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User Types for Sustainable Mobility Incentive Models

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Executive Summary

There is a gap between trying to satisfy individual short-term user demand and creating livable cities in a greater societal and long-term context. This gap has created a number of challenges related to transportation in urban areas worldwide which are addressed by various solutions. A selection of them deals with incentives for people to switch the mode of transportation. However, the modal split in most urban areas in Germany has not changed in the way necessary to reach the promised improvements until 2030 or 2050. This leads to the question, whether the measures used to reach the stated goals are the right ones: There is a need for a holistic system of incentive solutions tailored to the specific user needs and therefore addressing everyone in our society with the »right« incentive to actually manage a large-scale modal shift towards sustainable transportation behavior. A new approach towards user needs is followed in the Fraunhofer IAO project »urban mobility comfort«. It understands the main driver for travel mode choice to be subjectively experienced comfort. A cluster analysis carried out in combination with a survey in Stuttgart in this context revealed four urban mobility comfort user types along socio-demographic factors, comfort understanding and current use of transportation options. The paper at hand gives a first insight into the ranking of comfort aspects and the motifs for car-use per user type as assessed in focus groups in 2017.

Keywords: demand, incentive, mobility system, strategy, user behavior

1 The Gap

Cities across the globe face the same challenges associated with transportation: large amounts of space in urban environments are dedicated to roads and parking at the expense of high-quality public space, environmental pollution through CO_2-emissions and particulate matter as well as human health problems caused by insufficient exercise and noise pollution. According to the WHO in 2015 “overweight and obesity, which are among the major risk factors for premature mortality, remain alarmingly high” in the European region [1]. As of today in Germany ca. 55% of the population count as overweight and 20% of them are even considered obese. Incorporating exercise in our daily routines seems to have become difficult. This interferes with our physical and mental health. The more time we spend commuting for example, the less time we have to socialize, to relax, to eat and exercise consciously. TomTom’s traffic index indicates that commuters in Stuttgart averagely take an extra 34 minutes of travel time per day, accounting to 132 hours per year [2]. Thus, the city is regularly considered the traffic congestion capital of Germany. While some sources argue,

that insufficient exercise and transportation habits occur due to unsustainable lifestyles and culture, others hold the unhealthy design of today's cities responsible for this development [3]: "The life-shaping power of urban design isn't always obvious. But design has huge consequences for people, the economy and the planet", argues The Happy City. With re-urbanization trends occurring in many European centers, city inhabitants share this argument and demand options to participate in urban planning decisions. Events such as "Park(ing) Day" [4] exemplarily stand for this mind-shift as citizens showcase how they would use public parking spaces along the streets differently to improve well-being in their neighborhoods. Whereas most agree, that the particulate matter concentrations in the city of Stuttgart are alarming after the local and German newspapers discussed this problem openly in the winter of 2016 and 2017, the quality of public space is subjectively rated. This becomes clear, e.g. in the public discussion stimulated by an urban experiment in the summer of 2016 in Stuttgart which was carried out by the University, the city administration and a citizen initiative, in context with the *Future City Lab for sustainable mobility culture*: for a duration of three months eleven *parklets* were built on public parking space transforming it into publically-accessible urban meeting points [5]. While car-owners were offended by this temporary conversion because "parking space is already rare in this city" others wanted "more of these to turn the city back into the hands of its inhabitants".

The above-named challenges appear from a **gap** between trying to satisfy individual short-term user demand and creating livable cities in a greater societal and long-term context. To give an example for this abstract statement: Not arriving at work sweaty and out of breath competes with the possibility of having a heart surgery in the distant future. Experts in knowing individual user demand are obviously the users themselves. But, if we asked users today to specify their transportation-related demand, they might answer: we need more and wider streets to deal with the existing and expected traffic in the future; because they think in today's patterns and have their individual short-term benefits in mind [6]. Also, in context with a necessary modal shift, they might ask for free public transportation (stated preference), without ever considering to use it (revealed preference). **User demand** is on the one hand professionally analyzed by market research institutions in a more objective way. Nonetheless, it usually doesn't address desirable future developments linked to values and objectives. The industry on the other hand is clearly focused on concrete targets, such as selling their products and services according to their expertise. It is their goal to find out which user group is willing to pay for their products and how to reach them. But who bears in mind the needs of future generations, the elderly and the poor, environmental impacts as well as "second order objectives such as improving health, reducing accidents and providing a better quality of life" [7]?

