994 and 1995. In all, these were 600 decisions taken by the EU, 799 decisions by the German Federal Government, 323 decisions by the State of North Rhine-Westphalia, and 221 decisions taken by the City of Essen.

It was found that very many of the decisions taken on all political levels and in all areas of politics either require or create mobility and/or transport for the achievement of their targets, although at first sight such decisions would not appear to be relevant to transport. Typical examples are sectors such as culture, the economy, financial and social affairs, as well as domestic matters. All decisions relating to charges and fees, subsidies, taxes and other rates, for example, are relevant to transport, that is decisions involving, say, private household budgets or tax benefits granted for the economic promotion of weak regions. On the level of the EU, this also means the process of enlargement to the East, on the national level in Germany it means the reunification process, on state level it is the sponsorship of cultural events (such as the Hanover World Exhibition in the year 2000), and on community level support granted for sports and leisure time facilities (such as indoor swimming pools). Compared with the overall volume of transport, one might believe that the quantitative effects and repercussions of such decisions are negligible. But all together they certainly serve to increase transport, proving that even decisions in political areas appearing to be irrelevant in transport matters should be taken into account as the reason for the growing volume of transport.

The study proves that the various decision levels in politics by all means have an influence on the transport scenario. But at the same time the decision-makers are not adequately aware of the consequences of their decisions in affecting transport. In part, this is because the consequences of political decisions not directly relevant to transport are still underestimated when it comes to their actual effects on the transport system. And since many decisions and developments leading to an increase in transport can hardly be re-directed due to their political objectives, with transport even being a fundamental prerequisite for implementing these decisions, it would hardly be conducive to query mobility as such. The bottom line, therefore, is that growing mobility must be accepted as crucial to numerous developments and objectives, with politics having to adjust to such an increase in the volume of transport. And what can be realistically achieved is a reduction of the negative effects and risks of transport in practice – which calls for better coordination of decisions between the individual bo-

Research Project



Prof. Dr. Jörg Schönharting

dies and levels of politics and within the various ministries and offices.

The essential point is not to consider transport alone or by itself, but rather to focus on the overall concept, together with the objectives of decisions taken in other areas. This, however, will only be possible once we know more about the reasons for growing transport. This makes it essential to study the reasons for mobility in order to assess the many effects of political decisions at the earliest possible time. The indisputable point is that transport takes place in a complex scenario where different ideologies and objectives meet – and where the only way to reach a consensus is by relying on adequate information and showing goodwill in maintaining a dialogue and making compromises.

The final report on this project has been published within ifmo's internal series of papers. For a free copy contact: institut@ifmo.de

D. Bruckmann, U. Nehren, V. Rieken, J. Schönharting, K. Stöcker: *Untersuchungen der Auswirkungen ausgewählter Entscheidungen auf Verkehr und Umwelt*. (Studies of the Effects of Selected Decisions on Transport and the Environment). ifmo – Institute for Mobility Research (Publisher), Berlin 2000 (ifmostudies), in-house publication. ISBN 3-932169-24-7

The hydrogen Car and Its Function Scenario

A solution to many environmental problems which has been under proposal for quite some time is to use hydrogen as a source of energy in transport. And due to its leading role as a transport provider, the automobile is receiving a lot of attention in this area from both scientists and politicians. The use of hydrogen is however also being discussed in the context of air traffic, particularly when looking at growth forecasts in this area and the resulting increase in CO₂ effects on the atmosphere. Recently, we have also seen hydrogen-drive buses both in short-haul urban transport and at airports.

Nearly all parties now see hydrogen as an essential element of any transport policy suitable for the environment, particularly as the technical requirements both for the recovery of hydrogen and for its use as a source of driving power in the automobile would now appear to be in place.

Proceeding from this starting point, Gundi Dinse, cooperating with ifmo, started her studies in the Energy Systems Division of the Institute for Energy Technology at Berlin Technical University in 1999, considering which concepts might promote the broad-scale

introduction of hydrogen vehicles and what obstacles there might be in this process. The study examines the technical, political, legal and social dimensions involved, thus defining hydrogen in its so-called "function scenario".

The Technical Dimension

The technical dimension of hydrogen vehicles involves the infrastructure required (supply of fuel) as well as the actual design and construction of the hydrogen vehicle as such. With hydrogen only being available as a secondary source of energy, both the amount of hydrogen provided as well as the expenditure involved depends on the various options for recovering hydrogen. Among the ecological processes for the recovery of hydrogen, advanced alkaline water electrolysis is the most economical. But this is still very expensive in comparison with hydrogen recovered in a fossil fuel process. Looking at the design and construction of the hydrogen vehicle, on the other hand, we have alternative drive by a combustion engine or the fuel cell with an electric motor. The hydrogen-powered combustion engine now providing the same output and performance as a conventional engine has already

reached production level. The H₂ fuel cell with an electric motor, by contrast, while in theory offering the potential to drive a vehicle with efficient energy consumption and, accordingly, at low cost, still faces the disadvantage in practice of high production expenditure, great demand for platinum, and high additional weight in the vehicle due to the heavy fuel cell system. A feature both drive concepts have in common is that the hydrogen vehicle generates almost zero emissions, the only product of combustion or reaction being vapour. However, this huge ecological advantage over the conventional passenger car comes at a high price, with the cost of fuel being much higher than the cost of conventional gasoline.

Regardless of the drive technology ultimately chosen, storage of hydrogen is a challenge in terms of both development and research. From the perspective of the customer, storing hydrogen in liquid form is the best option for mobile purposes. But so far we still lack the infrastructure required for the supply of hydrogen, and the existing, conventional infrastructure would hardly be suitable for this purpose. Being very cost-intensive, establishing the infrastructure required for a hydrogen economy would call for an appropriate alliance of interests.

The Political and Legal Dimension

Analysing the political and legal dimension, we find that the self-commitments already assumed by the automotive industry as well as legislation already in place provide appropriate terms and conditions for promoting the introduction of the hydrogen car.

The Social Dimension

Apart from technical and political/legal aspects, as well as cost-related considerations, the social dimension is also crucial to the broad-scale introduction of the hydrogen vehicle: hydrogen as a fuel must be generally accepted by society. To determine the image of this innovation and the level of knowledge on this issue among the population at large, a survey was conducted on the streets of Berlin. The result is that while hydrogen is sometimes associated with phenomena that might be frightening, it is quite wrong to

assume that everybody thinks of that often-quoted "Hindenburg Disaster". On the contrary – the image of hydrogen is more or less neutral.

The image of the hydrogen car, in turn, is by all means positive, such a vehicle being regarded as ecologically clean and progressive. Still, the respondents would only consider switching over to a hydrogen car if such a vehicle offered the same quality as a conventional automobile: The main criteria are the same level of personal cost, the same cruising range on the road, and the same performance. In all, it is interesting to note that while the respondents show great interest in hydrogen and the hydrogen car, their knowledge on the subject matter as such is rather limited. Particularly young people are not well informed of the possibility of using hydrogen.

Proceeding from the results of the survey, the author suggests further incentives for the user and proposes specific steps and improvements to create a greater interest in this innovative technology.

Ultimately, the survey arrives at the conclusion that the hydrogen vehicle may well be introduced in principle in all three dimensions of this function scenario. But there is still a long and difficult way to go before mankind is able to replace fossil sources of energy in the motor vehicle in general. If we work together on the technical, political/legal, and social dimensions involved, however, expressing the right endurance, willpower, strength and common interests, the introduction of the hydrogen car on a broad scale would by all means appear possible.

The final report on this study has been published within the Institute's internal series of papers and is available free of charge at: institut@ifmo.de

Gundi Dinse: *Wasserstofffahrzeuge und ihr Funktionsraum: eine Analyse der technischen, politisch/rechtlichen und sozialen Dimensionen.* (The Hydrogen Car and its Function Scenario: An Analysis of Technical, Political/Legal and Social Dimensions.) ifmo – Institute for Mobility Research (Publisher), Berlin 1999, (ifmo studies), in-house publication. ISBN 3-932169-07-7



Gundi Dinse

General Acceptance of the Hydrogen-Powered Car

“Realising that something is right is far from guaranteeing that it will be generally accepted, no matter how significant it may be to the public.” (Korff 1992)

Following her study on the function scenario, Gundi Dinse examined the acceptance of the hydrogen car in another survey in the year 2000, focusing this time on people connected with cars in two respects: As users of cars/car customers and as employees of a car maker which has been developing hydrogen-powered cars ever since the late '70s. These were employees of the BMW Group.

