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How persuasive is 'free' public transport? A survey among commuters in the Brussels Capital Region

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ABSTRACT

In Belgium, several cities have been experimenting with 'free' public transport based on the concept of a third payer system. This study explores the modal shift potential of this measure for commuters by means of a large-scale survey. The results indicate that there is still a margin for a further modal shift, but in order to make public transport more attractive to car users, the price paid by the commuter should be lowered, the quality and capacity of the public services should be improved and the mobility policy of the companies should be adjusted in favour of public transport.

1. Introduction

The continuous growth of transport demand along with the increased traffic congestion has potential detrimental impacts, which threaten the environment, the economic competitiveness and the social cohesion in Europe. The new mobility requirements motivated the European Commission to take radical steps for the development of sustainable urban transport systems. Providing a reliable public transport service is considered to be an important element for creating sustainable mobility (European Commission, 2004).

The key policy issue of an efficient and sustainable urban transport system lies in reconciling two major objectives: minimizing traffic and its detrimental impacts, while fulfilling the demand for accessibility in support of economic and social goals. Public transport can serve both of them. Also, because of the way it is organized, public transport is very suitable for regular and repeating trips made to and from (big) cities, in other words, for commuting. Although most commuters have this useful transport mode at their disposal, several of them do not use it.

In Belgium, data from the National Institute of Statistics reveal that 72% of the commuters use the car and only 6% use the train to go to work. For commuting trips to the Brussels Region, the percentage of car users is already lower, but still 63%, and the proportion of train users is significantly higher (17%) than it is for commuting in Belgium in general. Being a major area of employment and very well served by public transport, Brussels already attracts more train commuters. Nevertheless, one-third of the commuters working in a company with good public transport access in the Brussels Region still use the car to go to work (CRB, 2007). There is a growing concern about dependence on the car and at the same time a growing recognition by the policy makers and citizens that more sustainable modes of transport should be promoted and used.

Several Belgian cities have been experimenting with 'free' public transport based on the concept of a third payer system. This implies that the price of public transport is not paid by the user or provider, but partially or completely by a third party, such as local authorities, other public organizations and private organizations. 'Free' public transport is actually a form of revenue redistribution and that is why we put 'free' between quotation marks, because in the end there is always someone paying for it. In general, the third party pays for public transport for a specific target group in a specific area. Given that at first the targeted groups were not the biggest car users (seniors, children and students), the measure was often rather socially than economically inspired. Recently, the focus has also shifted to commuters. Since 2005, private companies can enter into a third payer agreement to allow their employees to commute for 'free': the government pays 20% of the cost, the company 80%. Since 2007, the federal government provides 'free' public transport for all civil servants. These 'free' public transport measures were introduced to persuade more commuters to using public transport in order to relieve the pressure on the roads and to stimulate sustainable development.

The goal of this paper is to examine whether making public transport for 'free' is attractive enough to persuade more commuters to use public transport instead of the car. To do so, it is important to investigate whether price is a key factor in the transport mode decisions of commuters. Research on the impact of 'free' public transport for students on their travel behaviour has

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already revealed that 'free' public transport does indeed stimulate the use of public transport, but that there are also other important factors besides price influencing travel behaviour and mode choice (De Witte et al., 2006; Macharis et al., 2006; Steenberghen et al., 2006). In this paper, we want to explore the case for commuters working in the Brussels Capital Region. This Region is the largest employment area of Belgium and provides employment for 650,000 people. An important part of the employment is situated in the public sector (26%), because a vast majority of the various administrations is located in Brussels. These authorities attract other service companies (13.7%). Other important employment sectors in Brussels are education (12.6%), transport (12.5%) and also the financial sector (10.9%) (Brussels Hoofdstedelijk Gewest, 2006). There is a huge concentration of jobs in Brussels and only half of these jobs are filled in by people living in the Brussels Region, the other half by commuters, most of them living in the Flemish Region. In total, there are more or less 360,000 people who commute to and from the Brussels Capital Region every weekday for their work (Coppens, 2005).

This paper begins with a description of the theoretical framework we used for structuring the factors influencing commuting mode choice. In the following section, the research questions are presented. Section 4 deals with the methodology and in Section 5 the results of the study are described and discussed. Section 6 presents the conclusions.

2. Theoretical framework

In order to structure the factors we focused on during our research, we used the theoretical framework presented by Kaufmann (2002). He analysed mobility as a broad phenomenon, in which making trips depends on the fulfilment of several factors, considered as potential factors allowing to understand why a particular journey has or has not been undertaken. These factors can be grouped into three categories (access, skills and appropriation) and they constitute the travel potential of an individual: the individual's 'motility' (Fig. 1).