Creating overall **livable cities** is a complex demand and it is usually in the public authority's hands to coordinate all aspects accounting for such an environment. This includes – according to different rankings – business opportunities, income and education, urban green space, safety and housing prices, as well as civic engagement options, work-life-balance, supportive relationships and community [8] [9] [10] [11]. While the image of their business locations is important to attract suitable staff and investment, industry traditionally does not address livability on a city scale. Unless, since IBM came up with *smarter planet* in 2008, industry's interpretation of livable cities is oftentimes that: smart! Using technology to optimize traffic flows and waste disposal, to increase energy and water efficiency, to improve safety and security, etc. But this definition varies from the inhabitant's subjective perspective: users become more and more individualistic, not able to or not wanting to understand their particular role within a larger entity [12]. Moreover, they separate the demand they experience in context with transportation from demands they experience in other fields, such as urban playgrounds for their children, personal fitness or their monthly income. All of these demands from different stakeholders and towards different functions of the city need to be aligned when speaking about livable urban environments. As a result, interests are conflicting and the challenges are far more complex, pros and cons closely intertwined, and future scenarios quite unsure compared to the simple examples given above.

2 The Need for Integrated Incentive Solutions

Against the background of the above named challenges, common solutions which are being promoted in cities in terms of transportation and urban development are e.g., increasing the share of public transportation, bicycling and walking within the modal split or promoting the use of electric vehicles, creating ride-sharing and car-sharing alternatives to reduce either the number of driving or parking cars in the streets. When looking at the actual changes achieved in relation to the modal split of German cities over the past years as well as the success of the introduction status of solutions compared to the stated goals until 2030 or 2050, a large-scale behavioral change still has to be accomplished. This leads to the question, whether the measures used to reach the stated goals are the right ones: **Incentive models** for behavioral change currently reach from financial support for purchasing electric vehicles, apps using gamification to get people to use eco-friendly and healthy modes of transport, mobility cards promoting mobility-as-a-service and mobility management in companies, etc. But these incentives deal with a selection of separate measures and expect the single user to become proactive rather than offering a **holistic and integrated system of incentive solutions tailored to the specific user needs** and therefore addressing everyone in our society with the »right« incentive to actually manage a large-scale modal shift towards sustainable transportation behavior.

Numerous studies verify that if there is physical access to a mode of transport, it is more likely to be used. This is especially relevant for private cars [13] [14]. Bamberg elaborates: "The perceived advantages of car use also encourage it to become a habit. People develop activity patterns and a lifestyle that is tuned toward the use of a car. Once adopted, these lifestyles and habits are main barriers for taking into account alternative means of transport" [15]. The more habitualized a certain behavior is, the harder it is to be changed. And especially for everyday activities such as getting to work or shopping for groceries, **habit** plays a more important role than intention [16]. But if people's everyday behavior shall be changed, they must choose a mode of transportation actively – it must become **intentional behavior** until a new sustainable behavior becomes habit. In this context, DiClimente & Prochaska describe the willingness to actively change one's behavior in the so-called transtheoretical model. It classifies users in types according to their readiness level: precontemplation, contemplation, determination, action, (relapse), and maintenance. In this model a person manages their way through each stage at a time with a potential to relapse [17]. In this context, it is necessary to bear in mind that "never before have so many behaviors needed to change in so short a time. More challenging is that they must stay changed" [18]. De Young touches the heart of the problem of incentive schemes: they need to address people in different stages and with different measures accompanying them to the next stage and having a whole new set of incentives ready then. Furthermore, the urgency of the task asks for an integrated strategy instead of voluntary actions from users, product and service providers. However, a person's current mobility behavior cannot be interpreted as snapshot of a certain readiness stage and amounting to a city's modal split, when taking into account the scientific knowledge about habit, lifestyles or phases in life which stipulate different mobility patterns. This raises the question: Why do some people already practice a more sustainable mobility behavior than others?