Proceeding from the theoretical parameters and established knowledge on the acceptance of technology, the author sought to assess to what extent the hydrogen-drive car might actually penetrate the market. In this study she focused on 8 theoretically derived variables and interacting factors crucial to the acceptance of a given technology:

- The general attitude towards technology
- General interest in technology
- Level of knowledge
- The perception of risks
- The perception of benefits to the individual and to society as a whole
- Associations generated by the term as such and mental connections established with technology
- The influence of the media
- The feeling of trust and good faith

Results of the Survey

Empirical verification of these variables in the survey shows that hydrogen and hydrogen technology in the motor vehicle is broadly endorsed and accepted by employees of the BMW Group. The assessment of hydrogen-drive cars does not depend, however, on a person's fundamental attitude towards technology or the motor car as such. The aficionado of technology and the automobile is neither more sceptical nor more open-minded than the more critical individual in his judgment of hydrogen. Employees with a higher level of qualification, however, in particular men, are

better informed of this innovation and are more open-minded to its introduction, meaning that socio-demographic factors are by all means relevant to the level of knowledge.

The risks in using hydrogen to drive a vehicle are regarded as greater than in the use of gasoline and diesel. In the opinion of the BMW employees interviewed, certain hazards lie in the explosive nature of compressed hydrogen and the possibility of skin contact with liquid hydrogen. Still, the overall risk associated to hydrogen is regarded as calculable and is seen to remain within reasonable limits.

Given this attitude, the respondents support the opinion that hydrogen should replace conventional fuels in future. Indeed, they are strengthened in this opinion by the assumption that hydrogen fuel will become dramatically cheaper in the next 15 – 20 years. Conversely, the respondents seem far less inclined to use a hydrogen vehicle themselves, focusing instead on the general use of such vehicles by society as a contribution to environmental protection.

Specific concepts and assumptions are crucial to the acceptance of the hydrogen-drive car. The more such a car is seen as an all-round or high-tech vehicle, the more readily it is accepted. A further point is that a growing level of information on this technology also helps to build up confidence. Hence, the quality and quantity of reports in the media as a whole, as well as the credibility of the technical press, are of great significance.

Action recommended

Proceeding from these results, the following action is recommended for the broad-scale introduction of the hydrogen car:

- Publications in mass media should focus in particular on the assurance of individual mobility compatible with the environment.
- More specific, technical information should be made available through the technical press, at schools and universities in order to reach the interested public.

- Hydrogen cars should be developed and marketed in the long term as all-round vehicles.
- There should be target-oriented, ongoing demonstrations of hydrogen-powered vehicles following the philosophy of seeing, hearing, and understanding the hydrogen car.

The final report has been published within the Institute's internal series of papers and is available free of charge at: institut@ifmo.de

Gundi Dinse: Akzeptanz von wasserstoffbetriebenen Fahrzeugen: Eine Studie über die Verwendung eines neuen und ungewohnten Kraftstoffs. (Acceptance of the Hydrogen-Powered Vehicle: A Study on the Use of a New, Unusual Fuel.) ifmo – Institute for Mobility Research (Publisher), Berlin 2000, (ifmostudies), in-house publication. ISBN 3-932169-20-4

Acceptance of Hydrogen and Hydrogen Technologies

Experts Workshop

The issue of the general acceptance of hydrogen and hydrogen technologies was taken up and continued in a workshop to which ifmo invited 27 experts from various research facilities and companies on 28 November 2000. The purpose of the event was to present the latest results in order to determine specific options for action and, where appropriate, identify the need for further research.

The statements presented considered a wide range of aspects in the overall context of this issue: Starting with an overview of the current status of research, the perception and assessment of this innovative technology, and a comparison of risk perception by the lay public as well as experts, the range of points consi-

dered extended all the way to the power of the mass media in the judgment of risks. Further aspects considered were the groups of potential users and purchasers, marketing strategies, as well as political, legal, economic and social conditions for introducing a new technology. Together with meaningful examples of the initial use of hydrogen technology in the motor vehicle and the analysis of the maturity of this innovation ready for the market, two hydrogen projects in Hamburg were taken in particular as case studies in order to analyse the specific strengths and weaknesses of hydrogen technology and determine the challenges of the future.

Mobility in the Big City: Papers on the Concept of Sustained Mobility

Study

Choosing Your Place of Residence in Suburban Berlin

Growing urbanisation and the growth of transport areas in Germany are primarily attributable to the construction of new residential buildings, large areas being developed for residential purposes particularly in suburban districts around large cities. Such processes of suburbanisation lead to the dispersion of settlements, functional segregation (leading to the segregation of work, residential housing, and leisure time) and, as a result, a significant increase in traffic – all of these factors meaning quite the opposite of the “sustained development” concept regarded as crucial in zoning and area planning, where the appropriate use of land is seen to be a crucial factor for a settlement policy compatible with the environment and helping to preserve the countryside.

The current process of suburbanisation would also appear to be counter-productive to ongoing economic and social development. Typical examples are the growing cost of infrastructural facilities in peripheral areas as well as the increasing polarisation of population and social structures between the inner city and its surroundings.

In 2003 Martin Lambrecht, cooperating closely with ifmo, focused in his graduate study at the Institute of Geographical Science of Berlin Free University on the reasons why people living in new estates around the city of Berlin chose such suburban districts as their place of residence. Contributing in this way to suburbanisation research from the perspective of the “city/suburb commuter”, the study comprised a quantitative primary survey conducted in writing among households in the areas involved. In all, the sample covered 335 households from 7 different new residential estates in two districts, the suburbs of Bernau and Teltow directly on the northern and southern borders of Berlin.

This empirical study on a micro-spatial level provided a detailed insight into why people had moved out of the city and why they had chosen their new place of residence in the suburbs. A further point considered was the significance of transport and appropriate transport connections in taking such a decision. And finally, the study also considered conditions at the respondents' former place of residence as well as their satisfaction with their new address.

The most important results of this primary survey:

- In nearly all cases people moved only a very short distance. The longest distance they moved was to the nearest district of Berlin.
- The passenger car is by far the most important means of transport. In addition, the level of motorisation among respondents was higher than in the inner city.
- In their lifestyle and interactions, the respondents were closely connected to and integrated in the inner city.
- Infrastructures at the respondents' place of residence (quiet location, direct links to public short-haul passenger transport), distance-related factors (proximity to the inner city), as well as local qualities related to nature (“living in a green area”) were by far the most significant criteria in choosing such a new place of residence.
- In all, respondents were very happy with their new place of residence.

The study shows significant differences in the structure of households and age groups in the suburbs of Bernau and Teltow. In particular, this is attributable to the different proportion of rental housing versus ownership. Only Teltow shows the phenomenon often regarded as typical in such cases of residential suburbanisation, with “families moving to their own home in the suburbs”. In Bernau, by contrast, the share of rented, multi-floor apartments is approximately 90% and four-fifths of all households are made up of 1-2 persons. The largest group of incoming residents in this case is old-age pensioners.

Given these negative consequences of residential suburbanisation, the following steps are recommended to control the future development of settlements and residential estates by way of an appropriate policy and area planning, taking this examination of preferred residential areas into account:



- New residential estates in the suburbs should have good connections to short-haul passenger transport. The objective must be to improve traffic infrastructure and cooperation between the inner city and the suburbs and to provide more settlement areas along regional and suburban train lines.
- To counteract the negative consequences of people moving to the suburbs, more new housing areas and suburbs with denser population should be developed around the inner city at quiet locations close to nature. This would appear more meaningful than any attempt to slow down the migration of households to the suburbs by upgrading densely populated residential areas in the inner city itself.
- To effectively counteract demographic and socio-economic segregation, residential areas should be more varied in terms of building structures (multi-floor flats versus single and semi-detached houses) and property criteria (rented apartments versus people owning their own homes).
- Promotion of home ownership and the construction of residential buildings by the state should focus more on terrace houses and multi-floor residential buildings as well as existing buildings, serving in particular to reduce the space taken up by individual, detached houses.

