

Why Do People Drive from A to B?

If you want to design the transport of the future, you need to understand why people travel and transport their goods.

The DLR Nachrichten interviewed Professor Barbara Lenz, Head of the Institute of Transport Research at the German Aerospace Center (DLR) in Berlin.

Professor Lenz, you came from the University of Stuttgart to the DLR in Berlin five years ago – was this because of transport?

If you like, yes. Researching transport is a highly interesting and challenging task. Transport is an indicator for the complex interaction of very different processes, of objective and subjective needs and necessities, of causes and their effects. To investigate why transport is this way or that, to question the connections between economic development and the need for transport, to analyze human behavior, that is all very appealing to an economic and social geographer. And transport in Berlin, if that is what you are referring to, has many advantages ...

... And they would be?

The public transport services are excellent. You can usually do your shopping close to where you live. The road and pathway network in Berlin is also very well laid out for pedestrians. I really like living in Berlin.

The great Berlin naturalist and globe-trotter Alexander von Humboldt would have bequeathed many more discoveries if he had been able to get from A to B more quickly. Back then, there was a lack of well-designed roads and paths and there was no fast means of transport. 200 years later, we have both and we are increasingly spending our time in traffic jams. Is the path of the mobile society leading to a dead end?

It was only during the industrial revolution that peoples' traveling area fundamentally changed – naturally also that of goods – and not only for especially privileged individuals or those that were particularly thirsty for knowledge, but rather for a continually growing number of people. In other words, people are now traveling not only faster and further, but also more people are traveling. And they are not only doing this for special occasions but on a daily basis – be it going to work, to school, for leisure or other purposes. If we want to answer the question of future mobility, we need to investigate why people travel from place to place and how they

get there. Only then are we able to think about how this can be planned. How can transport be controlled? I see this positively. Transport is certainly a variable that can be influenced. Other possibilities than the dead end are available, we just have to find them and make them accessible.

How, for example?

Car traffic jams can be countered with an attractive public transport system. Shopping facilities around the corner, which can be easily reached on foot, reduce traffic. A good infrastructure for bicycles – a continuous cycle path network, multi-story bicycle parking garages and other parking facilities, for example, like in the city of Münster – creates the possibility of making the city accessible by bicycle. I see various solutions here. There is no one model that effectively leads to the target everywhere to the same degree. You need to deal with the structure of the city, understand the system and reflect the use of space and traffic development in terms of the social and individual needs.



How is a comprehensive understanding of the transport system achieved?

First of all, through surveys and by analyzing data and traffic flow surveys. Secondly, through models that depict, for example, the movements of all sections of the population of Berlin on a typical working day – we call this “transport demand”. By using empirically analyzed behavior with the aid of mathematical formulas to depict real life, we can find out how people behave and potentially change their behavior. To what extent do people allow themselves to be guided through traffic by a navigation device? How will the need for mobility and traffic behavior change when people get older? Here, at the Institute of Transport Research, we focus above all on what is known as “microscopic modeling”. This focuses on individual people and therefore enables detailed statements about changes in transport demand and the reasons for this, be it through the targeted exertion of influence or through new general conditions. Such questions are: What traffic flows are created when people change their activities, for example, through the increase of job-related trips? What means of transport are used for this? What is the reaction to measures such as charging parking fees in the city center? And in general: How does transport demand change if new costs are created or if the costs are distributed differently?

The density of traffic flows is continuing to increase. Town planners, traffic control centers, legislators and other political decision-makers expect help from transport research for making decisions in order to be able to also

guarantee mobility in the future. In your opinion, what are the most important questions that need to be answered?