3 The Urban Mobility Comfort Approach

In the applied science project »Urban Mobility Comfort« which was carried out at the Fraunhofer Institute for Industrial Engineering IAO in Stuttgart between 2013 and 2015 this question is answered with the hypothesis that people use the mode of transportation which is most comfortable to them. Supposing that »**urban mobility comfort**« is a highly subjective matter, a survey with over 1,000 participants was conducted considering the importance of different comfort aspects when choosing a mode of transportation. As a result, four types of users where identified which share a different comfort understanding and therefore use a different combination of mobility options [19] [20] [21]. These user types have been further assessed qualitatively in focus groups in 2017 by the author. Within the following sub-chapters first the methodology

is described (3.1), then the four user types will be introduced along the qualities associated with urban mobility comfort by each group (3.2) and their motifs presented behind the use of a car (3.3) to give an insight into the current status of the evaluation of the collected data and the possibilities offered by this information.

3.1 Methodology

By means of collecting socio-demographic information, access and current use of mobility options as well as collecting a general mobility comfort statement via questionnaire, people interested in participating in a focus group were classified by the author according to the results from the cluster analysis carried out in the Fraunhofer IAO research project. Homogeneous focus groups were carried out in January 2017 to guarantee a detailed discussion without the need to justify the use of certain mobility options, motifs and associations. Each of the four focus groups took 3-3.5 hours and consisted of two major tasks: Firstly, along a journal conducted about the trips, purposes and modes of transportation chosen during the past week (revealed preference), for each group typical chains of transportation were identified and motifs for their use discussed. Secondly, four to five common transportation chains were assessed by the group along a total of 19 comfort aspects. These were chosen according to different theories in context with changing mobility behavior towards more sustainability (e.g. Theory of Planned Behavior, Theory of Interpersonal Behavior, Norm-Activation-Model). The participants were asked to decide whether they associated the below listed positive or the matching negative version of the aspect with a certain chain of transportation modes or whether neither one applied. The discussion was evaluated to identify motifs for the use of certain transportation options.

- Cheap
- Dependable
- Desirable
- Easy
- Environmentally friendly
- Free
- Fun
- Happy
- In/cool
- Indulge oneself
- Practical
- Prestige
- Proud
- Quality of life
- Quiet conscience
- Relaxed
- Spontaneously
- Sporty
- Temporally flexible

3.2 A Brief Introduction of User Types

In this section the four user types will briefly be introduced according to a comfort aspect ranking and transportation mode choice. Table 1 gives an overview over the five highest-ranked aspects per user type.

Table 1: Highest ranked aspects of mobility comfort per user type

	The Jack of all Trades	**The Demanding**	**The Hotfeet**	**The Laid-Back**
1	*temporally flexible (30)*	*quality of life (30)*	*practical (34)*	*easy (32)*
2	*free (29)*	*indulging oneself (29)*	*dependably (32)* *temporally flexible (32)*	*relaxed (29)* *practical (29)*
3	*dependably (25)*	*temporally flexible (28)*	*cheap (31)*	*free (26)*
4	*practical (24)*	*desirable (26)*	*quiet conscience (23)*	*quality of life (22)*
5	*quality of life (21)* *spontaneously (21)*	*easy (26)*	*quality of life (21)*	*quiet conscience (22)*

The Jack of all Trades prefer **short trip duration and direct routes**, enjoy being active and use the private car least of all user types. Their comfort demands and mobility ideas are best answered by bicycles. Thus, they use bike sharing options more than the other user types. In comparison to the average age, this group is

the youngest and strongly refuses to pay more for an increase in comfort. This type was named the Jack of all Trades after the focus group evaluation to indicate the **wide variety of vehicles and mobility services** they use. While this group is highly flexible in their mobility choice and does hardly experience barriers when testing new options, they expect **high temporal flexibility** which makes them feel independent and offers **freedom**. Therefore, they prefer to use options which do not make an exact timing necessary. Individual mobility, such as bicycling and car-sharing, are thus used often. When using public transportation, the stations need to be serviced **dependably** and at least every ten minutes. The aspect **practically** in this context describes the opportunity to decide **spontaneously** on destinations and departure times as well as to switch transportation modes according to the purpose of travel, the destination and the availability. If all these aspects are fulfilled, the Jack of all Trades experience a high **quality of life**. This group overall ranked eight out of 19 aspects with more than 20 points. Prestige (in context with sportiness) and fun are ranked the lowest (below 10 points each).