Martin Lambrecht: Wohnstandortwahl im suburbanen Raum von Berlin. Das Beispiel der Randstädte Bernau und Teltow. (Choice of Places of Residence in Suburban Berlin taking the Bernau and Teltow Suburbs as Examples). (Graduate Study, Berlin Free University, 2003)

Assessing the Market Potentials of Innovative Options for Passenger Transport in Densely Populated Areas - the Berlin Example


Research Project

Today it is more important than ever before for public transport to be successful in the market: The lack of public funds as well as growing demands made of transport routes – in particular roads and streets – as well as the environment are all important factors which speak for themselves. From the perspective of short-haul passenger transport (SHPT) it is essential not only to cut costs, but also to win over customers through attractive offers, since the payment of fares is becoming increasingly significant due to the lack of public funding.

Apart from the political and administrative conditions urgently required (such as the management of parking space and competition in SHPT), we need offers and concepts more suitably tailored to the different mobility requirements of the user. Indeed, only offers specifically geared to individual target groups have a chance for success in the first place. To improve the standard of services in short-haul passenger transport, therefore, we must know more about the preferences of potential users and their willingness to pay a certain fare.

With this in mind, ifmo has promoted a project conducted by Carl Friedrich Eckhardt of the Department for Economic and Infrastructural Policies of Berlin Technical University under the guidance of Professor Hans-Jürgen Ewers. The method used in the study – conjoint analysis – is applied in marketing research to find new products with significant sales potentials, thus serving to develop optimum products tailored to the needs and requirements of the customer. In this context the conjoint analysis method shows what combination of features a product must have in order to offer maximum customer benefits and, accordingly, trigger maximum purchasing motives. The underlying assumption is that the overall benefit of a product crucial to its preference over other products adds up from the partial, individual benefits and advantages of each feature.

The focal point of the study is what offers and conditions SHPT must provide in order to make a fundamental change in the means of transport chosen.



In other words: Under what conditions would the owner of a car leave his car at home and switch over to another means of transport or a combination thereof? The fundamental decision of a potential user for or against buying a car is indeed key to the market strategy pursued by a provider of public transport. For once you have your own car parked outside the front door, you will tend to use your car even when SHPT would certainly make sense. To the disadvantage of buses and trains, the car owner tends to consider alternative means of transport less often and less consistently.

Applying simulation calculations, Eckhardt seeks to determine under what conditions car owners might vary the means of transport they choose. In the process he also compares innovative concepts such as car sharing as well as intermodal offers combining short-haul passenger transport and car sharing with the use of one's own car, taking various levels of fixed costs into account: He subdivides the most important alternative performance features versus the passenger car into three levels, that is three combinations of price:performance in the case of SHPT (a higher standard of performance requiring a higher fare), while looking in the case of car sharing at the price involved and the distance to the next car sharing centre (500, 1000, 1500 metres). Focusing on the user's own car, on the other hand, the study applies various parking rates for parking space in great demand.

In the study, four random combinations of transport use were presented to test persons on a screen. The question was under what conditions provided by SHPT and car sharing do the test persons choose one of these options not requiring them to use their car and therefore saving the cost involved? The results of this computer-based survey among transport users in Berlin were rather disappointing: Whether a person prefers his own car or not is hardly influenced by the quality of SHPT and car sharing. Indeed, SHPT plays a certain role only in specific niches of the market and in the case of specific offers, car sharing being virtually rejected by people in Berlin. Even with restricted availability of parking space, people hardly change their attitude, most inhabitants of Berlin who show a preference for their car willingly accepting a dramatic increase in their monthly expenditure instead of giving up their car.

Interconnecting various means of transport, therefore, is not enough to replace car ownership. Probably, the reluctance on the part of motorists lies in all the planning and organisational effort required for the combined use of various means of transport, the simple emotional feeling of owning a car certainly also playing a role. Apparently, people regard the substantial expenditure of running a car as a kind of insurance premium guaranteeing them constant availability of their own vehicle at all times. So it remains to be seen whether the trend away from ownership towards "mere" use of a vehicle predicted so often will really materialise.

Carl Friedrich Eckhardt: *Abschätzung der Marktchancen innovativer Verkehrsangebote für den Personenverkehr in Ballungsräumen. (Assessing the Market Potentials of Innovative Options in Passenger Transport in Densely Populated Areas)* (doctor's thesis 2004)

The study will be published shortly on the website of Berlin Technical University (www.tu-berlin.de). It is also to be published within ifmo's series of internal reports.

Mobility in Everyday Life and Leisure Time

Mobility Behaviour in Everyday Life and Leisure Time

Discussing strategies for solving transport problems, people focus time and again on ways and means of avoiding and shifting transport. A common assumption in this context is that leisure time mobility is particularly appropriate for such strategies, since it is less obligatory in nature than non-leisure time activities and represents a large share in the overall volume of transport. Official transport statistics would seem to confirm this assumption, claiming that more than 50% of all passenger transport is for leisure time activities. However, this assumption fails to consider that this number is the residual figure or bottom line left over after many not clearly defined trips and journeys. This we see clearly from the definition of leisure time transport in official statistics: "Leisure time transport comprises all other trips and journeys not allocated to the other five types of trips and journeys already defined". These "other" reasons for transport are travelling to work, training and education, business and professional travel, shopping, and going on holiday.

There has been no analysis yet studying whether and to what extent everyday and leisure time mobility offer a potential for reducing the volume of transport. Precisely this is why Thomas W. Zängler, in his doctor's paper "Micro-Analysis of Mobility Behaviour in Everyday and Leisure Time Activities" supported by the BMW Group and published by ifmo in the year 2000, seeks to overcome or at least alleviate this situation.

Proceeding from a model household, Zängler, in an empirical survey, compiled data on the everyday mobility of private households in Bavaria for an individual analysis of everyday transport in terms of the type of transport, its scope and purpose.

The model subdivides the activities of private households into three areas: **gainful employment**, **pursuing one's livelihood**, and **transfer** (Fig 1):

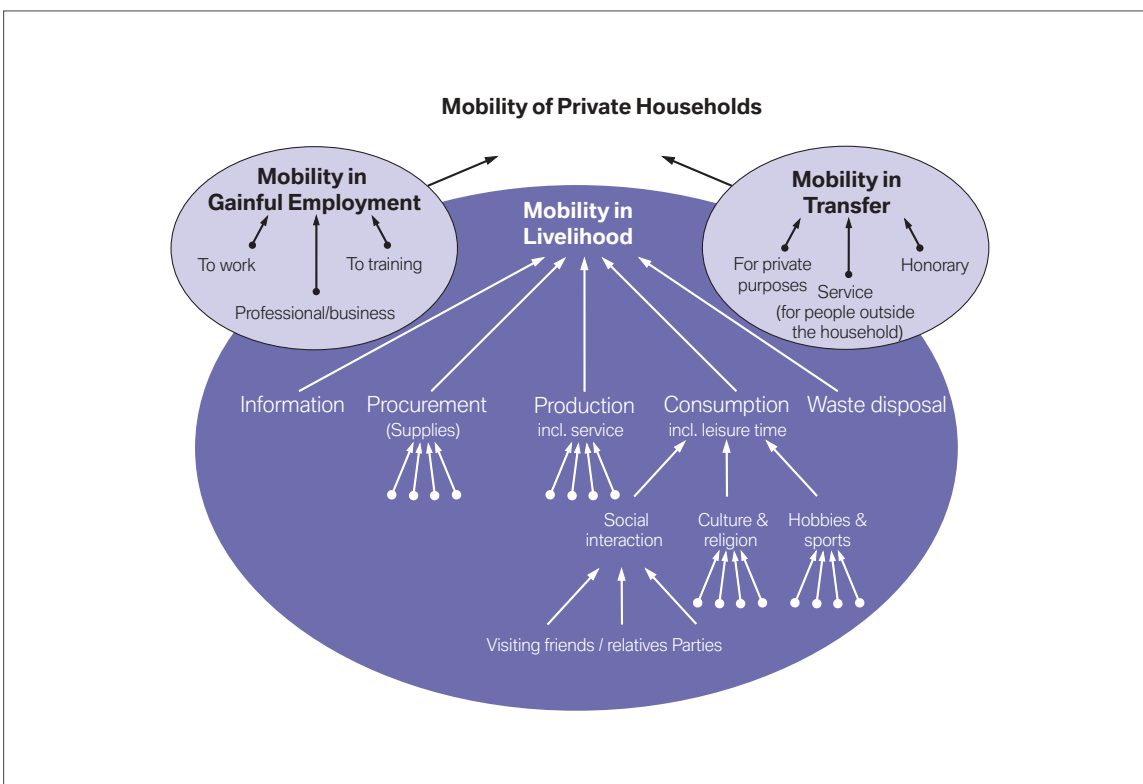


Fig 1: Different types of mobility in terms of activities and behaviour

- **Gainful employment** comprises all activities for earning an income today and tomorrow. Current employment primarily means job-related employment either as an employee or in a self-employed status. Earning an income in future includes education at school and vocational training of children and young people, further training for professional purposes, as well as general activities to secure one's future.
- **Pursuing one's livelihood** is the overriding sector comprising all activities serving the livelihood of a household. Using their income, the members of a household buy products, goods and commodities at shops and markets. Wherever such products are not yet ready for consumption, they are checked at home and consumed later. If they are ultimately not consumed at all, they will be thrown away and disposed of. To be specific, we distinguish here between information, procurement, production, consumption, and disposal.
- **Transfer**, finally, comprises all activities serving actively or passively to transfer money, goods and services. The recipients of such transfers are, say, other households, associations, clubs and parties.