This analysis framework has the advantage not to focus on one main explanatory factor of travel behaviours, but to explore these behaviours by paying attention to a wide range of factors that influence the demand for a certain transport mode.

2.1. Access

Access factors are linked to the availability of different alternatives or travel modes. Therefore, it is conditioned by the location and accessibility to transportation networks of the various origins and destinations of the journey (Kaufmann, 2002). In general, urban areas are better served with public transport than rural regions. The supply of transport comprises the number of cars in a household and the supply of public transport.

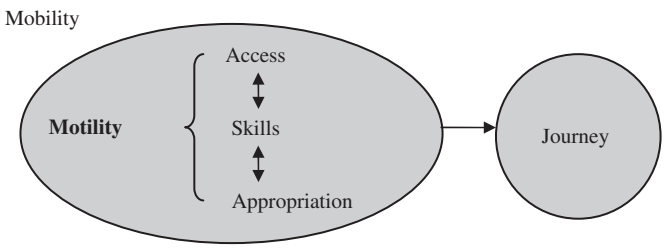

Fig. 1. Diagrammatic conceptualization of Kaufmann's concepts of mobility and motility. *Source*: translation of Kaufmann (2002).

Besides availability, there are also financial and time issues. Several studies indicate that the demand for travel is income related (Dijst and Van Wee, 2002). In general, transport is considered to be a normal good in the sense that more is demanded at higher levels of income. This generalization does not apply to all modes of transport or to all situations. There is a positive relationship with car use and an inverse relationship with public transport use. As incomes rise, people will buy more cars, and at the same time lower their demand for public transport. Mainly persons with lower incomes tend to be more concerned by the price of transport. This may stimulate them to modify their mobility behaviours according to this criterion (Hine and Scott, 2000).

Prices of travel modes, and consequently travel budgets, are difficult to assess. The assessments of car costs by individuals are often biased: the costs of a car are underestimated compared to the price of public transport for the same journey. This observation could be explained by the fact that only some variable costs are taken into account (mainly fuel) when assessing the price of the car (Hine and Scott, 2000; Frenay, 1994).

As far as time budgets are concerned, consumers have limited time budgets and different types of persons have different values of time. The motive for travelling is also important to assess the value of travel time: it is the highest for professional journeys, lower for home–work trips and lowest for other travel motives (Dijst and Van Wee, 2002).

2.2. Skills

Skills are developed by individuals relative to mobility and to the different means of travel. These skills can be physical, acquired or organizational. Acquired skills are linked to the knowledge users have developed of the various means of travel at their disposal and of the space in which mobility takes place. These skills facilitate the use of the considered means of travel. Skills may also result from organisational abilities developed by an individual with regard to time and space arrangements and to budget management (Kaufmann, 2002).

Daily travel behaviour is influenced by the position of the person in the lifecycle and her/his life-style choices (Axhausen et al., 2001). The position in the lifecycle depends on the age of the person. Differences in household income over the lifecycle can explain the pattern of increasing car ownership and car use as the head of the household grows older. This pattern continues until the head reaches his or her early fifties and starts to decline afterwards (Dargay, 2007).

Life-style choices include decisions on education and occupation. Both are related to income and car ownership. Higher educated people are more likely to have higher income levels and use the car to go to work (Pickery, 2005; Dijst and Van Wee, 2002). As far as occupation is concerned, the type of work influences the use and the need for a car. Commercial functions for instance imply a lot of trips during the day making the use of a car necessary for the job. In Brussels, however, an important part of the employment is created by public authorities and administrations often located nearby public transport stops, making the use of the car less essential.

The influence of life-style choices is also related to choices determining the access to the different transport alternatives, such as residential location (urban, rural, city centre, urban fringe, etc.), workplace, driving licence and car availability. These choices made with regard to access factors influence the development of skills concerning the different travel modes. For instance, when deciding on the residential location, the commuting mode choice is one of the factors taken into account. As such, the current

commuting mode decision results from a choice made in the past. The decision on residential location is often the outcome of carefully considering the cost of travel on the one hand and the cost of housing on the other hand (CRB, 2007).

2.3. Appropriation

Appropriation is developed by taking into consideration the user's experiences, habits, perceptions and values linked to the travel modes and to space. This affects the way individuals appreciate their own access and skills to the different travel modes (Kaufmann, 2002). Users often contrast car and public transport: car is usually seen as quite positive so that a dependence on the car seems to arise. Such car dependency is not easily reversed. Even when income starts to decline, there is a tendency to continue using the car (Dargay, 2007). Public transport is then more negatively assessed (Flamm, 2004; Kaufmann, 2000; Petit, 2002; Kaufmann and Bassand, 1996).

