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HOW TO EFFECTIVELY PROMOTE SUSTAINABLE MOBILITY IN SOCIAL HOUSING AREAS – RESULTS OF AN EVALUATION STUDY IN THE FRANKFURT RHINE-MAIN REGION

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Abstract

Finding ways of promoting sustainable mobility is one of the main goals of traffic planning and an important issue in the course of climate change mitigation. Since common efficiency strategies will apparently not be sufficient to reach current climate goals, the focus of traffic planning lays on strategies to foster the change of mode choice towards sustainable means of transport. The latter requires firstly measures to enhance the quality of sustainable transport modes. But besides that, demand-oriented strategies, defined as Mobility Management, play a decisive role in order to effectively trigger the actual behavioural change. The key challenge hereby is to reach the majority of the population, even those groups not automatically oriented towards Sustainability. Accordingly, this paper focuses on means to promote the acceptance and use of new mobility services in social housing areas in the Frankfurt Rhine-Main region in Germany. The core of the underlying project is a two-wave CATI-survey study, which was utilized firstly to conceive a target group specific communication campaign to promote new mobility services (e-cargo bike-sharing, e-car-sharing, charging poles and bike-boxes) and secondly to evaluate its impact. The survey collected, besides socio economic aspects, information on respondents´ possession and use of means of transport as well as their attitudes and preferences to the new installed mobility services, and the integration of these services into their daily routines. Other than assumed, the private car does not dominate mode choice and status perceptions of the target group. Moreover, the resident's attitudes indicate that overall there is a significant potential for the analysed types of alternative means of transport among the target group. However, the evaluation of the effect of the communication campaign also indicates that communicative measures to promote sustainable mobility should go beyond purely informational measures in order to be able to stimulate rapid changes in behaviour.

Keywords: sustainable transport modes, mobility management, social housing, behavioural change, CATI-survey

1 Introduction

The main goals and drivers of the research project underlying this paper lie in the essential function that transport and mobility plays in the context of sustainability and especially the aspect of climate change mitigation. Since common efficiency strategies will apparently not be sufficient to reach current climate goals, the focus of traffic planning lays on strategies to foster the change of mode choice towards sustainable means of transport [1]. In terms of a holistic sustainable societal transformation, all citizens should therefore be offered the realistic opportunity to change their behaviour, regardless of income, age or other conditions.

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Similar studies and projects show the importance of communication and design in the context of new mobility services [2] [3] [4]. It is also shown that the quality of the measures and the way in which communication is conveyed are decisive for its success.
Theoretical frameworks show that measures must always be strongly target group oriented. It is well known, that promoting behaviour change needs a complex mix of interventions [5], of which the provision of alternative transport modes, e.g. in the form of a rental bike system, is only one of them. Beyond the sheer physical existence of alternatives, the main challenge is to establish new behavioural routines. This means, that in addition to creating new offers, the actual usage of these new mobility options has to be motivated, e.g. by means of target group specific communication and training. To do so, a variety of measures have been developed, referred to as Mobility Management [6]. As a person's home is both source and destination for almost all trips, Mobility Management for residential areas plays a decisive role in strategies for sustainable transport.
Accordingly, this paper focuses on the overall question of how to promote sustainable mobility in social housing areas and, more specifically, whether a target group specific communication campaign may increase the acceptance and subsequently the usage of new mobility services in a variety of pilot areas. The paper is based on empirical findings derived from an evaluation study in Hessen, Germany which is described in the following. Based on the study's results, the paper provides empirical insights into the acceptance and usage of new mobility services in areas with predominantly low-income households, as well as the effects of the communication strategy. Drawing on these findings, key aspects of how to create effective target-group specific communication campaigns and mobility management programs to foster sustainable traffic are described.

2 Description of the evaluation study

2.1 Study background

The evaluation study "Sustainable Mobility in Pilot Areas of Social Housing" has been funded by the HessenAgentur GmbH (project-no: 686/19-06) and was carried out by a consortium of the housing-group "Nassauische Heimstätte/Wohnstadt" (NHW) as the main applicant together with the support of the scientific partners Offenbach University of Art and Design (HfG) and RheinMain University of Applied Sciences (HSRM).
While the NHWs task is to implement a variety of alternative means of transport in certain pilot areas (focussing in sharing modes like e-car sharing, e-cargo bikes, charging stations for e-cars as well as bicycle parking infrastructures in form of lockable bike-boxes), the HfG is responsible for the creation and implementation of the target group specific communication campaign. The HSRM is tasked with firstly providing empirical data on the inhabitants (target group) as a basis for the intervention and secondly assessing the impacts of the intervention on the mobility behaviour. Moreover, a process evaluation was carried out by the HSRM to analyse the main drivers and obstacles in the project and to derive indications for transferability on other social housing areas. The basic assumption of the study is, that tenants in social housing areas may not be regarded as early adopters of alternative and sustainable means of transport due to certain factors:

- The population of social housing areas is characterised by mobility attitudes that favour motorised individual transport over alternative transport modes.
- Moreover, the possession of privately-owned vehicles has a high-status value for the target group.
- Therefore, the private car is dominating the mobility of the residents, including those trips that could be covered in an optimal mobility mix with e-bikes or other mobility offers as well as

- The acceptance of shared modes is generally low.
- Due to low household budgets, the residents of social housing areas cannot afford a shift towards privately owned electric vehicles in a short-term perspective as prices for electric vehicles continue to be higher compared to conventional vehicles.

On the other hand, it can be assumed that, seen objectively, the use of alternative and especially shared transport modes is advantageous for many trips of the target group as they increase transport options to a relatively low price.
Based on these assumptions the main question for the evaluation study is, whether a communication campaign which is specifically designed to counteract the above-mentioned aspects may lead to firstly an enhanced acceptance and secondly an increased use of alternative (sharing) modes of transport.

2.2 Methodology of the evaluation study

The research question was addressed by a repeated cross-sectional survey, with the intervention (target group-specific communication campaign) taking place in between two survey waves. Accordingly, the first wave primarily aims to record the status quo ex ante in the pilot areas and to characterise the residents with regard to mobility behaviour, transport-related attitudes and awareness and use of the new mobility offers. In the second wave, the same aspects will be surveyed again ex post as the status quo, plus questions on the perception of the communication measures implemented. The quantitative surveys were carried out through computer-assisted telephone interviews (CATI) and the qualitative interviews were also held by telephone.
Primarily, the survey is conducted with the help of quantitatively oriented, standardised telephone interviews with the following contents: information on the housing and mobility situation (e.g. move-in date), questions on mobility behaviour in general (e.g. possession of means, frequency and reason for use), general questions on awareness and use of the new mobility services, questions for non-users of the service (e.g. obstacles and conditions of use), questions for users of the service (e.g. motivation, handling and use cases), socio-psychological attitudes (e.g. categorisation into attitudinal dimensions, classification into the SSBC - stage model of self-regulated behaviour change) [7], communication and perception of the service (e.g. perception via which channel), overall assessment and finally personal information (e.g. income, profession, household size, age, education level). Above that, the survey allowed to compare data of individual participants of the two waves (quasi panel design).
As both survey waves, like the entire project, took place under pandemic conditions. These general conditions had a significant impact on the implementation of the empirical study (telephone survey instead of face-to-face interviews). Accordingly, the sample achieved in the surveys therefore fell significantly short of expectations, as was the case in similar surveys at the same time. To compensate for this, the originally purely quantitative survey instrument was supplemented with qualitative elements (in-depth interviews) aiming at deriving more differentiated statements on the aforementioned aspects, especially with regard to the perception of both the new offers and the measures of the communication campaign.

2.3 Pilot areas for social housing in the Frankfurt-RhineMain region

The pilot areas were selected in an analysis prior to the actual project, based on several factors, but primarily the representativeness of the pilot areas concerning the characteristics of the residents (exclusively social housing or mixed housing including non-subsidised housing), the spatial context (urban as well as suburban areas) and the level of accessibility (dis-

tance to shops, transport infrastructure, level of public transport services) were significant. The chosen pilot areas are located in Frankfurt-Niederrad, Wiesbaden-Kohlheck, Kelsterbach-Mainhöhe and Langen. The areas range from 112 up to 496 registered housing units. As a first step within the evaluation study, each of the pilot areas was equipped with a range of different mobility services:

- a pair of e-cargo bikes at fixed stations, which can be booked via the service provider's app
- lockable bicycle boxes, which can be rented via NHW
- charging poles for e-cars with an associated parking slot
- discounts on the rental tariff of the local e-car sharing provider.

2.4 Intervention Design (Communication Campaign)

After the mobility services were installed, the NHW first of all rolled out a "standard type" communication campaign, consisting of merely objective information on the existence of the new services as well as their terms of use and the call to participation in the survey. After a short testing phase as well as the primary survey, the actual target group specific campaign was carried out. The campaign designed by the HfG was initially developed within a student seminar in form of a competition. Afterwards the winning concept was optimized in cooperation with a professional design and communications agency and executed for about three months.

The campaign measures included an article in the existing tenant magazine as well as several posts on the social networks Facebook and Instagram via the NHW channel, the launch of a dedicated microsite, posters at building entrances, a folding flyer with attached stickers and balloons in the mailbox, and events in the pilot areas with the providers and the opportunity to test the e-cargo bikes or to sign up for a car-sharing membership. The measures were carried out from April to July 2021 under the slogan "lighter with ..." and a photo manipulation of giant foil-balloons depicting the new means of transport e-sharing-car and e-cargo-bike awkwardly placed in the road space.