The Demanding differ from the other user types due to a large number of important factors for their transportation choice: only eight out of the 19 aspects are ranked below 20 points with quiet conscience (7), in/cool (5), environmentally friendly (4) and sporty (3) being the lowest ranked. When looking at the transportation choices, there seems to be hardly an alternative to the use of the private car in this group, which offers privacy, guarantees a seat, direct routes and short travel duration. They are also willing to pay more for a transportation option if an increase in comfort can be achieved. Rehabilitation and occupation are largely irrelevant to this group while traveling. In the focus groups the **quality of life**, in terms of convenience of travel, plays the most important role for the Demanding. In financial means they enjoy to **indulge themselves** with a choice of transportation and as the Jack of all Trades they like to be **temporally flexible**. This usually leads to the use of a private car. The Demanding chose a mobility option because they assess it as **personally desirable**, in terms of individual wealth or health instead of overarching societal desires such as sustainability. Also, **ease of use** is important to this user type which is why they rarely try new mobility options and instead stick to the familiar ones.

The Hotfeet can be considered hasty and are loyal users of public transportation, but stronger than the other groups they feel restricted in their mobility choice. They also have the lowest number of aspects ranked with 20 points or more. As an upside to this subjectively experienced restriction, they value the positive impact their transportation choice has on the environment and therefore state a **quiet conscience**. They evaluate speediness more important than convenience, which is why they dislike time-consuming routing and bridging between connections by foot. This user type acts efficiently with respect to travel time which is why **dependability** and **temporal flexibility** are seen as crucial, but are often not fulfilled to satisfaction by currently available transportation options. In this context **practicability** leads their ranking and can be interpreted as ability to combine routes and purposes of travel to save time. The restriction in travel mode choice might amongst others be due to financial reasons, because deciding on a **cheap** transportation option is quite important to this group. Interestingly, they are the only group stating that their **quality of life** is improved by all transportation modes. Prestige (5), fun (6) and in/cool (9) are the lowest ranked aspects for this user type.

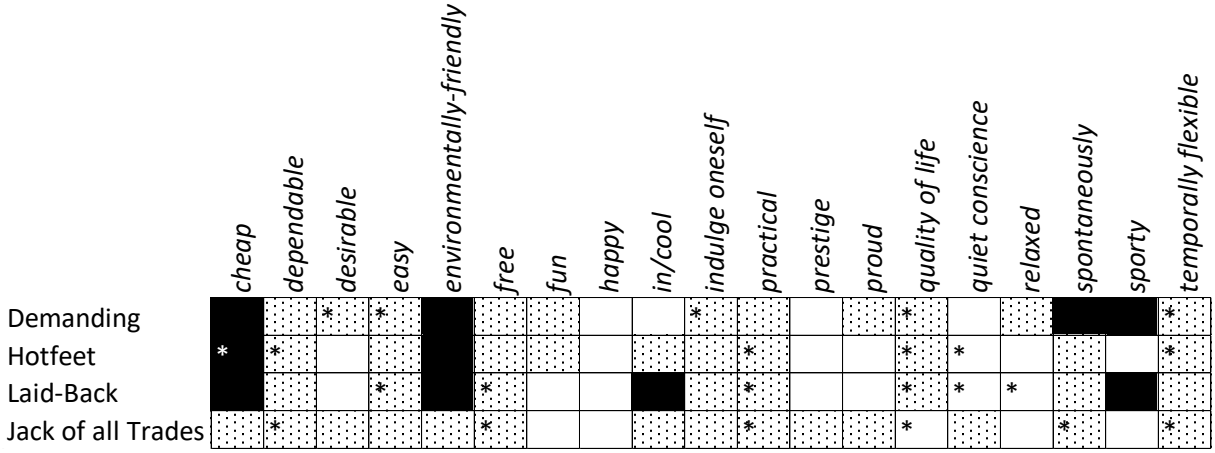
Ease to use is most important to **the Laid-Back**, closely followed by **relaxed** and **free** in terms of handing over responsibility in critical situations as well as **practical**, which can be understood as purpose-bound. They value rehabilitation and occupation while traveling and therefore often decide upon public transportation for longer distances. Even though walking does not mean physical strain for them, they prefer less transfers and would rather accept a longer overall travel duration. This can be interpreted in terms of ease of use for unknown routes and orientation options. Spontaneous trips are rarely taken and are therefore ranked last (4) alongside the aspect in/cool. This group choses the mode of transportation according to the

purpose of travel. Especially choices of active mobility such as walking and bicycling increase their **quality of life**, which they highly value as daily fitness activities for shorter distances. The Laid-Back also have a **quiet mind** in terms of the environment, since they often use eco-friendly modes of transportation. When they decide upon using their private car, they feel like there is no other, more environment- and fitness-friendly, option. This is the only cluster in the analysis, consisting of a larger amount of women. Compared to the average, this user type is the oldest.