The psychological approach of behavioural choices distinguishes two types of behaviour: reasoned and automatic behaviour (Dijst and Van Wee, 2002). In case of reasoned behaviour, the individual makes his/her (transport) choice after carefully considering the downsides and benefits of the different alternatives. In case of automatic behaviour, there is no consideration and the individual does what he/she usually does. This automatic behaviour occurs mostly when an individual has to deal with regularly repeating decisions, such as deciding how to go to work.

2.4. Inquired motility factors

In our research, we have been focusing the analysis on the factors listed in Table 1. We used the theoretical framework provided by Kaufmann to structure these factors by dividing them into three categories: access, skills and appropriation.

3. Research questions

The main research questions addressed in this study are: Is there still a margin for a further modal shift? What are the obstacles that need to be overcome in order to make public transport more attractive? What are the advantages of public transport according to the commuters and how can they be exploited? And more extreme, is 'free' public transport attractive enough for commuters to make them shift to public transport? Or are there other important factors that influence people's travel behaviour?

4. Methodology

In this section, a description is made of the study design and the statistical analysis performed on the available data.

Table 1
Motility scheme of Kaufmann, with factors analysed in this research

Access	Skills	Appropriation
Car availability	Professional status	Experiences
Home–work distance	Educational level	Habits
Income and price	Age	

Source: De Witte and Macharis, based on Kaufmann.

Table 2
Imposed quota % (Q) and selected sample % (S) of the active population according to gender and age

	20–29		30–39		40–49		50–59		60 and more	
	Q (%)	S (%)	Q (%)	S	Q (%)	S (%)	Q (%)	S (%)	Q (%)	S (%)
Male	11	11	17	15	17	13	10	10	2	1
Female	10	12	14	14	12	15	6	8	1	1

Source: Based on NIS (2002).

4.1. Study design

For this research, a written quantitative survey combined with a face-to-face approach was used. The survey was tested on a pilot sample of members from the target population: people living outside Brussels, but having to commute to the region on a regular basis to go to work.

There are approximately 363,000 people who live in the Flemish or Walloon Region and commute to the Brussels Capital Region for working purposes (Coppens, 2005). In order to select a representative sample, the principle of quota sampling was used. The following proportions of gender and age were taken into account while selecting the sample for the enquiry (Table 2).

Important to mention here, is that it was not a goal to be representative with respect to the travel mode. Attention is paid to two major groups: car users and train users, the latter possibly in combination with other transport modes. Within each of these two groups, a representative sample was taken.

The surveys were gathered during March and April of 2005. One thousand two hundred and seventy six surveys were used for data analysis: 536 of them were filled out by car users ($N_{car} = 536$) and 740 by train users ($N_{train} = 740$).

4.2. Statistical analysis

The analysis grid provided by Kaufmann allows us to categorize the factors we have focused on during our research. In order to identify the variables predicting the commuting modal choice among these factors, binomial logistic regressions were used. This regression model can be used for prediction of the probability of occurrence of an event and makes use of several predictor variables that may be either numerical or categorical. In this case, it is used to identify the variables predicting the probability that a person commutes by car or by train. As it can only be applied to independent variables being numerical or categorical, we could only use this statistical analysis on the factors categorized under access and skills. As for the appropriation factors, the analysis is rather descriptive. All statistical analyses were performed in SPSS 16.0 (SPSS Inc., 2008).

5. Results

This section first presents a general image of the travel behaviours of commuters. Next the motility concept of Kaufmann will be used to structure the factors influencing the commuter's travel decisions. And finally, the modal shift potential of making public transport 'free' will be discussed.

5.1. Commuting towards Brussels

In the following section, the emphasis is on three critical commuting factors: the moment of departure, the number of

