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Experimenting with a mobility budget for citizens in Flemish cities

Gwynne van Kaauwen[1*], Bart Ons[2], Pieter Morlion[3], Sven Maerivoet[2], Laura Khammash[1]

1. Tractebel, Belgium, gwynne.vankaauwen@tractebel.engie.com

2. Transport & Mobility Leuven, Belgium

3. More-Lion, Belgium

Abstract

The Flemish cities Hasselt and Leuven decided to research the possibility of facilitating an alternative through subsidizing a mobility budget for citizens, to be used in a Mobility-as-a-Service (MaaS) application. This paper presents the methodology and results of the experiment with such a mobility budget for citizens that took place in both cities in 2024. During six months, 240 participants had access to a budget of €180 or €360 per person to purchase mobility options in a MaaS-application. Their experience was evaluated through the use of surveys and analysis of expenses. The experiment allowed for some interesting insights of what to expect of such a mobility budget for citizens in practice.

- The modal shift enabled by the mobility budget remains rather limited.
- The mobility budget improves inclusivity and reduces transport poverty.
- A significantly higher budget likely results in more usage of shared cars. Given that the purchase intention of a private car did not decrease despite the mobility budget, this development is less societally desirable.
- The higher the mobility budget, the more trips and expenses are made.
- The allocation method that allows for most cost-efficient usage of the budget is by distributing the budget at once for a longer period of time. This could be a period of six months or a year.

Keywords:

Urban mobility innovation, Mobility-as-a-Service

1. Introduction

In the cities of Hasselt and Leuven, and by extension all main Flemish cities, the population is increasing[1]. Cities witness high volumes of vehicle traffic every day, coming from trips of both resident population and visitors, and mainly resulting from a high car ownership[2]. A high car ownership also translates for cities in high amount of vehicles being regularly parked on-street, whereas the cities wish to use this space for greenery, cyclists and pedestrians. In both cities, a plethora of mobility services as alternatives for private cars are present, but are not used optimally at the moment. For each service, a separate ticket or abonnement is required, making it cumbersome for users to try new services. Therefore, Hasselt and Leuven wanted to research the possibility of

facilitating an alternative through subsidizing a mobility budget for citizens, to be used in a centralized application that offers various mobility options, hence a Mobility-as-a-Service (MaaS) platform.

To achieve a realistic business case for the cities, before potentially implementing the budget at a large scale and for several years, in-depth research is conducted on various aspects. A major pillar of this research was the experiment conducted among 120 citizens per city during a period of six months, from February until August 2024. In exchange for answering three surveys and allowing the monitoring of expenses, these citizens received a mobility budget in a MaaS mobile phone application. The following hypotheses were drawn:

- Related to mobility:
    - The mobility budget for citizens results in a modal shift to more usage of public transport and active transport options, such as shared bikes.
    - The mobility budget reduces transport poverty and improves inclusivity.
    - The mobility budget reduces the intention to purchase a new private car.
- Related to the budget:
    - A larger mobility budget results in more trips and more usage.
    - Distributing a larger amount at once results in more large (and sometimes more efficient) purchases.

This paper describes the methodology and results of this experiment. The paper ends with some preliminary research conclusions and next steps.

2. Methodology

Sociodemographic characteristics with a potential impact on the usage of the mobility budget were identified. These are (i) family composition, and (ii) car ownership. It was decided that an individual would receive a total of €180 over the entire experimentation period, while a participant using the budget for multiple people would receive this in twofold.

Furthermore, to establish the best way of allocating a mobility budget for citizens, budget-specific characteristics were included in the research. These are (i) monthly budget amount, and (ii) method of budget allocation. By combining category (individual or collective), allocation method and monthly budget amount, eight cohorts per city were created. Each cohort consisted of 15 participants per city. The set-up of the cohorts is given in the table below (Table 1). For cohorts 1a, 1b, 3a and 3b, any remaining budget by the end of the month would be deleted. For cohorts 2a and 4a, any remaining budget by the end of the month would be transferred to the next month. Cohorts 2b and 4b received the entire budget at the start of the experiment.