Figure 1 folded Flyer and article layout of the tenant's magazine

3 Results

In the first survey wave of autumn 2020, a total of 10 % of all households in the pilot areas could be surveyed quantitatively and 0.62 % interviewed. The second survey wave from summer 2021 allowed a quantitative response of around 7.5 % of all households provided and 1.3 % in the form of the individual interviews. The identified panel sample from the two survey waves comprises 4.2 % of the active households and 55.9 % of the total sample from summer 2021.

3.1 Evaluation results of the survey

The survey data revealed a differentiated view on the assumptions mentioned above: Despite significant differences between the pilot areas, motorised private transport (MPT) is, as expected, frequently used in the pilot areas, but does not dominate neither the modal-split nor the transport mode related attitudes in the form of an affinity for MPT. Furthermore, and quite surprisingly, the status value of the private car turned out to be rather low. Moreover, the new services are predominantly evaluated positively and there is a high willingness to use them.

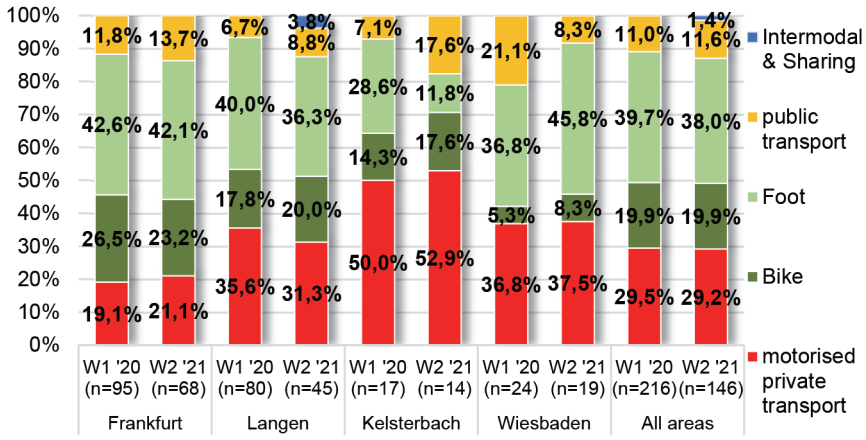

Figure 2 Stated daily use of the means of transport, multiple answers

Nevertheless, the differences between the pilot areas reveal location-related effects: The following chart shows the summarised attitudinal dimensions [8] for the two areas with the largest samples Frankfurt-Niederrad (urban context, high level of short-range accessibilities as well as public transport level) and Langen (suburban context, moderate level of short-range accessibility and basis public transport level). The chart (Likert 1-5; with 1 less and 5 most Item-agreement) shows clear differences in mobility-related attitudes between the two areas in terms of the forced dependence to be mobile, or using a car, how the social environment matters or the attitude towards sharing products or public transportation, which may be attributed to the different accessibility levels.