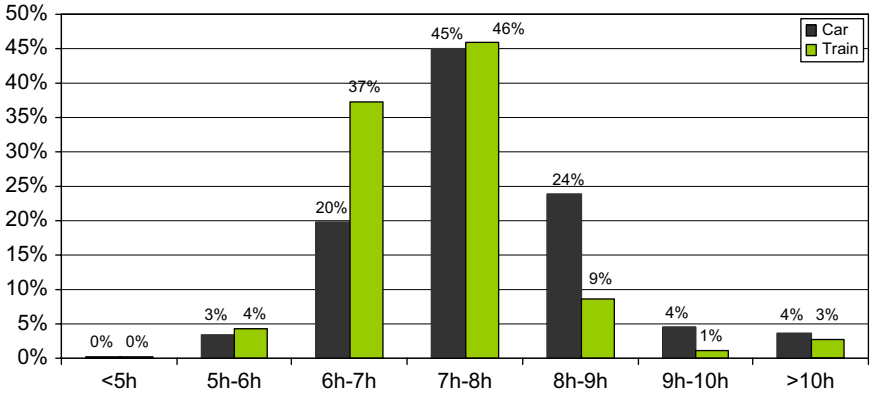

Fig. 2. Moment of departure from home to work [$N_{car} = 534$; $N_{train} = 737$; independent samples t-test (d.f. = 860,754; $p = .000$)].

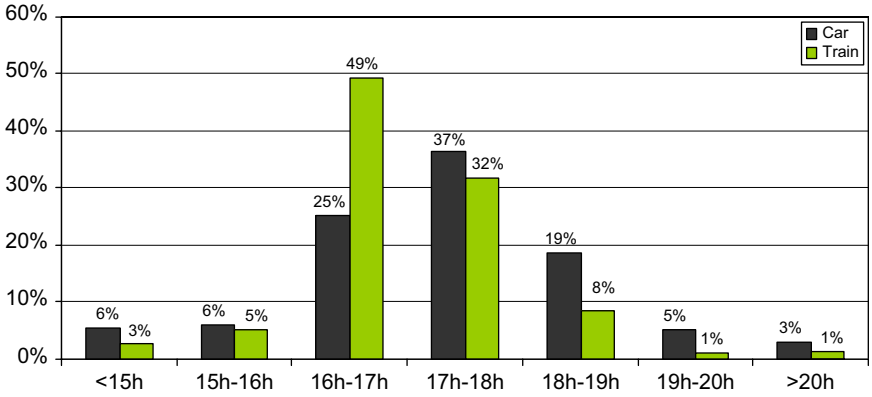

Fig. 3. Moment of departure from work to home [$N_{car} = 526$; $N_{train} = 737$; independent samples t-test (d.f. = 889,795; $p = .083$)].

travelled kilometres and the average travel time needed to get to the destination.

5.1.1. *Moment of departure*

The moment of departure indicates when people are commuting from home to work and vice versa. Fig. 2 shows when commuters leave home to go to work and Fig. 3 displays when the commuters depart from their work to return home. There is clearly a difference between car and train users in terms of the average moment of departure and its spread, especially for the trip from home to work.

Train users leave home on an average half an hour earlier than car users: the average moment of departure from home to work is 7h11min for train users and 7h42min for car users. To return home from work, the difference is smaller and not significant: train users leave approximately at 16h43min, whereas car users leave on average only 10 min later, at about 16h54min.

There is also a difference in the spread of the average moments of departure. Using the standard deviation to measure this dispersion, it appears that the moment of departure is wider for car users. With regard to the spread of the moment of departure to work, they have a standard deviation of 1h50min, whereas train users have a standard deviation of 1h18min. A similar conclusion can be drawn for the dispersion of the moment of departure to return home: the standard deviation for car users is 2h06min and for train users it is 1h29min. For both car and train users, the time frame for going home is more stretched than the one for going to work. This phenomenon is also being confirmed by other studies (Verhetsel et al., 2006; Glorieux et al., 2006; Pickery, 2005).

5.1.2. *Travel time and travel distance*

The travel time is the time a person needs to commute from home to work. It concerns the time needed to go from door to door, so in case of the train, also the time spent on combined transport modes, for instance the time needed to walk to the railway station, is included. On an average, train users travel for almost 1 h to go to work, whereas car users only commute for 44 min (Fig. 4).

Obviously, travel time and travel distance are strongly related. Fig. 5 shows that the car is indeed used for shorter distances, explaining why the travel time is also shorter. The transport mode choice depends on the travel distance: the car is dominant for smaller distances, and the train is more popular for longer distances (Pickery, 2005).