The following table 2 gives an overview about the aspects associated with car-use by each user type as preparation for the following sub-chapter. For the Jack of all Trades it has to be mentioned, that due to their actual car-use they assessed the aspects for a sharing vehicle while all other groups associated the task with a private car. Also, the use of a car was rated as in/cool by the Hotfeet only for the use of sharing solutions, not private cars. A dotted hatching indicates consent with the named positive aspect while a black solid color indicates a user group's association with the negative opposite of the named aspect. A solid white color indicates an irrelevance of the aspect and appears either if positive and negative aspects are considered evenly distributed or if the aspect does not trigger any association with this mode of transportation. The * marks such aspects which are most important to each group as summarized in Table 1.

Two things shall be highlighted: Firstly, three of the user groups weigh the stress caused by the responsibility as a driver, by traffic congestion and the search for a suitable parking spot as well as the ability to schedule exact arrival times against the advantages of using a car, which results in an irrelevance of the aspect **relaxed**. The only user group who feels that the positive aspects outweigh the negative in this respect are the Demanding. Secondly, there are differences in the way the user groups interpret the aspects **desirable** and therefore end up with a differing rating for car-use in this context. The Jack of all Trades compare their sharing of e-vehicles in Stuttgart as desirable, because sharing is interpreted as innovative which proposes being cool and is therefore considered prestigious. This group quiets their mind in terms of environmental-friendliness by associating e-car-sharing services with resource efficiency and low emissions. Though, their expectations towards freedom and flexibility might implicate that if there was no sharing alternative, this group is likely to own a private vehicle. The Demanding on the other side feel proud when driving a precious car and even though they do not feel like they would gain prestige within their social environment and today's society for this, they have a personal desire to do so.

Table 2: Associated aspects with car-use by user group



3.3 Motifs for car-use by user type

Within the focus groups motifs were collected for different modes of transportation as well as chains. In this paper it was decided upon highlighting the motifs for and against car-use for each of the four user types and presenting them in a qualitative way. Overall, there are no motifs against car-use which apply for all four user types, but there are analogies for the motifs leading to car-use for all four groups. These are:

- Access to public transportation at the place of residence or destination.
- Combination of purposes (especially shopping) or destinations with the same purpose.
- Transport of heavy, large or a large number of goods.

The assessed motifs for and against car-use will be presented per user type in the following section.

The Jack of all Trades enjoy using a car when **organizing** a trip with small children or with numerous passengers is considered less stressful in terms of coordination. Especially, when there's bad **access to public transportation at the destination**, e.g. when friends' houses are visited which are located at the outskirts of town and public transportation stations are serviced less during the evening hours and night or for day-trips out of town to go hiking or for events, or shopping for non-commodities. When a car is used, this group enjoys **combining the purpose** fulfilled at the destination with a social event. Doing something together such as shopping for furniture is for example a reason to give access to one's car or accompany friends. Since only fuel costs are calculated and every trip is assessed individually instead of cumulated, the Jack of all Trades feels that there are **low costs** for using a car. This is increased by those users that offer giving people a lift when traveling and getting financial compensation (Mitfahrgelegenheit). Other motifs for car-use are **temporal flexibility** and deciding spontaneously, because tight-scheduling make schedule-bound mobility options less attractive to this user group. Motifs against the use of a car are **parking space scarcity** and high **costs for parking**, especially since this group's center of vital interests as well as their location of residence are more commonly located in the city center, offering good **access to public transportation** alternatives. At the same time this group does not want to feel **limited in travel mode choice** by a car which is likely to be used when purchased. If a private car needs to be shared within the household, the Jack of all Trades feel an increase in organizational efforts and therefore a decrease in **flexibility** compared to the car sharing options offered by service providers. The **scarcity of resources** in the city, especially space, are described as a motif against car-ownership or the use of large cars. Also they feel that there is no opportunity for **occupation** while driving. In this context they experience driving a car as tiring, especially when the route is unknown. In comparison, they feel an increase in safety when handing over the responsibility of driving to a conductor of public transportation or in a shared vehicle.

