The Mobility Pass for Residential Real Estate – an Instrument to Calculate Mid- and Long-Term Mobility Costs of Real Estate Decisions

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1 ABSTRACT

The "Mobility Pass for Residential Real Estate" offers the possibility to calculate mid- and long-term costs (in terms of money, time, CO_2 emissions, accident risk) associated with the place of residence to be evaluated. It concentrates on both the real estate buyers or tenants and the real estate market. It applies where traffic and "forced" mobility occur and where the place of residence is chosen, and it offers a positive contribution to more conscientious mobility behaviour. The development of a „Mobility Pass for Residential Real Estate" is part of the research programme "ways2go", financed by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT) as the programme owner (Programme management takes over the Austrian Research Promotion Agency - FFG). The stand of research and development of a "Mobility Pass for Residential Real Estate" is at the beginning. Therefore this paper is seen as an introduction to the complex themes, which will be evaluated within this research project.

2 INTRODUCTION: THE CHOICE OF RESIDENCE AND THE EFFECTS

About 10 % of the population living in Austria is moving every year from one apartment or house to a new one, in 2008 that was about 875,000 persons. The choice of a place of residence is usually an important, long-term decision requiring a high level of investment capital. It is no exaggeration to say that the choice of residence or place of operations is one of the most important decisions for people and firms. With this in mind, such decisions should be considered together with their consequences. Moreover, such local decisions provide the basis for mobility behaviour as it is illustrated by the Table 1 below:

Maturity	Relevant Traffic Decisions
Short-term	- The usage of a vehicle for ways to go - Location of flexible objectives (for example shopping, leisure)
Mid- to long-term	- Location of inflexible objectives (for example workplace) - Vehicle ownership - Location of residence

Table 1: Maturity of relevant traffic decisions of households (Source: Bauer U., Holz-Rau Ch., Scheiner J. in "Standortpräferenzen, intraregionale Wanderungen und Verkehrsverhalten – Ergebnisse einer Haushaltsbefragung in der Region Dresden", Page 267)

The broad mid- and long-term consequences of local decisions are not well calculated by most people. All too often, decisions are made based on a real estate object that appears attractive from the standpoint of price and living qualities without considering the consequences associated with long commuting times or "forced" mobility both for work and leisure travel.

When buying a car, it is commonplace for people not only to consider the price, but also the mileage figures. The "Energy Pass for Real Estate" is an important instrument in Austria for improving conscientiousness in terms of operational costs and environmental impacts of housing. With the "Mobility Pass for Residential Real Estate", a tool will be developed that will allow users to realistically assess the mid- and long-term effects of choosing a place of residence. The target audience is on the one hand, the buyers or tenants – people seeking a residence – and on the other hand, the real estate agents who can offer a higher level of service quality.

3 OBJECTIVE OF THE RESEARCH AND DEVELOPMENT OF A "MOBILITY PASS FOR RESIDENTIAL REAL ESTATE"

The "Mobility Pass for Residential Real Estate" focuses on a holistic view of the relationship of the object (location of residence) and subject (person or household). Mobility patterns based on the individual lifestyle

of a person will be determined within the research project. Starting point of a "forced" mobility is the location of residence. From there the trips to workplace, school, training places etc. are examined with the "Mobility Pass for Residential Real Estate". Furthermore, individual facts of the person, like his/her lifestyle, living and mobility habits and of course the size of family, will show the detailed mobility costs. If there is no possibility of a detailed specification of the person, the mobility habits has to be figured out on the basis of sociodemographic characteristics and statistical facts.

The analysis of the components of the "object" will contain informations of the real estate, like size of the residence, the category (house/apartment, rental/ownership etc.) and especially the travel connections. As far as it will be possible, the Mobility Pass will show different locations of residence with the probable mid- and long-term consequential mobility costs. The advantage or disadvantage of residential real estate will be given for a transparent mobility.