Participants were selected after filling out a first questionnaire regarding their current mobility choices and sociodemographic situation. In Leuven there were many applicants, which allowed for selection based on level of transport poverty. In Hasselt there were just below 120 applicants, every applicant was therefore included in the experiment. The different levels of car ownership and the different family compositions were as far as possible represented equally over the eight cohorts per city, to ensure these characteristics would not distort the experiment outcomes.

Table 1 - Set-up of the participant cohorts in the experiment.

#	Category	Method of allocation	First period	Second period
1a	Individual	Monthly	€24 p.m.	€48 p.m.
1b	Individual	Monthly	€48 p.m.	€24 p.m.
2a	Individual	Monthly without expiration	€36 p.m.	
2b	Individual	At once	€180	
3a	Collective	Monthly	€48 p.m.	€96 p.m.
3b	Collective	Monthly	€96 p.m.	€48 p.m.
4a	Collective	Monthly without expiration	€72 p.m.	
4b	Collective	At once	€360	

In each city, a start event was organized to inform the selected participants about the overall experiment and research, as well as to instruct them on the use of the MaaS-application. Within the application, the participants were free to use the budget to their own wishes[1]. The experiment started on February 1st 2024, with the first test period lasting between February 1st and April 15th and the second test period between April 16th and June 30th (Figure 1). Each test period concluded with a questionnaire. Participants that filled out all questionnaires, received an additional one-time €100 mobility budget, to be used on the purchase of a ten-ride train pass in the month of July 2024.

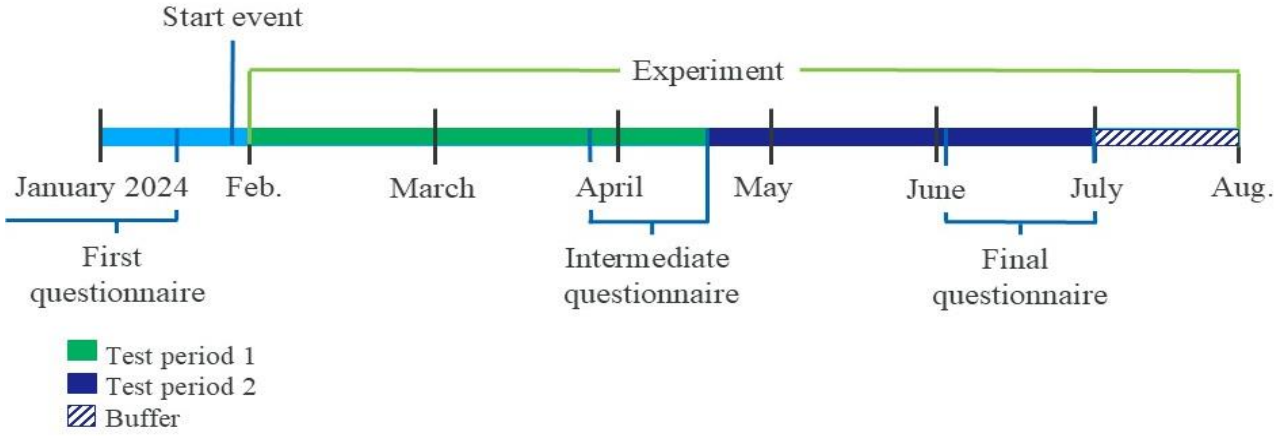

Figure 1 - Timeline of the experiment.

3. Results

The results of the experiment consist of a qualitative part, conducted through analysis of participant surveys responses, and a quantitative part, conducted through analysis of participants' mobility budget expenses.

[1] As home-work commute is generally paid for by the employer in Belgium, participants were not allowed to use the mobility budget for this type of trip.

3.1. Surveys

The surveys allow for a complete view of the mobility choices of the participants, including those made outside of the purchases in the provided MaaS-application. For each transport mode, participants were asked to indicate how often they use this mode on average. By comparing the answers pre experiment, during the first test period, and during the second test period, potential changes in the mobility choices can be observed. The answers for the mobility choices car as a driver and car as a passenger are summarized in the graphs below, aggregating responses from both cities, all cohorts considered (Figures 2 and 3).