Wherever such activities take place away from home, they require mobility and generate transport: Hence, we must distinguish in the case of households be-

tween gainful employment, pursuing one's livelihood, and transfer mobility.

Proceeding from these considerations, we are able to distinguish between leisure time and non-leisure time activities, together with the respective forms of mobility.

Defining "work" and "vocational activities" in a direct sense of the word (eg as gainful employment), we automatically obtain a broad concept of leisure time comprising the entire area of one's personal livelihood and transfer activities. Defining "work" and "professional activities" in a broad sense, on the other hand (eg work to earn money as well as work relating to, say, an honorary office), we automatically obtain a closely defined and limited concept of leisure time.

Another important distinction is between everyday and non-everyday life. Non-everyday activities are tantamount to vacation which, according to a common definition of transport, means leisure time trips involving more than three nights away from home. "Everyday activities", therefore, are times spent outside of such vacation periods.

Careful analysis shows a detailed and more varied picture of the integration of mobility in people's everyday lives, mobility so far regarded quite generally as "leisure time mobility", and factors influencing mobility behaviour.

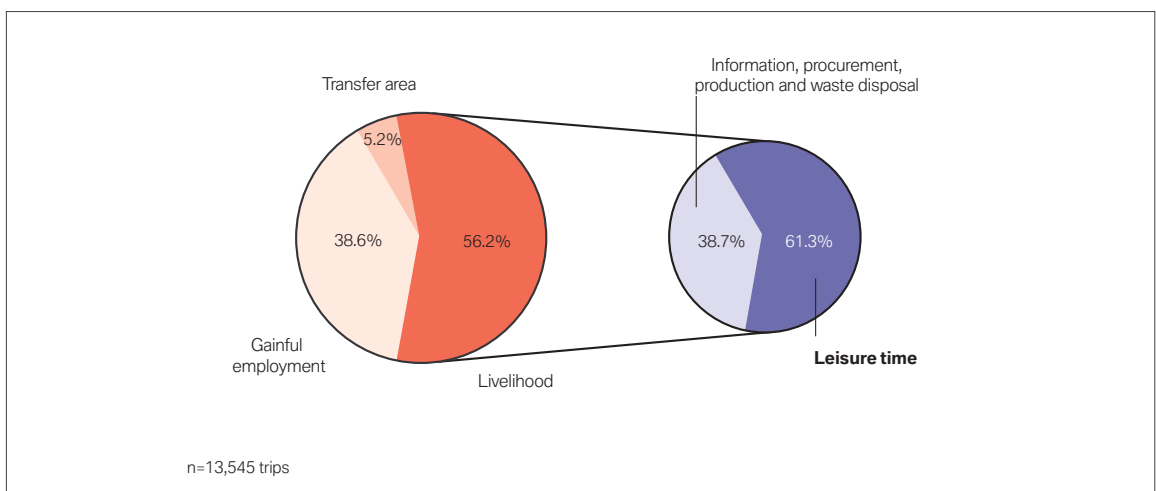


Fig 2: Cumulated distances by areas and groups of activities



Fig 2 provides an overview of the various areas of mobility in a household and the magnitude involved in each case:

Livelihood: approx 60 per cent of all distances covered.
 Leisure time: approx 60 per cent of the individual's total mobility in pursuit of his livelihood.

In other words, approximately one-third of a household's total mobility is attributable to leisure time activities (which, by definition, excludes holidays). We also find that mobility behaviour in one's everyday life and leisure time is very heterogeneous. It is a simple fact that "leisure time" is not a homogeneous "segment" when it comes to the reasons for travelling, the number of trips, the distances covered, the urgency to go away, and the choice of a specific means of transport (Fig 3).

In reality, therefore, leisure time mobility is borne out largely by the need for social interaction in a society characterised by individual lifestyles and mobility. Considering that social interaction is an essential

element of human life, we may claim that all leisure time travel required for social interaction is necessary and, indeed, obligatory. And that means more than half of all such mobility.

Following the almost dramatic collapse of the large and multi-generation family, leisure time mobility thus serves primarily as "social cement" holding society together. It is essential to consider this point when expecting an – optimistic – decrease in transport by inducing private households to change their (leisure time) mobility.

The study has been published as a book in the ifmo series of reports and is available at bookshops:

Thomas Zängler: Mikroanalyse des Mobilitätsverhaltens in Alltag und Freizeit. (Micro-Analysis of Mobility Behaviour in Everyday Life and Leisure Time). ifmo – Institute for Mobility Research (Publisher), Berlin, Heidelberg, New York 2000, Springer-Verlag. ISBN 3-540-66534-X

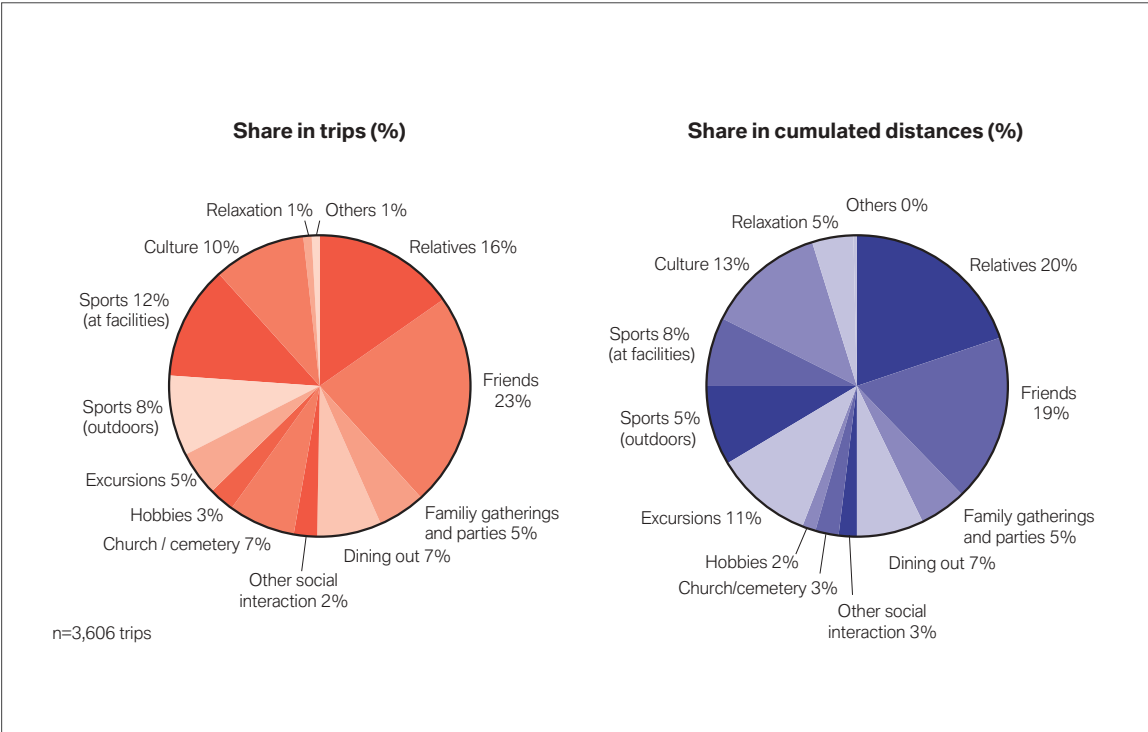


Fig 3: Travel and cumulated distances in leisure time by activities

We see from Zängler's study that leisure time mobility is not simply one and the same thing, but rather a highly complex, differentiated matter. Within this overall spectrum people's motives for mobility and, accordingly, the reasons for transport cover a range as diverse as life itself. People travel for happy and sad reasons, for altruistic or selfish motives just as much as they do for the requirements of everyday life. And at the same time leisure time transport is the fastest growing type of transport, requiring detailed study for this reason alone: How will leisure time

approach to research, transport and tourism policies. In terms of research, this means moving away from isolated, unrelated research activities within the "ivory tower" of individual disciplines generally seeking only to optimise specific functions and aspects, and moving over to a multi- and inter-disciplinary approach to leisure time transport and tourism research.