The Demanding's motifs for car-use show a very different picture: Their **access to public transportation at their location of residence** or their destinations is lacking. At the same time their home and destinations offer free parking in close walking distance. Also, destinations are not **grouped** and the **combination of travel purposes** makes the use of a car necessary. Common combinations are work and picking up children or work and shopping for groceries. In this context, transporting heavy, large or a large number of goods is a motif for car-use within this user group. Moreover, the Demanding estimate (not check actual) **overall trip duration** in comparison to other modes of transportation for the same route. Longer trip durations happen due to the need of public transportation chains and service circles which cause long waiting times in case a connection is missed. Temporal flexibility is therefore restricted. The major motif for car-use is the **habit to own and use a car**, which was already influenced in the childhood and youth. **Expenses** for car-use are assessed as costs which exist anyways while public transportation costs are in addition. Motifs against car-use are much less than for the other user groups: **Inner city traffic** is mentioned as motif to use other modes of transportation for destinations which are easily accessible by public transportation. Rarely, public

transportation is used by this user type, e.g. for events including the drinking alcohol, and in combination with park&ride options, depending on their location and the chance to maintain directness of routes, especially when tickets for events in the inner city include the costs of public transportation. Also, **environmental awareness** and missing **physical activity** are reasons against car-use. However this applies for short distances, e.g. within the town of residence. In case there's a need to switch to plane or train for a certain trip, the **safety** of the parked car is a motif to use public transportation or a taxi to reach the station of transfer.

The Hotfeet use cars due to **missing options** at their location of residence, e.g. for shopping or sports as well as bad **access to public transportation** in terms of general availability or timing in the evening and at night. As time efficiency is very important to this user group, the **combination of travel purposes** is common and therefore the **transport of large or a large number of goods** a common motif for car-use. Another one is the **overall trip duration**. It is often shorter by car, because of the directness of routes. This groups' assessment in this context is based on experience. Which is also, why they use other modes of transportation if the alternatives are faster or more **dependable**, e.g. park and ride with car and commuter train. Compared to the other user groups, their interpretation of **safety** as a motif for or against car-use is unique to this group. While it is a pro-motif in terms of traveling together in a group especially at night which also offers occupation and entertainment during the trip, it becomes a contra-motif when such weather conditions are experienced in which road safety are decreased, such as snow, heavy rain or icy roads. In those cases the Hotfeet tend to enjoy the comfort of handing over responsibility to public transportation conductors.

Lastly, **ease of use** is a major motif for the Laid-Back to use a car: entering, driving and getting-off are habits which cause comparably low **organizational efforts** compared to other modes of transportation. **Direct routes** between the points of departure and destination, with parking options in close walking vicinity as well as free-of-charge parking add to this experienced ease of use. But, it is decreased in inner city traffic and unknown environments, e.g. when searching for parking. That's when the group switches to other modes, e.g. public transportation chains. The Laid-Back also assess the **costs for transportation** based on experience with the costs for a car being considered fixed expenses. Bad **access to public transportation** or bad **service during the day** are motifs for car-use for trips with an out-of-town destination within this group. At the same time, the existing **options at the location of residence** seem to fulfill the daily needs of this group as supermarket, butcher, bakery, pharmacy etc. are available in short walking distance. That's why this group only takes one larger trip for shopping per week which is generally managed by car to be able to **transport heavy and many goods**. The Laid-Back's motifs against car-use are an experienced **limitation in travel mode choice** when owning a car, especially in context with their intention to include walking or biking routines in their everyday life as well as any aspect reducing the ease of use.

4 Conclusion & Outlook

To be able to construct a holistic and integrated system of incentive solutions for changing mobility behavior and creating an environment supporting the habitualization of sustainable mobility in Stuttgart and beyond, an awareness needs to be developed for the existence of different stages in such a transformation process. Moreover, it needs to be accepted that different users assess values and costs of different mobility options subjectively according to the RREEMM-model, which understands man as resourceful, restricted, evaluating, expecting and maximizing individual. To make use of this knowledge in practice, users can be clustered into groups. In the study at hand, this is done with respect to factors explaining urban mobility comfort. For the Jack of all Trades, the Demanding, the Hotfeet and the Laid-Back specific demands towards mobility options can be extracted from the assessed data: ranking of mobility comfort aspects important to each user group, association of mobility options with these comfort aspects and motifs behind the use of current mobility

patterns. By combining the pieces of information, for each user type and stage relevant incentives can be developed and the selection of incentives integrated into an overall concept promoting a behavioral shift. Thus, user demand and sustainability objectives of future transportation systems will be linked in this work.