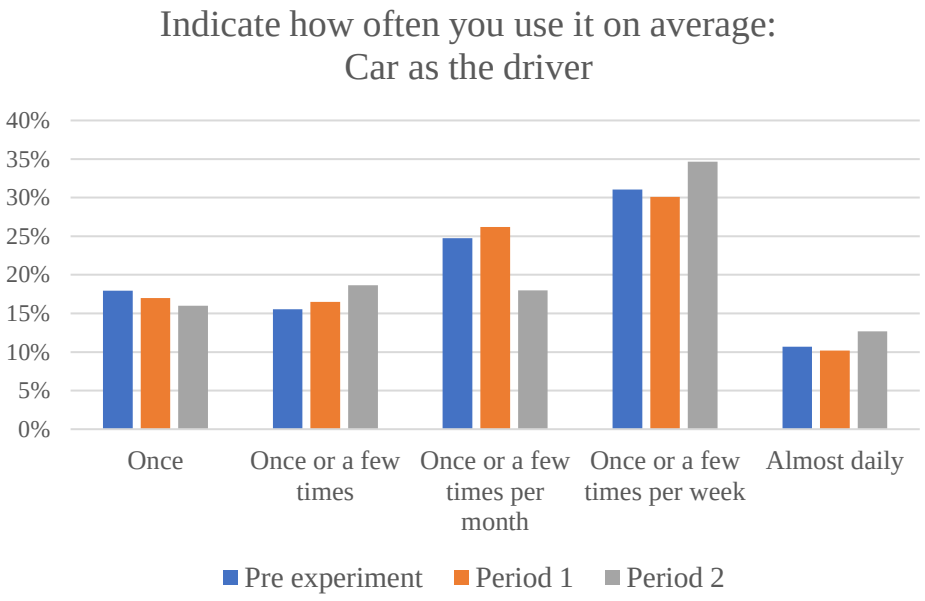

Figure 2 - Modal shift, the usage of the car as the driver as mode of transport.

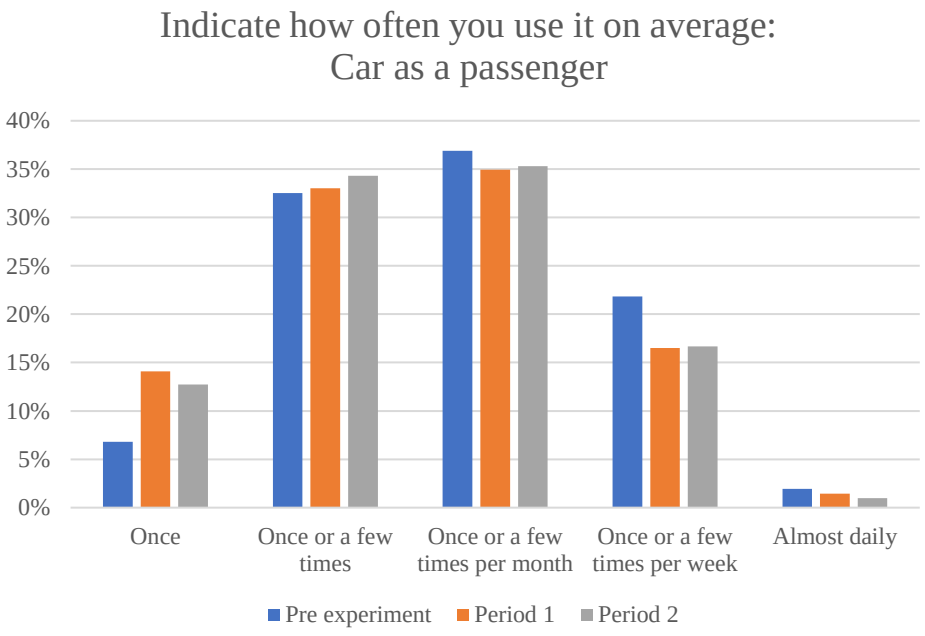

Figure 3 - Modal shift, the usage of the car as a passenger as mode of transport.

While the first test period saw a small drop in the use of the car as a driver, the use increased in the second test period. The use of the car as a passenger decreased slightly in both test periods compared to the situation before the experiment. However, both developments were statistically insignificant. For the public transport and shared mobility options, small gains in use were visible, but these were again statistically insignificant.
Moreover, beforehand participants expected themselves to experience a higher modal shift thanks to the mobility budget than they did in practice (Figure 4).