Conducting research of this kind, we must not be afraid of looking at things in their entirety: The only way to understand our modern world today is to carefully analyse the dynamics of mobility, while the only way to grasp the dynamics of mobility is to know the structures and logic processes of modern society.

Applying this to transport and tourism, we must come to terms with the fact that it is not as easy to control and mastermind the global megatrends in society and technology such as individualisation, globalisation or virtualisation as we would like it to be – which is certainly not good news in the light of the ecological problems we face today. So there will not be any universal solutions or a radical turnaround, but rather a whole range of small, intelligent, tailor-made solutions for individual target groups in their lifestyle.

On the second day of the conference four working parties took a closer look at the following aspects:

- Leisure time mobility in everyday life
- The rediscovery of nearby destinations in the city and countryside
- Long-distance tourism – a risk or an opportunity for sustained development?
- Virtual travel as a cultural experience

The event finally culminated in a research agenda stating the need for various requirements: Further empirical and descriptive studies providing a more precise survey of leisure time and holiday mobility in their current dimensions and manifestations, careful analysis of target groups as the starting point for developing specific transport services, and, in particular, ongoing empirical and theoretical research into individual motives.



The conference hosts (left to right): Dr. Kai-Michael Schellhorn (BMW Foundation Herbert Quandt), Frank Albrighton (University of Birmingham), Dr. Walter Hell (Institute for Mobility Research)

transport develop in future? What transport- and environment-related strategies are required to counter the potentially negative repercussions of leisure time transport?

Finding answers to these and similar questions was the objective of a conference of experts from politics, science and business organised by ifmo together with the BMW Foundation Herbert Quandt and the University of Birmingham in October 1999.

The conference clearly showed the enormous bandwidth and complexity of the subject. What we need in future – this was the "secret curriculum and outcome" of the conference – is a kind of common denominator holding this diversity together: We need a wholistic



Prof. Dr. Erwin K. Scheuch

It was agreed that to implement such an agenda we need new methods of study and investigation describing the complexity and heterogeneity of modern lifestyles and the conditions of life more appropriately than the conventional methods and models of transport research.

The results of this conference have been published within the ifmo series of reports and the publication is available at bookshops:

„Freizeitverkehr – Aktuelle und künftige Herausforderungen und Chancen.“ (“Leisure Time Transport – Current and Future Challenges and Opportunities.”) ifmo – Institute for Mobility Research (Publisher), Berlin, Heidelberg, New York 2000, Springer-Verlag. ISBN 3-540-67459-4



Prof. Dr. Horst W. Opaschowski

Series of Workshops on Leisure Time Mobility and International Tourism

Proceeding from this research agenda, the Berlin Scientific Centre for Social Research, working on behalf of ifmo, organised a series of four workshops on the subjects of leisure time mobility and tourism between December 2000 and October 2002. The objectives of these workshops were, first, to precisely determine the demand for further research and, second, to specify concrete options for further action. The results of the first two workshops held in December 2000 and October 2001 have been published within the ifmo series of publications under the title „Motive und Handlungsansätze im Freizeitverkehr“ (“Motives and Approaches to Leisure Time Transport”), with the results of the two subsequent events in May and October 2002 being published subsequently under the title „Erlebniswelten und Tourismus“ (“Worlds of Experience and Tourism”).


Leisure Time Transport

Taking the perspective of various scientific disciplines, the first workshop on the subject of Leisure Time Transport considered the motives of people “going somewhere” in their regular or weekly leisure time. The workshop combined aspects involved in this area with other fields of study such as applied psychology, socio-scientific research, and quantitative consumer research, while also applying a gerontol-

ogical and socio-geographical perspective. The highlights considered included studies on various styles of mobility and the reasons for leisure time mobility indicating the transport models and concepts to be developed for specific target groups, as well as a socio-economic model enabling researchers to describe and explain the mobility of private households. A further study on the motives of senior citizens in leisure time transport looked into a target group which, in the light of ongoing demographic development, will play an increasingly significant role in the world of transport. Finally, the workshop offered an insight into the phenomenon of large-scale leisure time facilities such as theme parks taking on increasing relevance in the development of leisure time transport (in terms of both quantity and quality).

Players and Possible Action

The second workshop “Players and Possible Action in Leisure Time Transport” examined the latest options and offers being developed in the leisure time market. Focusing initially on leisure time and encounter worlds as well as city tourism, the workshop discussed two segments of the leisure time market currently of particular relevance. Various leisure time strategies such as “artificial” leisure time and encounter worlds, including theme parks and event centres,



were examined for their generation of transport, as was a project linking various historical sites to form a “Renaissance Encounter World”. Then, applying the concept of geographical partnerships, specific approaches to the improved networking and cooperation of regions were also considered, looking in particular at the Berlin-Usedom Partnership and a network called “Alliance in the Alps”. Last but not least, the subject of “Event Transport” focused on the current development of transport offerings and the future strategies of transport providers in leisure time transport.

International Tourism

The third workshop examined the subject of “International Tourism” from various aspects ranging from general trends and determining factors in demand and supply through political and market-related control functions in the interest of sustainability all the way to the future significance of information and communication technologies used in tourism as well as specific concepts for activities in both tourism and mobility. One aspect considered was the development of new media in the world of tourism, another was the results of an empirical study on e-commerce and its effects on the travel market. Finally, two papers presenting examples of specific action concepts in tourism and mobility took the workshop from general debates to specific, practical action: These papers were on the “Mallorca World of Mobility and Encounters” research and demonstration project, which seeks to induce changes in mobility behaviour and vehicle technologies in the interest of environmentally-friendly and sustained mobility.

Leisure Time and Encounter Worlds

The fourth and final workshop examined a special segment of global tourism commonly referred to as “leisure time and encounter worlds”. The concept in this case was to compare conditions in the triad of countries formed by North America – Japan – Europe. This comparison of cultures was then supplemented by specific business administration and traffic planning aspects, encounter worlds being carefully examined as instruments of corporate communication and transport concepts for major leisure time facilities presented from the perspectives of regional and city planning.

The reports on these workshops have been published in two series of ifmo publications and are available at bookshops:

„Motive und Handlungsansätze im Freizeitverkehr.“
 (“Motives and Approaches in Leisure Time Transport”)
ifmo – Institute for Mobility Research (Publisher),
Berlin, Heidelberg, New York 2003, Springer-Verlag.
ISBN 3-540-44229-4

„Erlebniswelten und Tourismus.“
 (“Encounter Worlds and Tourism”) ifmo – Institute for
Mobility Research (Publisher), Berlin, Heidelberg,
New York 2004, Springer-Verlag.
ISBN 3-540-20261-7

Virtual Mobility

Virtual Mobility of Private Households: A Phenomenon Relevant to Transport?

New electronic technologies in information and communication, in particular the internet with its multimedia functions, allow people today to interact in global networks. This gives many people brand-new perspectives in telecommunications no longer requiring their physical presence at the same place and at the same time. Virtual communication thus breeds virtual mobility making purely physical mobility dispensable and ultimately allowing the individual to do without a “genuine” human partner in communication.

It is obvious what this may mean in our everyday lives: Without having to get off our chair in front of the PC, virtual mobility enables us to go shopping in a virtual mall, to meet in a chatroom, to download music, plan our trips, and so on and so forth. Whatever the reasons for such “virtual excursions” might be, they may well be able to dramatically change our mobility behaviour one day.

We hear time and again, for example, that the internet will reduce traffic or at least slow down the increase in physical mobility. Or will it mean exactly the opposite, networks of this kind generating even more traffic just like the telephone, where we once also hoped – in vain, as we know today – that it would cut down on our travel?