In Belgium, the trips made for commuting are on an average longer compared to the surrounding countries. This can partly be explained by the fact that most Belgians want to own their own houses. Once they do, they are not likely to move. Consequently, a change of career does not necessarily imply a change of residence (Hubert and Toint, 2002). According to Verhetsel et al. (2006), the average distance and travel time for commuting to Brussels are even higher than those for Belgium in general. The average travel distance is 30 km and the average travel time 45 min. This is in line with the data gathered on car users in this survey. Other research indicates that travel distance can be influenced by two factors: gender and level of education. According to Mérenne-Schoumaker et al. (1999), women try to work closer to home, in order to facilitate the combination of work with their household. As for the level of education, according to Dijst and Van Wee (2002), people with a higher educational level have higher and more specific work-

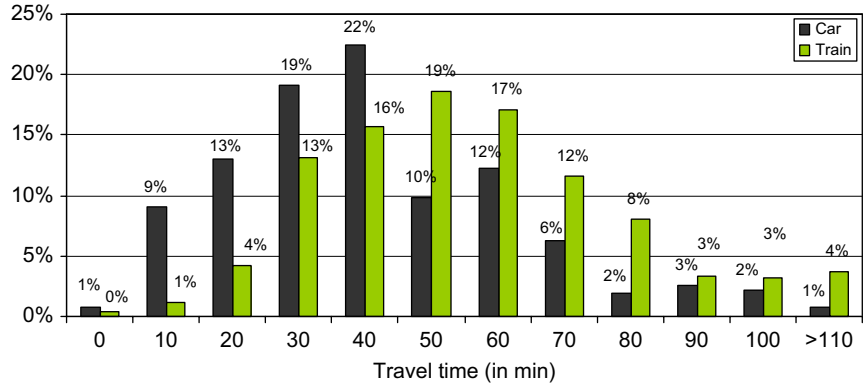

Fig. 4. Travel time [$N_{car} = 509$; $N_{train} = 735$; independent samples t-test (d.f. = 1242; $p = .000$)].

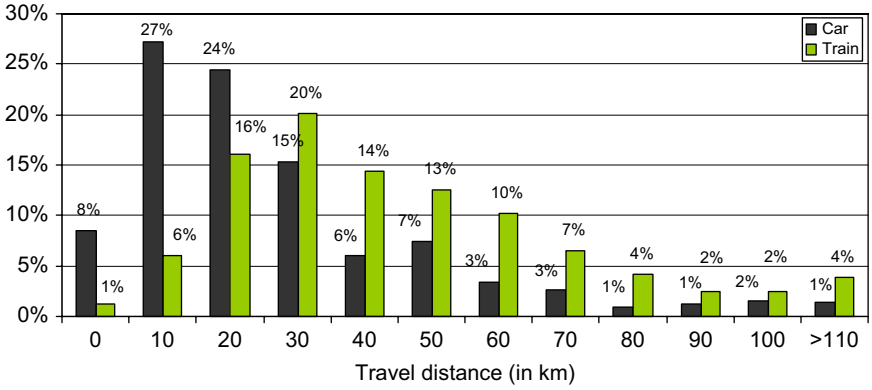

Fig. 5. Travel distance [$N_{car} = 508$; $N_{train} = 735$; independent samples t-test (d.f. = 1169,850; $p = .000$)].

related demands. This lowers the chance to find a suitable job within a certain distance from home and results in an increase of the commuting distance.

5.2. Application of the motility concept

In the following section, the motility concept will be applied in order to categorize the factors influencing modal choice. As mentioned before, this study focused on two main groups: car and train users, thus ignoring the very small group of other transport mode commuters.

5.2.1. Access

Accessibility concerns service and deals with all the financial and spatial–temporal conditions necessary for the available means of transportation to be used. Access factors are linked to the availability of different travel modes and are conditioned by the location and accessibility to the transportation networks.

The outcome of the logistic regression with the number of cars available in the household, the residential location in terms of home–work distance and the net income level as predictors for access factors is shown in Table 3.

When the probability is less or equal to the level of significance of 0.05, it can be concluded that the access factor has an influence on the mode choice decision of the commuter. This seems to be the case for all the selected factors, except for income.

5.2.1.1. Household car availability. In our sample, the majority of households have access to at least one car and many have even more than one. Car ownership is related to income but is also determined by the number of adults in the household: when adult children are still living at home, this creates a situation with multiple drivers and earners in the household. This not only results in an increase of the household income, but it also enlarges the need for additional cars. As income has a positive influence on car travel, these rising household incomes also lead to a higher car travel level (Dargay, 2007). The more cars available in the household, the more likely the respondent will commute by car. The analysis shows that for each unit increase in number of cars, the odds of train use in comparison to car use decrease by 52%.

Next to the number of cars, also the availability of a company car is of significance. Having a company car influences the commuting mode choice in favour of the car. The odds of train use decrease by 96.6% when commuters posses a company car.