In addition to an even better understanding of the way in which passenger and commercial traffic functions and the factors that influence this, there are currently two main questions when it comes to transport. First of all: How can transport be better designed, more fluid and more environmentally friendly? We are working very intensively on the question of what contribution both technology and politics can make towards reducing the impact of transport on people and the environment. We were therefore commissioned by the Deutsche Verkehrsforum (German Transport Forum) to draw up a “Transport energy and emissions balance”. Here, we were able to show, among other things, that the technological potentials relating to cars in terms of energy requirement and CO₂ emissions at best lead to a form of compensation for the growing level of traffic. We worked on the basis of the traffic growth rates that have been calculated by other renowned institutes in modern trends and scenarios. Furthermore, we are cooperating on projects that are aimed at reducing the consumption of energy and emissions. A particularly interesting example is the “Driving Style Manager,” which is aimed at reducing energy consumption in rail transport – it’s not only car drivers that can conserve energy when driving, train drivers can also learn this! The second important question is: How can transport demand be appropriately met in a society which is getting older? In 20



Professor Barbara Lenz has been directing the Institute of Transport Research at the DLR in Berlin since the beginning of 2007.

years' time, nearly a third of road users will be older than 65. The number of elderly road users is increasing. At the same time, the number of young people is decreasing and there are less people that are gainfully employed. As a result, the requirements placed on commuter traffic, on the vehicles and assistance systems as well, and on the entire transport system are changing. In order to be able to react to this process in good time, forecasts are necessary that estimate the long-term developments and incorporate as many traffic development elements as possible.

Speaking of commercial transport, being able to transport goods as inexpensively as possible can decide

the success of a company. This can lead to conflicts of interests with passenger transport or protecting the environment. What role does commercial transport play in the work of your institute?

It is one of the two profile lines of our research. Until now, freight transport has only been examined very generally. We still know too little about the conditions that induce a company to transport their goods using this method or that, with or without intermediate storage, with or without changing means of transport. That is why we are investigating what decision-making rules are used by companies when it comes to dispatching their goods. We are gathering data from companies sur-

veyed in the producing sector and the service sector. By analyzing and evaluating this data and applying the data in microscopic modeling, we produce reliable statements and forecasts on commercial transport and its future development.

... To answer which questions?

What role do delivery criteria such as delivery time windows or delivery quantities play in the choice of transport mode? Or: Under what circumstances do companies shift their goods transport to the railways? What about service-related transport? There is hardly any data on this subject. In this field of research, we are working closely together with other research institutes, for

► Clearing House for Transport Data



example, with the Institute of Applied Transport and Tourism Research in Heilbronn and the Research Institute for Telecommunications in Dortmund. Together with these partners, we create a solid data foundation and, at the same time, develop concepts suitable for the practice regarding the efficient handling of transport that is necessary for performing services.

In the car-dominated country of Germany, mobility is without doubt an issue that affects many people? but mobility is not only a national problem ...

No, not at all. Rapidly growing metropolises around the world, for example, in Latin America, have



entirely different problems. We are therefore cooperating as part of the joint megacity project "Risk Habitat Megacity," which is run by the Helmholtz Association. We are investigating what political transport decisions need to be made today in these megacities to develop alternatives to automotive growth or to counteract the critical air pollution conditions. In cooperation with scientists from two universities in Santiago de Chile, we are utilizing the TAPAS travel model developed at the Institute of Transport Research. TAPAS is the abbreviation for "Travel Activity PAttern Simulation". In the model, interactions within the complex megacity system can be depicted and analyzed. Measures such as the introduction of

Transport research requires a considerable amount of detailed information on traffic movements. Empirical studies and measurement campaigns are accordingly extensive and varied. Many relevant datasets are often only known to a small group of well-informed users or their application potential is limited because the survey methods are not documented well enough. The clearing house of the DLR closes these information gaps, qualifying itself as a central point of contact.

In the transport data archive of the DLR, detailed meta-data is provided as well as notes on possible uses and sources. Furthermore, access to the data itself is facilitated. This includes, for example, the "MiD 2002" survey commissioned by the Federal Ministry of Transport, Building and Urban Affairs on the daily mobility of private households. Germany-wide, 25,000 households containing over 61,000 people were surveyed. The answers to around 40 questions provide an indicative picture of the socio-economic conditions of the people and their actual mobility behavior. For example, reports about 167,000

roads were compiled. The services offered by the clearing house are targeted at the entire transport research community, which includes both organizations who gather transport-relevant data and those who wish to use the results of this research. The above includes engineering firms and planning authorities as well as academic institutes. ■

Angelika Schulz

Questions about mobility? – The DLR transport data archive has answers.