Online Banking, Online Travel Office, Online Chatting

The “Virtual Mobility in Private Households” research project conducted under the guidance of Peter Zoche in late 1998 by the Fraunhofer Institute for Systems Technology and Innovation Research (ISI) considers how virtual mobility may effect transport and the environment today and tomorrow. One of the highlights of the project was a representative empirical survey of internet users in Germany seeking to determine how growing orientation to and use of electronic offerings affects physical mobility behaviour. Can we expect a substitution effect? Or does an increase in virtual mobility also mean an increase in physical mobility and, accordingly, in the volume of transport?

These issues were examined by focusing on online banking, the use of online travel offers, and online chatting as typical examples, since these applications

in particular have a lot to do with mobility and are already used regularly by a large number of online users. While surveys focusing on such “early adopters” do not allow definite forecasts as to the future use of the internet for private purposes, we can at least determine under what conditions the internet is spreading and how it affects physical transport behaviour. A systematic documentation of this study has been available within the series of ifmo publications since 2002 under the title of “Virtual Mobility: A Phenomenon with Physical Consequences?”.

Contradictory Effects on Transport

Presenting empirical evidence, the authors of this study are able to prove that all of the three applications considered have an extremely contradictory effect on transport: We find both substitution and complementarity effects and repercussions. Taking the sum total of physical transport, we will presumably not see a significant reduction of overall mileage in the medium term, but rather partial substitution of the number of journeys.

Using online information for planning their travel activities, people benefit from the internet in particular as a medium for better advance information and selection, but do not use this tool so much for actually booking trips. In other words, they still go to a travel agent for their final decision and the actual booking process. And since the sheer number of travel options offered in the internet whets people's appetite for travelling, the final result is indeed an increase in transport: The reduction of visits paid to the travel agent by the customer is set off by an increase in holiday travel.



Peter Zoche

We find comparable processes in online banking comprising a large number of different activities. In all, we do not expect users to change entirely to online banking, since they still prefer to use many services personally at their bank. Online banking, therefore, does not serve to significantly reduce the volume of traffic, especially as people often combine visits to their bank with other activities, meaning that they go to the bank while “travelling around and taking care of business”.

Chatting likewise does not serve to reduce transport as a whole. The virtual contacts established in and through online chatting are far from able to replace the “real thing”, a genuine face-to-face encounter. Instead, a virtual chatroom is an independent medium supplementing existing options in establishing and maintaining contacts and enabling users to enter into new relationships, the chatter thus enhancing his social integration. The probability of actually meeting one's virtual counterpart increases with growing use of the system: Three-quarters of the respondents repeatedly went to personal meetings, in some cases

covering long distances to get there. So ultimately chatting creates new personal contacts and even expands the scope of mobility.

The study thus describes the relevance and possible repercussions of virtual mobility, showing that new, flexible use of online options points towards new patterns of behaviour. Further studies based on a broader empirical database must now describe this in greater detail.

The results of this study have been published in the ifmo series and are available at bookshops:

Peter Zoche, Simone Kimpeler, Markus Joepgen: *Virtuelle Mobilität: Ein Phänomen mit physischen Konsequenzen? Zur Wirkung von Chat, Online-Banking und Online-Reiseangeboten auf das physische Mobilitätsverhalten. (Virtual Mobility: A Phenomenon with Physical Consequences? On the Effects of Chatting, Online Banking, and Online Travel Offers on Physical Mobility.)* ifmo – Institute for Mobility Research (Publisher), Berlin, Heidelberg, New York 2002, Springer-Verlag. ISBN 3-540-41445-2

Effects of Virtual Mobility

The subject of “Effects of Virtual Mobility” was subsequently given further consideration in interdisciplinary discussions at an international conference (18./19.11.2002) held by ifmo. The objective was to discuss the findings and results established in the research project and to compare this information with the experience of other researchers, focusing in particular on input provided by experts from the USA, a country always a step ahead in the development of trends. The principal objective was to apply media information to the findings of traffic research – and the No.1 issue in this context was which mobility-related substitution and complementary effects result from the ongoing use of electronic online services.

The results of recent empirical studies confirm that such effects of the new media changing our patterns of mobility represent a complex process of development. Substitution and complementary effects interact with one another, they are included in the processes of action and regulations within society. The long-term quantitative effects of virtual mobility are closely connected to regular, habitual use of the internet. This is indeed a function of ongoing development in technology and the use of specific, preferred structures for various applications.

From Online Use to Changes in Behaviour

With this in mind, the first issue discussed was “From Online Use to Changes in Behaviour: A Comparison of Germany and the USA”, focusing on individual highlights of this development process. To judge the effects on mobility, it is important to know that users of the internet resort to mobility-related offers to an increasing extent, as they become more accustomed with the system. While use of the internet is spreading very quickly all over the world, the internet now having reached all sectors of human life, still a “digital divide” in Germany (and Europe), with large sectors of the population being far from interested in online offers which might actually integrate them in their world. Data presented by the US World Internet Report confirms that virtual communication does not make physical encounters redundant – on the contrary, over the years online relationships lead increasingly to personal face-to-face meetings. The internet therefore does not eliminate the stereotypical modes of behaviour in our physical world, but rather only creates an additional, virtual sphere.

Professor Miriam Meckel, State Secretary for Europe, International Affairs and Media in North Rhine-Westphalia, referring in her paper to new methods of mobile communication and their effects on society, also highlighted the interaction of technological change and new trends within society.

Specific Applications of Virtual Mobility

The second day of the conference and the second section of topics focused on specific applications of virtual mobility and their effects relevant to transport and the environment: Electronic trading and the changes it induces in the chain of value creation through new logistics and organisational structures, on the one hand, and remote learning, telework and e-government, on the other. The process of analysing how information and communication technologies affect the environment is indeed so complex that it initially requires detailed analysis of individual applications such as electronic shopping (in this case buying books) and its effects on the environment, the supply of food, as well as the messenger, express and parcel market. Indeed, the repercussions found both for the

individual and society as a whole cannot be covered by one single denominator, but rather prove to be extremely complex and in some cases even contradictory.

Precisely this is why the panel debate concluding the conference did not seek to present one standard or uniform result, but rather attempted to establish and gain new momentum from virtual mobility, presenting current challenges and opportunities in mobility research.

The papers presented at the conference are to be found in ifmo's series of publications and are available at bookshops:

Auswirkungen der virtuellen Mobilität. (Effects of Virtual Mobility) ifmo – Institute for Mobility Research (Publisher), Berlin, Heidelberg, New York 2003, Springer-Verlag. ISBN 3-540-20233-1



Prof. Dr. Miriam Meckel

The Future of Mobility

Research Project

The Future of Mobility – Scenarios for the Year 2020

Starting Point

Traffic has increased significantly in recent years. But the infrastructure required has not grown to the same extent. Measures required for maintaining and expanding transport systems have been neglected above all for financial reasons, but also due to the sheer duration and complexity of licensing procedures. In the light of the growing problems created in this way, debates on the pros and cons of traffic as well as the management of underlying conditions are constantly becoming more intense. But there are growing differences in opinion as to what should be done and with what priorities.

One point, however, is obvious: To maintain or even enhance the standard of living we have now achieved in Germany and Europe, we will require even more transport. Today, at any rate, it is still impossible to generate greater value without generating additional demand for transport in the process. The challenge we face in the decades to come, therefore, is to provide mobility and, at the same time, to reduce or even avoid its negative repercussions.

We do not have much time to set the switches for a successful future of mobility. But the decisions we now have to take are based on such a complex system of interacting factors that simple, cause-and-effect solutions are quite inadequate to describe reality. Hardly any other area of human life is as complex and dependent on as many factors as mobility, where the most diverse aspects – technology, the structure of the population, business, financial interests, the social context, individual wishes, and motivations – are linked directly to one another. The only answer, therefore, is to consider mobility in its entirety.

In close cooperation with the BMW Group, German Railways (Deutsche Bahn AG) and Deutsche Lufthansa AG, ifmo therefore launched a comprehensive research project in the year 2000 under the title: “The Future of Mobility in the Light of Changing Conditions”. Given its significance to society, this project is funded by the German Federal Ministry of Research.

Basic Method and Techniques

The study was compiled with the help of the Geschka Scenario Method, a technique developed in its basic principles at the Battelle Institute in Frankfurt in the '70s and consistently improved ever since. For reasons of simple and straightforward use, the study was initially limited to Germany and passenger transport.