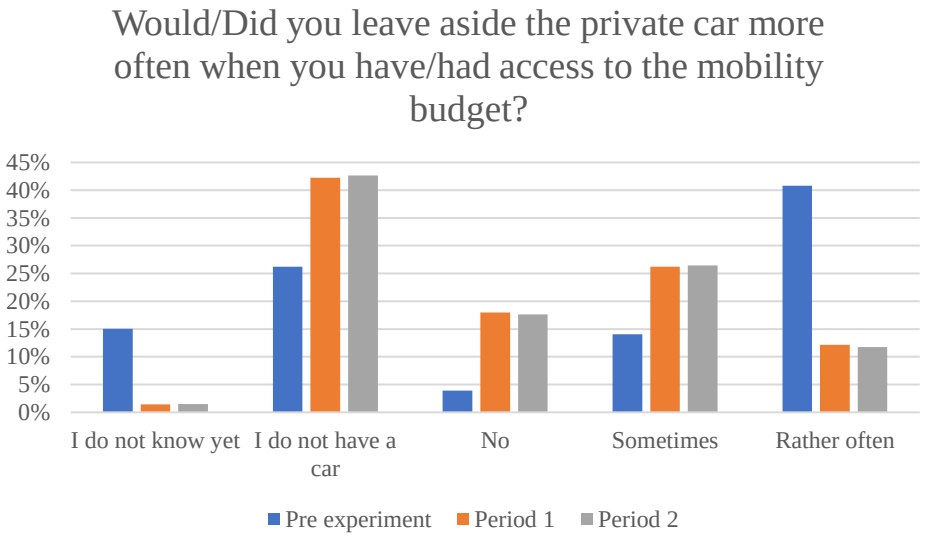

Figure 4 – Expected and realized modal shift away from the private car.

Furthermore, participants were asked to indicate their preferred transport mode for specific destinations. For most destinations, no shift in preferred mode was observable. For farther city trips there was a small but significant shift from private car to train (Figure 5).

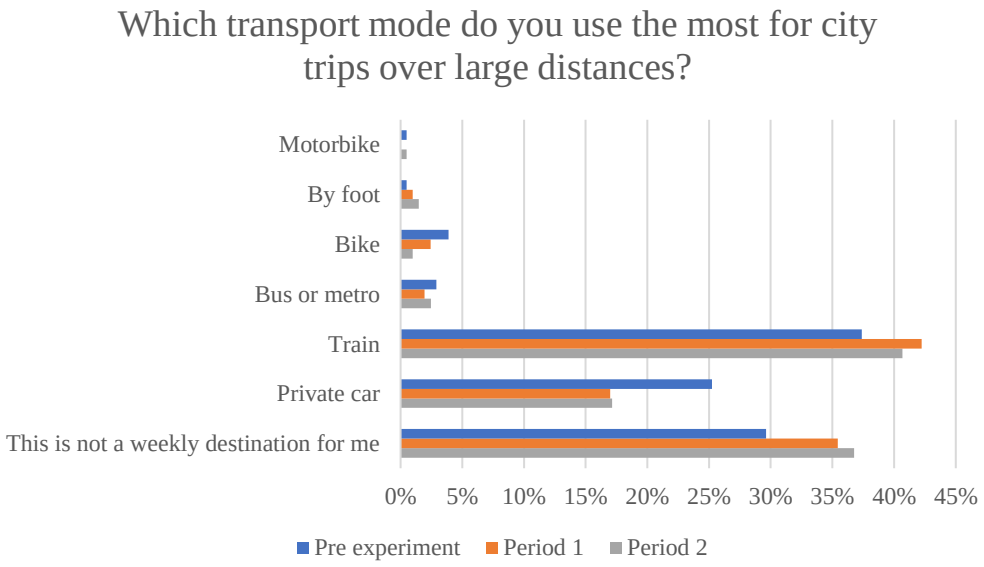

Figure 5 - Preferred use of various transport modes for city trips over large distance.