Figure 1 shows the components of the "Mobility Pass for Residential Real Estate":
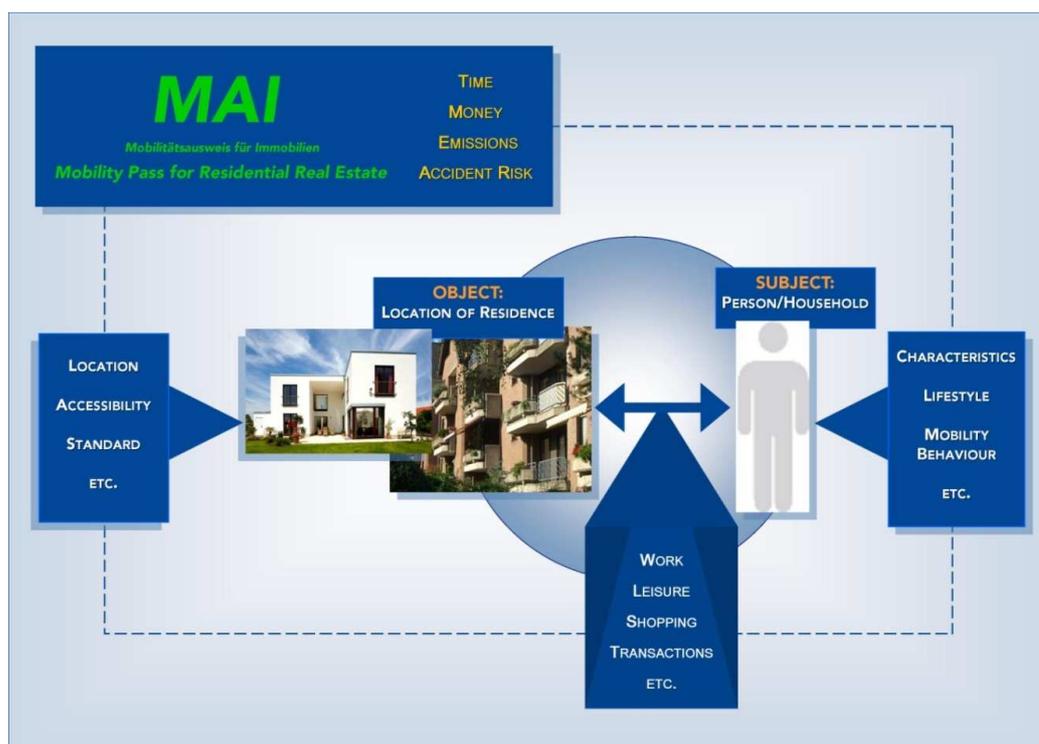

Figure 1: Examined components of the „Mobility Pass for Residential Real Estate (Source: CEIT Alanova, own illustration)

The Mobility Pass examines social and spatial characteristics. Because there are different influences on the traffic behaviour of a person (for example: the composition and size of the household or the net income), these characteristics will be considered in the estimation of the mobility behaviour of a person. On the other hand, the mobility behaviour depends on the location of residence and on the distances and numbers of trips to different facilities (work, school, kindergarten, buying, leisure, etc.). The location-based (= spatial) characteristics again influence the choice of transport and of course the owning of a car or the regular usage of public transport. These ratings influence the mobility costs, such as in term of money, time, CO_2 emissions and also a possible accident risk, which the "Mobility Pass of Residential Real Estate" will illustrate for a positive affecting on the mobility behaviour.

Traffic inducing trends, like the increasing rate of suburbanisation or the increasing numbers of cars per household, will be gathered and therefore be part of the research project.

3.1 What will be the aims of the "Mobility Pass for Residential Real Estate"?

The "Mobility Pass for Residential Real Estate" can be seen as an instrument for influencing the mobility behaviour, which is chosen consciously. It will function as a support, an incentive for better mobility behaviour and as a service for real estate agents. And it will show the user (buyer/tenant) his/her mobility patterns, which are depended on his/her housing situation and mobility habits. The relationship between the

selection of location and the mobility behaviour will show the effects to time, costs (money), environment (CO_2 emissions) and the accident risk.