Some 50 experts from all kinds of disciplines and institutions contributed their particular knowledge and skills to the study, among them population researchers, economists, sociologists, engineers, transport researchers from universities, as well as specialists from the business world, associations, research institutes, and business consultants.

Looking into the Future from the Perspective of the Expert

The approach taken led to two scenarios, both describing the situation in the year 2020 resulting in the first case from an active policy (“Action Scenario”), in the latter case from a reactive policy (“Reaction Scenario”). The projections in both scenarios differ significantly only on a few points and areas of influence, such as economic development, national and European transport and structural policies, development of the population, as well as concepts of mobility. But the surprising result is that these few deviations are enough to generate extremely different results overall. So we see that the influence of politics, values and market mechanisms must not be underestimated. And the bottom line for mobility of the future is that we need “Action”, not “Reaction”.

The “Reaction Scenario” assumes an extremely reserved and reluctant policy as well as a general mood of resignation paralysing all transport policies. It assumes that due to difficult economic times in Germany, major decisions required to handle the increase in transport without significant problems are neglected up to the year 2020. Whenever confronted with issues of mobility and transport, politicians and economic leaders act only under immediate pressure. As a result, the situation in Germany, looking at the year 2020, is pessimistic. Indeed, it may be described as an ongoing process of aggravation, with things going from bad

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to worse:

Motorised individual transport still dominates the transport scene, the car remains status symbol No.1 – the volume of traffic has increased significantly and fuel prices have doubled. Since all attempts to introduce car toll have failed for political reasons, road construction and the introduction of traffic guidance systems have been deferred due to lack of money. Only the technical facilities and equipment available have improved. But while road users, benefiting from improved telematics, are able to call up traffic information virtually in real time, they are still unable to escape traffic congestion due to inadequate expansion and modernisation of the road network. On a national level, politicians merely “fill gaps” here and there in order to avoid a total collapse of traffic, and on a European level there is still no standard, uniform set of measures and activities. Plans for public short-haul passenger transport, new and more efficient rail or air connections have not become reality. For economic reasons, on account of increasing parking rates, or due to stricter access rules, an increasing number of people has to rely on public short-haul passenger transport. But the image of such transport systems has not improved. Competition in the transport markets is developing only slowly, since the Federal Government, the States and the communities, being required to promote competition but also being the owners of or partners in transport systems, face an obvious conflict of interests.

While demand for air traffic has increased, airport capacities have not been developed sufficiently to keep up with this demand. The results are delays, long waiting times and hold patterns. This proves beneficial for the railway system, which has now become the biggest competitor for the airlines on journeys of up to three hours. But even the railways cannot replace the car in its popularity.

In all, the outlook at the transport scenario in Germany in the year 2020 is rather pessimistic: We face even more serious congestion, greater environmental problems, and high costs also to the economy.


The more optimistic “**Action Scenario**” regarded by the experts involved as particularly convincing, shows that mobility in future will depend largely on politi-

cians acting instead of reacting: This scenario assumes a generally positive development of the economy and society, with appropriately positive effects on mobility as a whole. The volume of traffic, while increasing dramatically in this projection, is appropriately handled by far-reaching transport policies and decisions on both national and European level. So although the transport situation will not really become any calmer than today, mobility and transport, contrary to what we see in the Reaction Scenario, achieve and maintain a relatively high level of quality.

The decisive factor for maintaining such quality of transport despite growing demand is the substantial enlargement and modernisation of our transport infrastructure financed by a widespread system of road toll. And with transport policies being coordinated Europe-wide (and therefore overcoming individual national interests), railbound transport is no longer obstructed by national borders and airlines benefit from an open-skies policy as well as the enlargement and modernisation of airports for long-distance travel. Deregulation and modernisation of railbound transport, in turn, ensure increasing growth rates, new express train lines reducing the volume of domestic air traffic and providing more slots for international connections.

Improved road traffic control technologies prevent the situation from becoming even worse on our roads: With the help of their mobile phone, consumers are able at any time to compare departure and arrival times, fares and other costs, travel times and general transport conditions when travelling by car, aircraft and/or train. Galileo, the European satellite system, improves traffic guidance and networking, further innovations in technology also enhancing the management of transport. Internet-based work and entertainment options make travelling by train and plane more attractive. Even the individual states and communities have fortunately avoided insular solutions in public short-haul passenger transport, transport providers being properly networked and everybody benefiting in the process.

Given this situation, many consumers have become more pragmatic in choosing their means of transport and determining their travel itineraries. Many travellers first calculate the cost of their trip and then take the appropriate decision. And the more emotional



relationship to the automobile people have felt for so many decades has now become more sober and straightforward.

Even though the volume of transport has increased dramatically – by 20 per cent in passenger transport and up to 90 per cent in goods transport versus the year 2000 – the overall consumption of energy in transport, as well as noise and airborne emissions, have remained largely the same as in the year 2000. This is the result of innovations in technology reducing the level of specific emissions and, in particular, the result of smoother traffic conditions thanks to the improved infrastructure.

Summary and Outlook

The most significant conclusion to be drawn from this project is not surprising: We will be able to maintain our current level of prosperity in economic and societal terms only by providing adequate conditions for mobility and transport.

The results make it quite clear that we need only a few decisions, but they must be the right, essential decisions at the right time to guide the process of development in one or the other direction in the long term – either towards a complete collapse of transport or towards a well-functioning transport infrastructure in future. The areas of action involved are however difficult and complex in some cases, for example the need to harmonise political conditions within the EU.

Other factors are also crucial to the development of transport and mobility in Germany, but are difficult to influence through politics alone. These include demographic developments or the dominating concept of mobility in society. Aspects of this kind can only be influenced very indirectly in the long term by changing general conditions and the overall framework. This makes it all the more important to influence these factors in good time and in the right way through political and economic decisions. To benefit in full from the study, the intention is to maintain a regular dialogue with decision-makers in politics, the world of business, science, and society. If we succeed in this way in initiating political action or preventing counter-productive decisions, the project would have successfully reached

one of its essential targets.

The scenarios and their contents will be regularly updated as of the year 2004. A comparison with developments in the preceding years will then show where the outlook at the year 2020 has to be corrected. These results will again be made available to the responsible decision-makers in politics, business and associations as well as scientists and researchers, hopefully leading to further discussions.

The results of this study were officially presented to some 300 invited guests from the worlds of politics, science and business in Berlin on 12 December 2002. On the occasion there was also a panel discussion on the subject of mobility in future, the participants being Wolfgang Mayrhuber, at the time Deputy Chairman of the Board of Management of Deutsche Luft-hansa, Hartmut Mehdorn, Chairman of the Board of Management of German Railways, Dr. Helmut Panke, Chairman of the Board of Management of BMW AG, Dr. Uwe Thomas, at the time State Secretary in the German Federal Ministry of Research, as well as the Director of ifmo, Dr. Walter Hell.

Reports on the ongoing progress of the project are presented regularly on the Institute's website, and a complete version of the study is available free-of-charge at institut@ifmo.de. The publication provides an exact description of the scenario method used as well as all initial data compiled in the Experts Workshops (on a CD-ROM).



Handing over the Scenario Study at the German Federal Ministry of Education and Research (left to right):
Hartmut Mehdorn, Chairman of the Board of Management of Deutsche Bahn AG
Wolfgang Mayhuber, Deputy Chairman of the Board of Management of Lufthansa AG*
Dr. Walter Hell, Director of the Institute for Mobility Research
Dr.-Ing.E.h. Uwe Thomas, State Secretary at the German Federal Ministry of Education and Research*
Dr. Helmut Panke, Chairman of the Board of Management of BMW AG

(* Function at the time of the event)

Scenario Dialogues

The express objective of the Future of Mobility Project from the start was to use the scenarios developed as the foundation for talks with representatives of politics and the business world (Scenario Dialogues). Publishing, disseminating and explaining the results were therefore the highlights of the Institute's activities in 2003.