Table 3
Logistic regression parameters for access factors

Access		*B*	Sig.	Exp (*B*)
Car availability	No. of cars in the household	−0.735	0.000	0.480
	Company car	−3.396	0.000	0.034
Distance (home–work) (km)	⩽30			
	30–60	1.727	0.000	5.621
	>60	2.150	0.000	98.589
Net income	⩽2.000€	0.161	0.432	1.174
	>2.000€			

The reference category for distance home-work is set on ⩽30 km; for net-income on >2.000 euros.

5.2.1.2. Home–work distance. We divided the home–work distances into three categories: distances from 0 to 30 km, distances from 31 to 60 km and distances of more than 60 km. The results show that people are more likely to commute by train when the distance between their home and work is more than 30 km. This relationship is also supported by other studies, indicating that the car is the dominant transport mode for commuting distances up to 30 km (Pickery, 2005). Beyond this distance, the train becomes more competitive because of its characteristic of being more performing on longer distances.

5.2.1.3. Income and price. Both car ownership and car use are related to income: as income rises it becomes easier for households to own cars, and once obtained cars are used even despite rising costs of usage. Not only car ownership, but also car use is more sensitive to car purchase costs than to the variable costs of car use, such as fuel prices. Car use however is more sensitive to changes in income and price than car ownership (Dargay, 2007; Kingham et al., 2001).

However, in our research, the analyses do not identify income as one of the predictors for the commuting mode choice. This is because in most cases it is not the employee, but the employer who pays (part of) the costs related to commuting. The company's mobility policy, and more in particular their arrangement of reimbursing commuting expenses, has an influence on the commuting mode choice of their employees. When the company provides company cars or a financial reimbursement, the employees are stimulated to use their car for commuting. When the company pursues a public transport encouraging policy, employees will be more likely to commute by public transport. Within the group of car users, 27% have a company car and 48% receive a financial compensation for their car use. In the group of train users, 90% of the respondents indicate that their train subscription is completely or partially paid by the company.

5.2.2. Skills

Skills are related to socialization. An individual develops skills relative to his/her mobility and to the different means of travel. Some skills are linked to the knowledge they have developed of the various means of travel at their disposal, others may regard to the ability to manage time and financial budgets. In any ways, the daily travel behaviour of an individual is influenced by the position of this person in the life cycle and her/his life-style choices. In this case, the logistic regression was applied to the following factors: professional status, educational level and age. The outcome of the analysis is shown in Table 4.

Table 4
Logistic regression parameters for skill factors

Skills		*B*	Sig.	Exp (*B*)
Professional status	Civil servant			
	Employee	−1.013	0.000	0.363
	Labourer	−2.465	0.000	0.085
	Independent	−2.295	0.000	0.101
	Other	−1.513	0.003	0.220
Educational level	Low educational level	0.467	0.007	1.595
	High educational level			
Age (year)	18–34			
	35–44	−0.872	0.000	0.418
	45–64	−0.607	0.001	0.545

The reference category for professional status is set on civil servant; for educational level on high educational level; for age on the youngest group (18–34 years).

5.2.2.1. Professional status. The influence of life-style choices is among others related to the occupancy of the respondent. Civil servants are more likely to commute by train. There are two main explanations for this outcome: first, a lot of public administrations are located nearby public transport facilities and second, since 2007, civil servants are able to use public transport for 'free'.

5.2.2.2. Educational level. Next to professional status, also the level of education belongs to life-style choices. This study distinguishes two categories: a low educational level (primary school and secondary school) and a high educational level (university short cycle (3 years) and university long cycle (5 years)). The results show that commuters belonging to the group of respondents with a low educational level are more likely to use the train than those with a high educational level. This outcome is in line with the results from other studies concluding that higher educated people are far more likely to commute by car (Pickery, 2005). Higher educated people in general have higher income levels and consequently also higher car ownership levels, explaining why they are more likely to use the car for their commuting trips.

5.2.2.3. Age. The position of a person in the life cycle can be determined by his/her age. We subdivided age into three categories: the 18–34 year old, the 35–44 year old and the 45–64 year old. Compared to the youngest group, the respondents of the other categories are less likely to commute by train. This can be explained by the fact that several young people do not immediately posses their own car and the differences in household income over the life cycle. As the head of the household grows older, there is a pattern of increasing car ownership and car use (Dargay, 2007).

5.2.3. Appropriation

Appropriation refers to what actors make of the mobility options they have access to and is developed by taking into consideration the user's experiences, habits, perceptions and values linked to the travel modes. This affects the way individuals appreciate their own access and skills to the different travel modes. The appropriation factors discussed below are experiences and habits.