Contact:

<http://www.clearingstelle-verkehr.de>
info@clearingstelle-vekehr.de

city center road tolls are assessed in terms of their effect before they are even implemented. This provides support for the decision-makers at the megacity's urban and transport planning departments and, at the same time, reinforces acceptance of the use of tools for sustainability management.

Back to Germany now: What is the situation with the transport of the future? What is the outlook for mobility in 2020?

We will need to make use of our immediate environment again for daily life. We will have to learn that geographical flexibility has its value and that this value cannot be taken for granted. Mobility will in all likelihood

become more expensive, for both the individual and society as a whole. Modern, environmentally friendly vehicles will certainly become more expensive, but bicycle paths or truly pedestrian-friendly sidewalks of course also have their price. And we need to consider all those involved in transport far more than we do now. Currently this is only just starting. We are quite rightly placing our trust in new technical solutions, but we should always bear in mind that the real development of individual wishes, needs and preferences will be shaped by both people and companies.

What does that mean for your institute?

That we will continue to follow the system research path on which we

have started, we will create qualified analyses, improve modeling and focus on the transferability of our work right from the outset. We can make the added value which lies in complementary in-house DLR research even more fruitful.

DLR Transport Research also works intensively on new vehicle concepts, on driver assistance systems and investigates the environmental impact of transport. To do this, other institutes often use large-scale systems. The "large-scale systems" of the Institute of Transport Research are called analysis and modeling. To assess future requirements that will be placed on transport and to develop solution concepts? these

► Mobile Seniors

The message from the demographers has finally been received loud and clear everywhere: Germany's population is decreasing. The population structure is changing. In future, there will be more elderly people among them an increasing share of "elderly seniors", i.e., people aged 80 and over. Therefore, the basic general conditions are changing in nearly all areas of society and thus also transport. What are the implications when an ever-increasing number of elderly people have an influence on traffic movements? What is the outlook for the mobility of the elderly in the future? These are questions to which scientists at the DLR Institute of Transport Research are seeking the answers.

Already today, senior citizens are more mobile than in any other generation before. This is thanks to generally better health, a rising life expectation and an increasing

number of driver's license holders, in particular among elderly women. But the trips made by senior citizens are less and shorter. Once they enter retirement age, there is no more commuting to work and the distances that are covered decrease. Instead, elderly people go shopping more frequently and undertake more leisure trips – "getting out and about" is thus of increasing importance. It appears that they generally keep to the mobility they have "learned". If they often used to take the car, people will also barely leave the car in the garage when they are retired.

Nevertheless, the mobility of the elderly in the future is difficult to predict. It can be expected that in 20 years' time, senior citizens will be even more mobile than elderly people today. Key determinants for the number of kilometers that a person travels in a given period of

are the challenges to which we are finding answers and with which we contribute both towards scientific progress and towards solving concrete problems. ■

The interview was conducted by Cordula Tegen, Editor at DLR Corporate Communication.



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time are driver's license ownership and car availability. While in 2002, in the 60- to 65-year old group, 82 percent already had a driving license, in the group of over 80-year-olds only 42 percent were entitled to drive a car. When, in 20 years' time, the current group of 60- to 65-year-olds is over the age of 80, then 82 percent will have a driving license – which is almost twice as many as today. It is particularly striking that this so-called "catching-up motorization" is above all attributable to women. While large gender-specific differences exist in today's older birth year cohorts – the number of men with a driver's license is significantly higher than among women – these differences will be brought in line with each other.

But the elderly of the future will not only hold a higher percentage of driving licenses, they have also been more mobile all their lives than today's senior citizens. And they have clearly distinct habits, particularly with regard to

overcoming distances. Changing family structures, such as the increase of single households in which over-proportionally many trips are made, are having an effect on transport demand.

The general development of car mobility has led to the coining of the term "Society on Wheels". Transport and social scientists are unanimous that the "Society on Wheels" will become a "Graying Society on Wheels". By analyzing already identifiable behavioral changes and their implementation in microscopic transport demand models, the Institute of Transport Research has developed scenarios that illustrate the influence of demographic change on transport development, making an important contribution towards transport forecasting and especially towards ensuring the mobility of elderly people. ■

Anne Klein-Hitpaß

More and more elderly citizens are becoming road users – either with motorized means or on foot – this is something which city and transport planners need to take into account.