- 23.05.2003 **Discussion round with representatives of the CDU Hessen Parliamentary Group** Wiesbaden
- 01.07.2003 **Discussion round with the Transport Working Party of the CDU/CSU German Parliamentary Group**
- 17.07.2003/
27.11.2003 **Presentations at the Siemens Forums** in Munich and Berlin
- 09.10.2003 **Presentation at the VDI Transport Forum**, Brunswick
- 26.09.2003 **Discussion round with the Hanns Seidel Foundation**, Wildbad Kreuth, Bavaria
- 13.10.2003 **Discussion round with representatives of the German Federal Ministry of Transport, Building Construction and Residential Housing**, representative of the Fundamental Policies Department
- 14.10.2003 **Discussion round with the Transport Working Party of the FDP German Parliamentary Group**
- 15.10.2003 **Parliamentary evening with representatives of the SPD German Parliamentary Group**
- 22.10.2003 **Discussion round with representatives of the Bündnis90/DIE GRÜNEN German Parliamentary Group**
- 23.10.2003 **Workshop: The Future of Mobility – Options for Action and Obstructions from the Perspective of the Transport Provider**

The subject matter was also presented and discussed at a number of events within the BMW Group.

We will continue these communication activities in future. The significance of this subject matter is borne out clearly by the fact that more than 2,000 copies of the study have been requested since its publication. Currently we have the third edition in German and the first edition in English.

Goods Transport in the Year 2025

In its subject matter and geographical coverage “The Future of Mobility – Scenarios for the Year 2020” Study is restricted to passenger mobility in the Federal Republic of Germany. Accordingly, both goods transport as well as EU policies were considered only as “additional” factors influencing the mobility of passengers. However, the need has been expressed repeatedly in all discussions on the scenario to conduct a similar examination of goods mobility and its ongoing development, taking European factors into account. For it is precisely in this area that we anticipate the largest growth rates in the next 20 years.

ifmo has already responded to this proposal by initiating a scenario project dedicated exclusively to goods transport against the backdrop of European enlargement. Now, in addition to the BMW Group, German Railways and Deutsche Lufthansa, MAN Nutzfahrzeuge AG has also joined the project team. The intention is to combine the results of this new study with the results of the scenarios already examined, thus presenting an overall transport scenario for the Federal Republic of Germany.

In methodological terms the goods transport study under way since October 2003 follows the scenario project on passenger transport, referring, inter alia, to the following questions and aspects:

- What is the influence of cross-border transport and international standards on the future development of transport?
- What is the role and significance of ship transport?
- How is the enlargement of the EU to the East (continuing a further step by the year 2020) changing the type of goods transported from, to and through Germany? What effects does this have on the means of transport, transport mileage and transport routes?

The assessment of future developments in this area is being discussed by experts in a number of interdisciplinary workshops, with the results being recorded for further use. As far as they are feasible and justified, different and even contradictory projections should not be diluted, let alone suppressed by a compromise, but should rather be taken into account by way of alternative development options. Particularly the diversity of trends considered ensures a high standard of reliability in the forecasts made, which obviously face a certain challenge to their accuracy considering the period of approximately 20 years covered.

The Passenger Transport Scenario updated by that time and the Goods Transport Scenario currently in progress are to be presented to the public in spring 2005.

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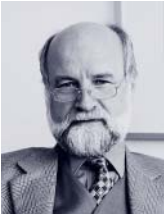
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Publications

G. Dinse: „Wasserstofffahrzeuge und ihr Funktionsraum“ (“The Hydrogen Car and its Function Scenario”) ifmo – Institute for Mobility Research (Publisher), Berlin 1999, (ifmo studies), in-house publication. ISBN 3-932169-07-7

F. Steinkohl, N. Knöpffler, S. Bujnoch:
„Auto-Mobilität als gesellschaftliche Herausforderung“ (“Auto-Mobility as a Challenge to Society”)
Institute for Mobility Research (Publisher), Berlin 1999, Herbert Utz Verlag. ISBN 3-89675-917-5

G. Dinse: „Akzeptanz wasserstoffbetriebener Fahrzeuge“ (“Acceptance of the Hydrogen-Powered Vehicle”) ifmo – Institute for Mobility Research (Publisher), Berlin 2000, (ifmo studies), in-house publication. ISBN 3-932169-20-4

T. Zängler: „Mikroanalyse des Mobilitätsverhaltens in Alltag und Freizeit“ (“Micro-Analysis of Mobility Behaviour in Everyday Life and Leisure Time”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2000, Springer-Verlag. ISBN 3-540-66534-X

D. Bruckmann, U. Nehren, V. Rieken, J. Schönharting, K. Stöcker: „Untersuchungen der Auswirkungen ausgewählter politischer Entscheidungen auf Verkehr und Umwelt“ (“Examination of the Effects of Selected Political Decisions on Transport and the Environment”) ifmo – Institute for Mobility Research (Publisher), Berlin 2000, (ifmo studies), in-house publication. ISBN 3-932169-24-7

Institut für Mobilitätsforschung:
„Freizeitverkehr – Aktuelle und künftige Herausforderungen und Chancen“ (“Leisure Time Transport – Current and Future Challenges and Opportunities”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2000, Springer-Verlag. ISBN 3-540-67459-4

Peter Zoche, Simone Kimpeler, Markus Joepgen:
„Virtuelle Mobilität: Ein Phänomen mit physischen Konsequenzen?“ Zur Wirkung der Nutzung von Chat, Online-Banking und Online-Reiseangeboten auf das physische Mobilitätsverhalten (“Virtual Mobility: A Phenomenon with Physical Consequences? On the Effects of Chatting, Online Banking, and Online Travel Offers on Physical Mobility Behaviour”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2002, Springer-Verlag. ISBN 3-540-41445-2

Institut für Mobilitätsforschung: „Motive und Handlungsansätze im Freizeitverkehr“ (“Motives and Approaches in Leisure Time Transport”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2002, Springer-Verlag. ISBN 3-540-44229-4

Institut für Mobilitätsforschung: „Zukunft der Mobilität – Szenarien für das Jahr 2020“ (“The Future of Mobility – Scenarios for the Year 2020”) ifmo – Institute for Mobility Research (Publisher), Berlin 2002, (ifmo studies), in-house publication. ISBN 3-932169-25-5

Institut für Mobilitätsforschung: „Erlebniswelten und Tourismus“ (“Encounter Worlds and Tourism”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2003, Springer-Verlag. ISBN 3-540-20261-7

Institut für Mobilitätsforschung: „Auswirkungen der virtuellen Mobilität“ (“Effects of Virtual Mobility”)
ifmo – Institute for Mobility Research (Publisher), Berlin 2003, Springer-Verlag. ISBN 3-540-20233-1

Events

1999

Kick-Off Event: Research for a Mobile Future

Berlin, 28/29 January 1999

Discussion Series: Auto-Mobility as a Challenge to Society

Munich, May 1998 – February 1999

Experts Workshop: Effects of Political Decisions on Transport and the Environment

Berlin, 17/18 May 1999

International Experts Conference on Leisure Time Transport

Berlin, 01/02 October 1999

2000

Experts Workshop: Acceptance of Hydrogen and Hydrogen Technologies

Berlin, 28 November 2000

Experts Workshop: Leisure Time Transport – Theoretical and Empirical Motives Research from the Perspective of Various Disciplines

Berlin, 12 December 2000

2001

Experts Workshop: Players and Action Principles in Leisure Time Transport

Berlin, 02 October 2001

2002

Experts Workshop: International Tourism

Berlin, 07 May 2002

Experts Workshop: Leisure Time and Encounter Worlds

Berlin, 22 October 2002

International Experts Conference on Virtual Mobility

Berlin, 18/19 November 2002

Presentation of the Results of “The Future of Mobility” Scenario Project

Berlin, 12 December 2002

2003

**Scenario Dialogue with Representatives of the CDU Hessen
Parliamentary Group**

Wiesbaden, 23 May 2003

**Scenario Dialogue with the Transport Working Party of the
CDU / CSU German Parliamentary Group**

Berlin, 01 July 2003

**Scenario Dialogue with Representatives of the German Federal Ministry
of Transport, Building Construction and Residential Building**

Berlin, 13 October 2003

**Scenario Dialogue with the Transport Working Party of the
FDP German Parliamentary Group**

Berlin, 14 October 2003

**Scenario Dialogue with Representatives of the SPD German
Parliamentary Group – Parliamentary Evening**

Berlin, 15 October 2003

**Round of Talks with Representatives of the Bündnis90 /
DIE GRÜNEN German Parliamentary Group**

Berlin, 22 October 2003

**Scenario Dialogue with Representatives of various Transport Providers
Workshop “The Future of Mobility – Options for Action and Obstacles from
the Perspective of the Transport Provider”**

Berlin, 23 October 2003

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