Next to the questions relating to mobility choices, the participants were asked about their intention to purchase a private car. Each participant received a score based on their answers on six car-purchase related questions. When the survey answers before and during the experiment are compared, one can conclude that the intention to purchase a private car unexpectedly has increased. The results are summarized in the graph below (Figure 6). The standard deviation is given by the error bar.

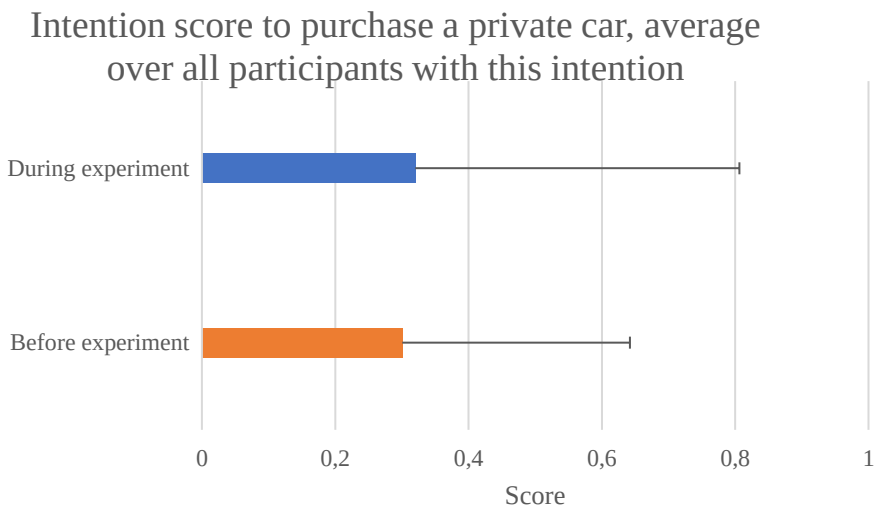

Figure 6 - Intention to purchase a private car, scored between 0 and 1.

In Leuven, participants were asked to answer questions relating to inclusivity and transport poverty (Figures 7 and 8). For both aspects, a statistically significant improvement was found during the experiment.

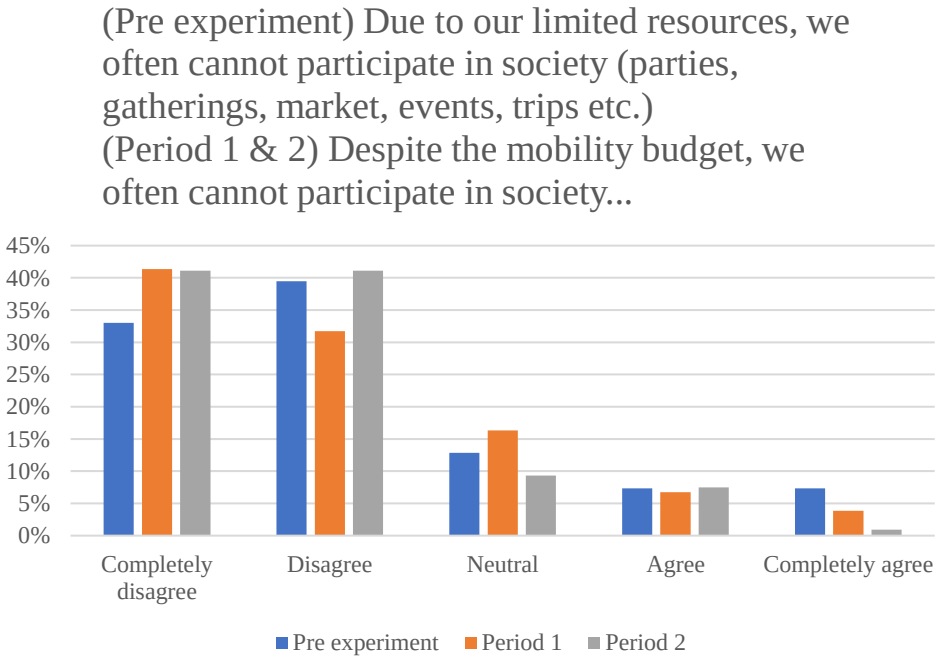

Figure 7 - Social inclusivity of participants in Leuven.