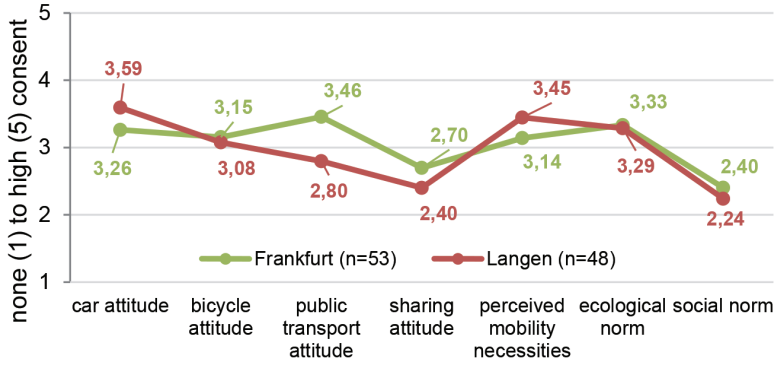

Figure 3 Distribution of the attitudinal dimensions for selected areas

The communication campaign was successful in terms of reach: The second wave shows that 90 % of the respondents were familiar with one or more campaign elements. In addition, the awareness of the new services was obviously increased: with about 75 % of the respondents, significantly more people stated that they were aware of the new offers than it was the case in the first survey wave (about 50 %). It can be assumed that the communication campaign contributed to this.
Moreover, the new offers are rated as at least "good" by almost 70 % of the respondents. The e-car sharing and e-cargo bike rental services were rated best and about half of all respondents can imagine using these, with availability and price named as the main decision factors. Nevertheless, the new services are primarily considered as a supplement to existing mobility tools, i.e. they may not contribute to lowering car ownership in general.
On the other hand, the data shows no effect yet on the mode choice. This may partly be due to the relatively short and extensive intervention design (mainly caused by COVID-19 restrictions). But a number of statements from the interviews show that the reasons for the discrepancy between positive evaluation and actual usage may also be caused by the design and scope of the services: E.g. with regard to e-carsharing the lack of a guaranteed availability was criticised. In the case of e-cargo bike rental, it was stated that this would not be suitable to reflect the previous behaviour patterns, or only at higher costs than before. These statements reflect the usual reservations about these services, which suggest that the individual possibilities of use have not been intensively reflected upon, or that corresponding indications and imaginations are missing. The desire for individual mobility counselling or education was also explicitly expressed. This indicates that the communication campaign with the aim of creating awareness should ideally be directly supplemented by consistent further information and moreover individual advice.

4 Key findings and discussion

Other than assumed, the private car does not dominate mode choice and status perceptions of the target group. Moreover, the resident's attitudes indicate overall that there is a significant potential for the analysed types of alternative means of transport among the target group, which could be activated by the communication campaigns. The new offers are welcomed and generally seen as potentially useful, although the actual individual benefit is often not (yet) being seen. However, comparing the different pilot areas shows significant differences concerning mode choice as well as attitudes and the willingness to use the new services. This finding is most likely to be attributed to the differences in the built environment (accessibilities) as well as levels of transport services, which therefore also exert a decisive influence on the establishment of new forms of mobility.
The evaluated communication interventions were perceived positively and raised awareness. However, a significant behavioural effect in the sense of increased use of offers could not be proven, allegedly due to the short and rather extensive intervention. Obviously, the intervention did not succeed in clarifying the individual benefits of the services and in generating incentives to use them. Perception, intention to use and changes in behaviour seem to be all the lower, the worse a) the level of supply of alternative mobility options or the corresponding accessibility in the neighbourhoods and/or b) the economic status of the households are.

5 Conclusion

The results of the project indicate that communicative measures to promote sustainable mobility should go beyond purely informational measures in order to be able to stimulate rapid changes in behaviour. A conceptual framework for such measures with reference to corresponding socio-psychological theories and concepts is available in the form of mobility management for residential areas.
Especially in social housing, the housing provider should firmly anchor the topic of mobility in their business model for a long-term safeguarding of sustainable mobility interests.
However, for the interpretation of the data it has to be kept in mind, that the whole evaluation study was carried out during the COVID-19 pandemic, which affected both, the interest of the respondents to participate in the survey as well as the willingness to use the new mobility services

References

[1] Creutzig, C., Jochem, P., Edelenbosch, O., Mattauch, L., Van Vuuren, D.P., McCollum, D., Minx, J.: Transport: A roadblock to climate change mitigation? Science, 350 (2015) 6263, pp. 911-912, DOI: 10.1126/science.aac8033

[2] Klein, M., Klinger, T., Lanzendorf, M.: Nachhaltige Mobilität in Lincoln, Evaluation des Mobilitätskonzepts und Veränderungen im Mobilitätsverhalten der Bewohner*innen der Lincoln-Siedlung in Darmstadt, Arbeitspapiere zur Mobilitätsforschung, Nr. 25, Frankfurt a.M., 2021.

[3] Blitz, A., Lanzendorf, M.: Mobility design as a means of promoting non-motorised travel behaviour? A literature review of concepts and findings on design functions, Journal of Transport Geography, 87 (2020), DOI: 10.1016/j.jtrangeo.2020.102778

[4] Aichinger, W., Gies, J., Klein-Hitpaß, A., Zwicker-Schwarm, D.: Elektromobilität in der Stadt- und Verkehrsplanung, Praxiserfahrungen aus den Modellregionen und weitere Wissensbedarfe, 2014, https://repository.difu.de/jspui/handle/difu/211115, 29.03.2022

[5] Michie, S., Atkins, L., West, R.: The Behaviour Change Wheel, A Guide To Designing Interventions, London, Silverback Publishing, 2014.

[6] European Platform on Mobility Management (EPOMM), Mobility Management: A Definition, https://epomm.eu/sites/default/files/files/MMDefinition_english.doc, 01.03.22.

[7] Bamberg, S.: Applying the stage model of self-regulated behavioral change in a car use reduction intervention, Journal of Environmental Psychology, 33 (2013), pp. 68-75, DOI: 10.1016/j.jenvp.2012.10.001

[8] Hunecke, M., Haustein, S., Böhler, S., Grischkat, S.: Attitude-Based Target Groups to Reduce the Ecological Impact of Daily Mobility Behavior, Environment and Behavior, 42 (2010), DOI: 10.1177/0013916508319587