It is the goal to transfer the gained knowledge to an agent-based model of mobility choice for the four different user types and simulating different impacts on a city's modal split by integrating certain incentives and interventions into the system within a PhD carried out by the author.

References

[1] WHO, *The European Health Report 2015 – Highlights*, http://www.euro.who.int/__data/assets/pdf_file/0008/284750/EHR_High_EN_WEB.pdf?ua=1, accessed on 2017-06-15

[2] TomTom International BV, *Traffic Index Measuring Congestion Worldwide*, https://www.tomtom.com/en_gb/trafficindex/city/stuttgart, accessed on 2017-06-15.

[3] The Happy City, https://thehappycity.com/, accessed on 2017-06-15.

[4] Rebar Group Inc., *Park(ing) Day*, http://parkingday.org/; accessed on 2017-06-15.

[5] Parklets für Stuttgart, http://parklet-stuttgart.de/; accessed on 2017-06-15.

[6] H. Monheim & K.-G. Schroll, *Akzeptanz innovativer ÖPNV-Konzepte bei professionellen Akteuren. Endbericht Gesamtprojekt*, Trier, 2004.

[7] A. Hull, *Transport Matters. Integrated Approach to Planning City-Regions*, Routledge, Oxon, 2011.

[8] OECD, *Better Life Index*, http://www.oecdbetterlifeindex.org/countries/germany/, accessed on 2017-06-15.

[9] nef, *National Accounts of Well-being*, http://www.nationalaccountsofwellbeing.org/learn/measuring/indicators-overview.html, accessed on 2017-06-15.

[10] Forbes Media LLC, Americas most livable cities, https://www.forbes.com/2010/04/29/cities-livable-pittsburgh-lifestyle-real-estate-top-ten-jobs-crime-income_slide_5.html, accessed on 2017-06-15.

[11] The Economist Newspaper Limited, Global Livability Ranking 2015, http://www.eiu.com/public/thankyou_download.aspx?activity=download&campaignid=Liveability2015, accessed on 2017-06-15.

[12] Zukunftsinstitut GmbH, https://www.zukunftsinstitut.de/dossier/megatrend-individualisierung/, accessed on 2017-16-02.

[13] S. Klein, *Beeinflussung der Verkehrsmittelwahl im Personenverkehr. Ermittlung des kommunalen Handlungsspielrams im Städtevergleich*, In: Schriftenreihe für Verkehr und Technik, Band 88, Bielefeld. Erich Schmidt Verlag, 1999.

[14] E. Davidov et al., *Time and Money: An Empirical Explanation of Behavior in the Context of Travel. Mode Choice with the German Microcensus*, In: European Sociological Review, 19(3), p. 267-280, 2003.

[15] S. Bamberg & P. Schmidt, *Incentives, Morality, Or Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz and Triandis*, In: Environment and Behavior (2003); Ausgabe 35; Seite 264-285. http://eab.sagepub.com/cgi/content/abstract/35/2/264, accessed on 2016-07-02.

[16] C. A. Klöckner, *Das Zusammenspiel von Gewohnheiten und Normen in der Verkehrsmittelwahl - ein integriertes Norm-Aktivations-Modell und seine Implikationen für Interventionen*. Inaugural-Dissertation zur Erlangung des Grads eines Doktors der Philosophie in der Fakultät für Psychologie der Ruhr-Universität Bochum, 2005.

[17] R. Fuchs, *Konsequenzerwartungen als Determinante des Sport- und Bewegungsverhaltens*, In: Zeitschrift für Gesundheitspsychologie, Sonderdruck, Band 2, Heft 4, 1994, Hogrefe-Verlag, Göttingen, Seite 269-291.

[18] R. De Young, *Changing Behavior and making it stick. The Conceptualization and Management of Conservation Behavior*, In: Environment and Behavior, Vol. 25, No. 4, July 1993, p. 485-505.

[19] Fraunhofer IAO (2017): *Urbaner Mobilitätskomfort – Region Stuttgart*, http://www.muse.iao.fraunhofer.de, accessed on 2017-02/06.

[20] Fraunhofer IAO, *Urbaner Mobilitätskomfort – Region Stuttgart. Ergebnisbericht*, Internal final project report, 2015.

[21] Dialogik gGmbH, *Urbaner Mobilitätskomfort – Region Stuttgart. Ergebnisbericht zu AP1.2*, Internal project report, 2014.

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