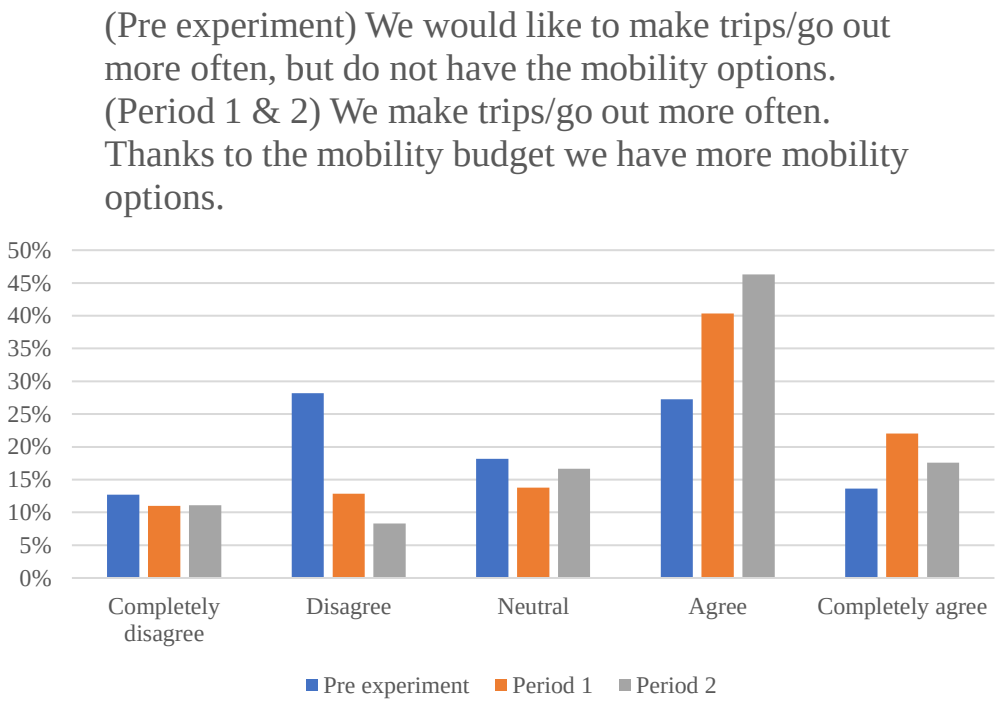

Figure 8 - Transport poverty of participants in Leuven.

Many participants in Leuven indicated beforehand that they would prefer to have a car available to go grocery shopping. Surprisingly, shared cars were not used much for this purpose during the experiment (Figure 9).