5.2.3.1. Experiences. The way users have experienced travel modes will lead them to appreciate a certain travel mean and to perceive that travel mode and its attributes in a particular way. The more positive the experience and perception, the more likely the travel behaviour will not be changed. Fig. 6 illustrates that the majority

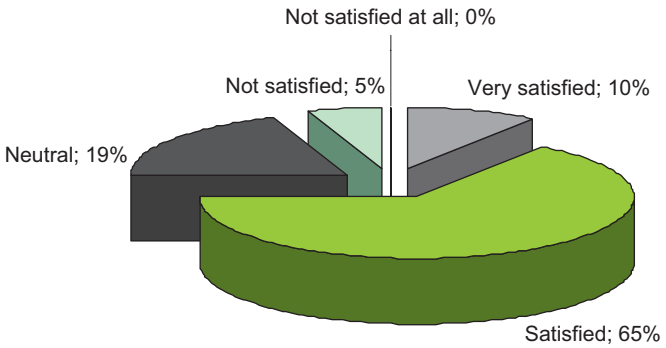

Fig. 6. Satisfaction of train users with train services.

Table 5
Main reasons for choosing car or train for commuting

Car			Train		
1	Speed	22%	1	Avoid traffic jams	22%
2	Bad connections public transport	13%	2	Cheap	18%
3	Company car	10%	3	Speed	17%
4	User friendliness	10%	4	User friendliness	16%

of train users is satisfied (65%) to very satisfied (10%) with the service level of the train. Nineteen percent have a neutral opinion and only 5% are not satisfied with the train services. This indicates that most respondents have quite positive experiences with using the train and are therefore likely to keep commuting by train.

Next to service satisfaction, the main reasons for choosing a particular travel mode may also reveal positive or negative experiences influencing the transport mode decision. Both car and train users were asked to indicate their principal reason for using this transport mode (Table 5).

Both commuter groups use positive as well as negative reasons to explain their choice. The positive reasons are linked to the travel mode they actually use and the negative ones to the other transport alternative. This may be the result of a negative experience or negative perception. A bad public transport connection is the second reason for car users to use their car; avoiding traffic jams is the most important reason for train users to use the train. Also remarkable, is that the positive reasons are the same for car and train users: speed, price and user friendliness. As company car and cheap transport are highly ranked by, respectively, car and train users, it appears that price plays an important role in their transport decision: not having to pay or only having to pay a part of the transport costs, because of a company car or train ticket remuneration, influences the transport decision.

5.2.3.2. Habits. Automatic behaviour occurs mostly when an individual has to deal with regularly repeating decisions, such as deciding how to commute. After a while, the commuter will be used to go to work using a certain transport mode and following a certain path. The respondent will not modify this automatic behaviour, unless there is a drastic change that has a sudden positive or negative impact on his/her daily home–work transport choice. A positive impact can for example be triggered by the opening of a new road or the improvement of a train connection; a negative impact can for instance result from roadblocks and traffic jams due to road construction or public transport timetable alternations so that connections with other public transport modes are disturbed.

5.3. Modal shift potential

The motility concept helped to structure the factors influencing the travel behaviours of commuters. The next step is to explore the potential of a modal shift from car towards public transport. For this part of the research, stated preference techniques were used to elicit information on trade-offs individuals would make when confronted with particular situations (Button, 1994). Although stated preference surveys can generate stable preference estimates, there is also evidence that these preferences can be contingent on context. As a result, the behavioural intention may sometimes deviate from the actual behaviour (Fujii and Gärling, 2003).

For this study, a survey was used to ask the commuters whether their travel behaviour would be influenced if public transport was made 'free'. In this section, attention will be paid to the attractiveness of 'free' public transport, to the obstacles preventing car users to make a modal shift to public transport and to whether there is still a margin for this shift.

5.3.1. The attractiveness of 'free' public transport

As Table 5 showed, price is perceived as an important reason when commuters are asked to indicate why they commute by car or train. Moreover, the fact that they do not have to pay the full price of their journey, because of a company car or remuneration, has a noticeable influence on their travel choice. As commuters appear to be sensitive to price, the question arises whether making public transport 'free' would induce a further model shift from car to public transport.

As Table 6 indicates, there is indeed a certain willingness to switch to public transport. Moreover, the motivation tends to be influenced by company car ownership. As they already have a 'free' car at their disposal, the 'free' public transport alternative is less appealing.

Given that the possession of a company car influences the willingness to make a modal shift, from now on a distinction will be made between company car users and private car users. Ten percent of the private car users point out that they would certainly switch to public transport if it was made 'free', 42% hesitate and 48% have no intention to do so at all. With regard to the company car users, still 7% would definitely choose 'free' public transport, 30% hesitate and the majority of 63% would not be attracted to 'free' public transport.