Further aims of the "Mobility Pass for Residential Real Estate" will be:

- To design an instrument for the individual need of an adjusted residential-location
- An advice for changing mobility behaviour
- An orientation for tenants and purchaser, when buying a house or an apartment
- A marketing instrument for the real estate industry/real estate agents
- More integration of the "mobility" subject into the evaluation of real estate

3.2 State of the Art

There are already basic approaches which calculate mobility costs (in term of money). These tools are a good basis for developing a "Mobility Pass for Residential Real Estate". It will contain some of the basic approaches, but extend the state of art in research through the use of a more holistic point of view.

A good example for an existing calculator of residential- and mobility costs is the "WoMo" (Wohn- und Mobilitätskostenrechner) calculator. This online-tool was designed for the metropolitan area of Hamburg, Germany, and is a free online tool. Transparency and information of the residential and mobility costs are the main objectives of this tool. The consequences of the individual mobility patterns are neglected, but will be shown by the "Mobility Pass for Residential Real Estate".

3.3 The Developing of a Tool called "Mobility Pass for Residential Real Estate"

The "Mobility Pass for Residential Real Estate" will be designed as a free online IT-Tool with the components of a geographic information system (GIS). The users are supposed to be real estate agents and persons, who want to buy or rent a new house or apartment. A possibility to implement the tool is with My SQL or PostgreSQL (SQL stands for "Structured Query Language"). This language allows running complex queries on a database. It also provides a means of creating databases. Many database products (like MS Access) support SQL, so an updating with actual data is very easy. These features can be useful for the "Mobility Pass for Residential Real Estate". That way, for example, real estate agents could actualize the prices of the residential real estate on their own. MySQL and PostgreSQL are freely available open sources Relational Database Management System (RDBMS) that uses Structured Query Language (SQL). MySQL is an essential part of almost every open source PHP application. Good examples for PHP/MySQL-based scripts are phpBB, osCommerce, and Joomla.

PostgreSQL supports a large part of the SQL standard and offers many modern features:

- complex queries
- foreign keys
- triggers
- views
- transactional integrity
- multiversion concurrency control

Also, PostgreSQL can be extended by the user in many ways, for example, by adding new data types, functions and operators. These host languages could be useful to develop the online-tool "Mobility Pass for Residential Real Estate" because of their individual and flexible applications.

The actual research is to develop two modules of the "Mobility Pass for Residential Real Estate". The first one will deliver different scenarios of residence locations and based on this, the possibilities of reducing mobility costs (in terms of money, time, CO_2 emissions and possible accident risk). In this case, the "Mobility Pass for Residential Real Estate" will be a support to save mobility costs and on a long term effect it will achieve sustainable mobility patterns by changing the awareness people. The target group of this module will be the general public. The second module is similar to the first one, but is specially designed for

real estate agents. As a result, they can offer a better service to their customers. Therefore, a professional version will be developed where real estate agents can update facts and data themselves.

4 CONCLUSION AND OUTLOOK

The evaluation of the actual consequential costs of residence decisions is very complex and depends on living situations and it can be assumed that the mobility portrait changes over the usage period of the real estate object. The transparent presentation of consequential costs of locational decisions such as induced mobility costs, environment impacts, time and accident risk will be the final output of the "Mobility Pass for Residential Real Estate". In this manner, the "Mobility Pass for Residential Real Estate" should encourage consideration of the total costs of locational decisions. With its support, already at the selection of location, it addresses the roots of many current traffic problems and should contribute to a more conscientious mobility. Applications for the calculations of the costs associated with mobility reflect an evaluation of mobility in general and not the mobility behaviour of individuals. This behaviour is nevertheless in the forefront along with an evaluation of the place for residence. In order to present this relationship, a multimodal consideration and modelling is necessary. The „Mobility Pass for Residential Real Estate" is modular so that over the time it will be possible to add new models or improve existing ones. In this manner, the online-tool can always keep up with current research. Consideration of the favorability of the local and the object-related components of the Mobility Pass and the development of custom mobility passes can increase the awareness of more sustainable mobility patterns and habits.

5 ACKNOWLEDGMENTS

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