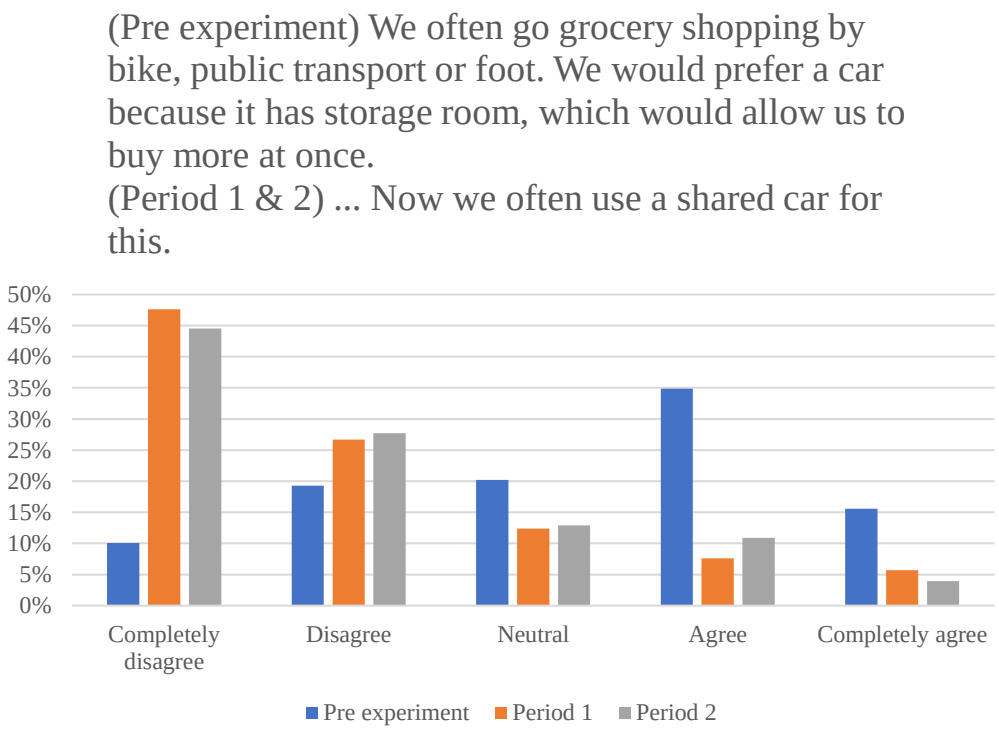

Figure 9 - Use of a shared car to reduce transport poverty among participants in Leuven.

3.2. Transactions

In Hasselt, €15,672.56 of the available €32,400 was used for mobility service transactions, whereas in Leuven €23,253.95 of the available €32,400 was used. Overall, the amount of budget spent was lower than expected. Distribution of expenses over the different mobility options is displayed in the figures below (Figures 10 and 11).

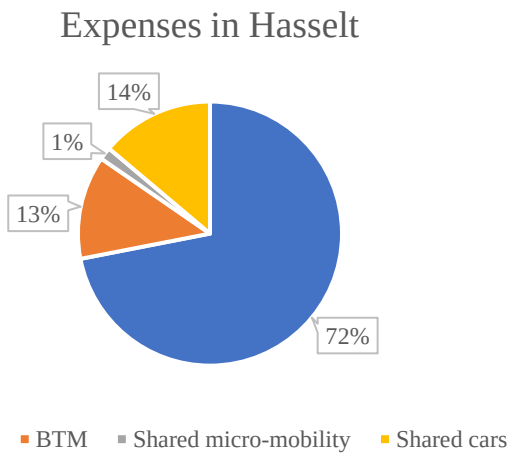

Figure 10 - Distribution of expenses over mobility options in Hasselt during the experiment.[2]

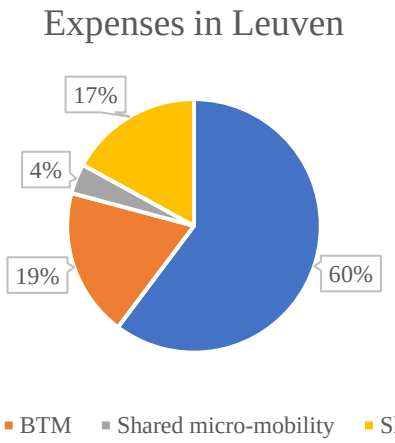

Figure 11 - Distribution of expenses over mobility options in Leuven during the experiment.

Looking into the differences between the cohorts, as established in Table 1, it becomes clear that cohorts which experienced loss of remaining budget by the end of the month used on average a smaller part of the available budget. This indicates that it is more difficult to make (efficient) expenses when a participant cannot accumulate budget over time. This assumption is strengthened by emails the research team received during the experiment. Various participants indicated that they felt this allocation method was suboptimal. For example, throughout the

[2] The abbreviation BTM means the collection of bus, tram and metro.

experiment, the participants in cohorts 1a, 1b, 3a and 3b were never able to purchase a train travel ten-ride pass, as the price of this was €99. Therefore, they were required to purchase single-ride tickets to ride the train. This is less cost-efficient when riding the train multiple times a year. Other participants indicated they were not able to use the remainder of their monthly budget, as it was not sufficient for the mobility options they were interested in. For instance, a participant had a remaining €4,50 near the end of the month, but the cheapest mobility option they would have liked to purchase was €5.

The difference in spending between cohorts is most visible in Hasselt.