5.3.2. Obstacles

Nine percent of the car users would be willing to make a modal shift when public transport is made 'free'. What are the obstacles that need to be overcome in order to make public transport more attractive to the remaining 91%?

Table 7 shows the five most important obstacles prohibiting car users from using public transport. The main barrier appears to be the bad connections of public transport. For company car users, availability comes second and speed third, for the private car users the order is vice versa. To complete their top five of public transport obstacles, company car users mention the comfort and network and the private car users refer to the timetable and the public transport frequency.

Table 6
Attractiveness of free public transport

Willingness to switch	Overall (%)	Company car (%)	Private car (%)
Yes, certainly	9	7	10
Maybe	39	30	42
No, certainly not	52	63	48

Table 7
Obstacles public transport

Overall			Company car			Private car		
1	Connections	57%	1	Connections	47%	1	Connections	61%
2	Speed	44%	2	Availability	40%	2	Speed	46%
3	Availability	39%	3	Speed	38%	3	Availability	38%
4	Timetable	31%	4	Comfort	24%	4	Timetable	37%
5	Frequency	26%	5	Network	18%	5	Frequency	30%

Table 8
Modal shift when removing the obstacles?

Willingness to switch	Overall (%)	Company car (%)	Private car (%)
Yes, certainly	22	16	25
Maybe	49	39	53
No, certainly not	29	45	22

5.3.3. Modal shift potential

There are still some important obstacles that need to be overcome in order to be able to attract more car users to make a modal shift. When the respondents were asked if they would make a switch when the obstacles they mentioned were solved, another 22% point out that this would certainly have an impact on their transport mode choice. As Table 8 shows, here again, people without a company car are easier to persuade: only 16% of the company car users would make the switch in comparison with 25% of the private car users.

There is certainly still potential for modal shift from the user point of view. Lowering the price of public transport and improving its quality are two actions that would make public transport more attractive for commuters. With regard to the public transport companies, investments to improve the quality of public transport (frequency, capacity, connections, etc.) are necessary if they want to be able to provide a sustainable and efficient alternative for the car.

6. Conclusions

Commuter traffic is very specific and causes huge traffic flows leading to severe congestion. Although public transport is very suitable for home–work transport, still one-third of the commuters working in a company with good public transport access in the Brussels Region use the car to go to work. One of the objectives within the concept of sustainable mobility is making public transport more attractive to the current car users. Overall, there are two ways to do so: lower the price of the services and/or increase its quality. This study examined the possible attractiveness of making public transport 'free' for commuters in Brussels.

There is a range of factors influencing the modal choice of commuters. They can be structured into three main categories according to the motility concept of Kaufmann: access, skills and appropriation. Factors such as household car availability, home–work distance, professional status, lifecycle, educational level, previous experiences and habits appeared to have an influence on the commuting mode choice between car and train. Also income and price have an impact, but as the majority of the commuters receive a compensation for their home–work transport, the logistic regression does not identify income as one of the predictors explaining the modal choice between car and train. This shows that the company's mobility policy also has an influence on the commuting mode choice of their employees. When the company provides company cars or a financial reimbursement, the employees are stimulated to use their car for commuting. When the company pursues a public transport encouraging policy, employees will be more likely to commute by public transport. Not having to pay the full price of the train ticket is mentioned as one of the main reasons for commuters for choosing the train.

The price plays a role in the transport mode decision, but will 'free' public transport be attractive enough for car commuters to make a modal shift? Nine percent of the respondents indicate that it would. The others encounter other obstacles besides price preventing them from using public transport. The main obstacles are bad public transport connections, followed by speed and availability, or better the absence of it. However, if these obstacles would be removed, another 22% would be willing to switch over to public transport. In both cases of switching towards public transport, an important capacity increase of public transport would be necessary, especially during peak hours, to be able to capture this modal shift potential.

Another important outcome of this study is that the price and the quality of public transport are not the only obstacles preventing a modal shift towards public transport. Our study shows that the willingness to make a modal shift is significantly smaller among commuters with a company car than it is among those without it. Consequently, company cars are also obstacles preventing the use of public transport. Here also, the importance of the mobility policy pursued by the company becomes apparent.

Nevertheless, it can be concluded that there is still a margin for a further modal shift from car use towards public transport. In order to make public transport more attractive to car users, the price paid by the commuter should be lowered, the quality and capacity of the provided public services should be improved and the mobility policy of the companies should be adjusted in favour of public transport.

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