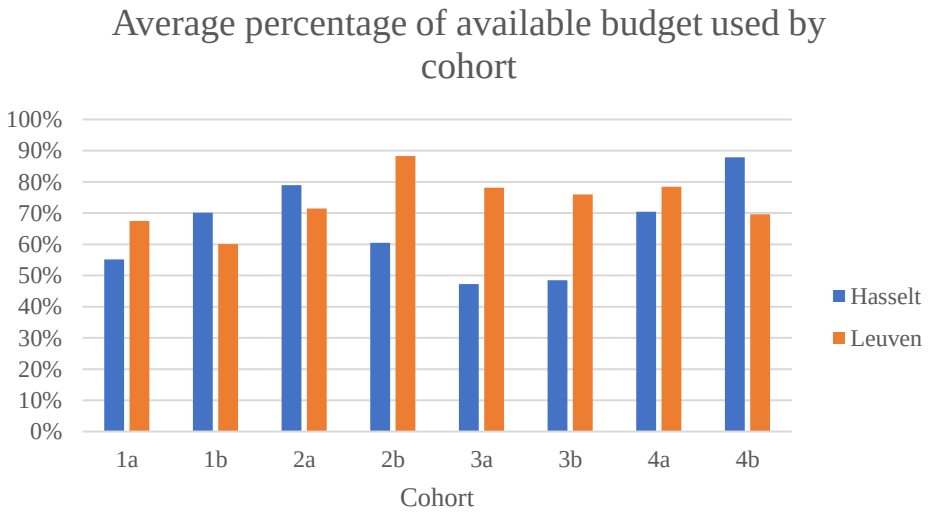

Figure 12 - Available budget used per cohort and per city.

The impact of the size of the budget becomes clear when considering the expenses over the various mobility options. The cohorts with a higher available budget (€360 vs €180 over the entire experiment) tend to use shared cars far more. The use of shared micro-mobility and BTM surprisingly did not increase much when the budget was doubled.

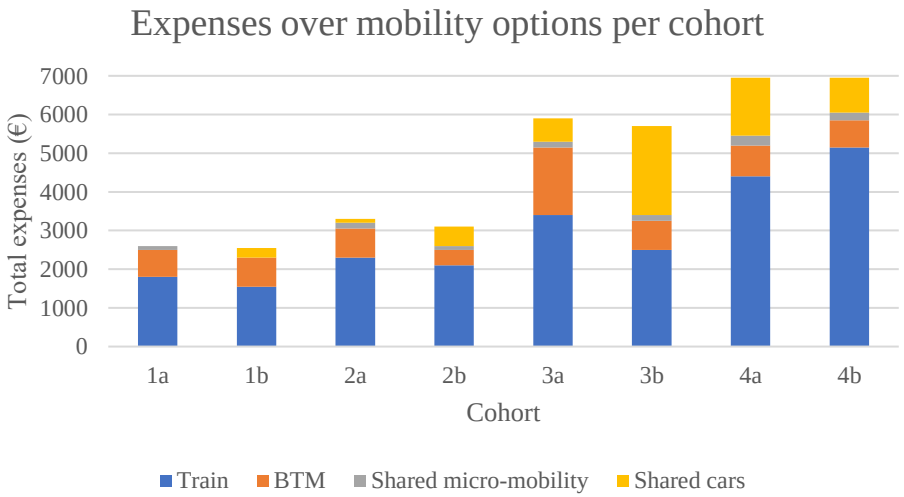

Figure 13 - Distribution of expenses over mobility options during the experiment per cohort.

4. Conclusions and next steps

This paper presented the methodology and results of the experiment with mobility budget for citizens that took place in Hasselt and Leuven in 2024. During six months, 240 participants had access to a budget of €180 or €360 per person to purchase mobility options in a MaaS-application. Their experience was evaluated through the use of surveys and analysis of expenses.

The experiment allowed for some interesting insights in how such a mobility budget for citizens is used.

- The modal shift enabled by the mobility budget remains rather limited.
- The mobility budget improves inclusivity and reduces transport poverty.
- A significantly higher budget likely results in more usage of shared cars. Given that the purchase intention of a private car did not decrease despite the mobility budget, this development is not societally desirable.
- The higher the mobility budget, the more trips and expenses are made.
- The allocation method that allows for most cost-efficient usage of the budget is by distributing the budget at once for a longer period of time. This could be a period of six months or a year.

Next, the results discussed in this paper will be combined with insights from other research aspects, such as desk research and a questionnaire among MaaS-platforms. All this research will lead to recommendations for implementation and to the development of a business case. The project finalization is planned for end of March 2025.

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