Public Transport (2018) 10:529–543
https://doi.org/10.1007/s12469-018-0189-z

ORIGINAL PAPER

Travelers' preferences regarding the interior of public buses: a hierarchical information integration approach

Peter van der Waerden[1] · Emilie Couwenberg[2] · Geert Wets[1,2]

Accepted: 18 September 2018 / Published online: 25 September 2018

Abstract
A study is set up that aims to provide more insights into travelers' preferences regarding the interior of standard buses serving the urban public transport. To get insights into the travelers' preferences a stated choice experiment is set up. A list of six perspectives on the bus is composed: the bus as accessible vehicle, as sensory attractive vehicle, as comfortable seating place, as eating and drinking place, as work place, and as relax and entertainment place. All perspectives are described in more detail using five attributes per perspective. The preference data are analysed using regression and multinomial logit models. The analyses show that travelers prefer mostly the bus as comfortable seating place, at some distance followed by the bus as accessible vehicle and the bus as work place. Travelers are willing to pay extra—for a bus trip when the suggested interior is offered.

Keywords Bus interiors · Stated preference · Information integration

1 Introduction

Public transport companies are looking for suggestions that can improve the image of their facilities and buses that fulfil their services. At the moment, the standardised buses are not very attractive compared with cars on the market today. For example, Stradling et al. (2007) stated that 'one barrier to increased bus patronage is held to be the image of bus service …'. In their study they found several negative opinions regarding the bus service such as the seats are too crampy, the buses are too crowded, the buses are dirty, the buses look old and shabby, and the buses are too noisy. Both bus companies and bus constructors are looking for improvements on the exterior and interior of buses to increase the image of bus transit (e.g., Ibraeva

✉ Peter van der Waerden
p.j.h.j.v.d.waerden@tue.nl

[1] Urban Planning Group, Eindhoven University of Technology, PO Box 513, 5600 MB Eindhoven, The Netherlands

[2] Transport Research Group, Hasselt University, PO Box 6, 3590 Diepenbeek, Belgium

and De Sousa 2014; d'Ovidio et al. 2014). To support new initiatives, involved decision makers want to know what travelers prefer regarding their perfect bus. Meeting these preferences could trigger travelers to use the bus more often. Insights into travelers' preferences and resulting use, especially regarding the interior of buses, are still limited (e.g., Redman et al. 2013; Jain et al. 2014) or not really dealing with journey experiences of bus users (e.g., Stradling et al. 2007).

Therefore, a study is set up that aims to provide more insight into travelers' preferences regarding the interior of standard buses that serve the urban public transport. The study focuses on standard buses that are used at both the city and regional scale. Almost the whole fleet of a public transport company in Belgium consists of this type of buses. As data collection method a stated choice experiment is set up. Because of the large amount of interior-related attributes a hierarchical information integration approach including a stated preference experiment is applied. This paper is mostly based on the master study of Couwenberg (2014).

The remainder of this paper is organised as follows. First, a brief overview is given of existing studies regarding the role the interior of buses plays in travelers' choice behavior. Next, the adopted research approach is outlined, followed by a description of the data collection and the sample. In the following section, the setup of the model analysis and the results of the model estimation are described. The paper ends with conclusions and recommendations for both bus constructors and future research.

2 Literature review

In the past, a variety of studies regarding various components (design and color) and the configuration (location of components) of the interior of buses have been presented (for a more extensive overview see Napper 2014). The overview of Napper also includes passengers' requirements regarding the ease of cognitive and physical access, vehicular and personal safety, physical and psychological comfort, flexibility in using transit time, an aesthetically appealing environment, cleanliness, and suitable space for a comfortable and useful journey. The study focuses on how bus configuration should be carried out, ensuring an optimum mix of operational and manufacturing needs. The study showed that the needs of manufacturers could be fulfilled by a modular interior. In the paper, there is no attention paid to passengers' needs and preferences. de Ortúzar et al. (1996) used a Delphi survey method to study the importance of various level-of-service variables in the context of bus services. Comfort associated with vehicle occupation and characteristics (seat quality and spacing, dirt, noise, etc.), was one of the variables that were selected for detailed investigation. This was done using a stated choice experiment. The relative importance of the variable vehicle-comfort on average compared to the scores of other variables. In most cases, travel costs, in-vehicle time and accident risk have a higher importance score while waiting time, bus occupancy and variety in waiting time have a lower score. It appears that low-income bus users rated the vehicle-comfort variable more positively than medium- and high-income bus users. In search for a Service Quality Index (SQI) for buses, Hensher et al. (2003) investigated several vehicle-related attributes: seat availability on bus, access to bus, temperature on bus, driver attitude, and general cleanliness on board. The vehicle-related attributes were part of a bus service package consisting of a bundle of 13 attributes. In a stated preference experiment, respondents were invited to evaluate three hypothetical service packages in order to choose one. It appeared that the contribution of the vehicle-related attributes to the SQI is limited and strongly related to traveler segments. This is especially true for bus cleanliness and driver friendliness. Richter and Keuchel (2012) used comfort as one of the constructs in their stated choice study on mode choice in passenger transport. The construct included the attributes cleanliness of train/bus toilet, cleanliness of train/bus inside, seat availability, and comfort of seats. The study showed that all attributes significantly contribute to the rating of the construct 'comfort'. Most attributes also significantly influence the passengers' mode choice behavior. Only the parameter of 'comfort of seats' is not significant.

The concept of bus comfort is investigated in several studies. For example, De Oña et al. (2013) found in their customer satisfaction survey that comfort significantly influences the overall bus service quality. From their study, it appears that comfort brings together the cleanliness, space, and temperature in a bus. Jain et al. (2014) investigated four factors that are related to an efficient public transport: comfort, reliability, safety, and low cost. In their study, comfort of public transport was defined using the attributes cleanliness, air-conditioned, seating availability, low floor, (un-)crowdedness, accessibility, and travel time. Based on a pairwise comparison, it appears that comfort has the lowest weight compared to other factors that were included. Maraglino et al. (2014) used users' perceptions to model the perceived quality of public transport in the city of Santander (Spain). Among the influential attributes were interior-related attributes: information on bus monitor, cleanliness and hygienic condition on the bus, heating and air conditioning, comfort, and degree of crowding. D'Ovidio et al. (2014) identified the component 'comfort and cleanness' (including vehicles' modernity, crowding, and air conditioning) as most important in the customers' perception of public transport service quality.

Some studies focus on one specific aspect of a vehicle's interior or atmosphere, both inside trains and buses. Li and Hensher (2011) reviewed several studies dealing with travelers' preferences regarding in-vehicle crowding and willingness to pay for crowding reduction. Most studies they reviewed are based on stated choice experiments and show that crowding affects the attractiveness of public transport through an increase of the value of travel time. The studies also showed that travelers are willing to pay for reducing in-vehicle crowding. Another study focuses on thermal comfort inside a bus (Pala and Oz 2015). The researchers developed a standard testing and computational model for bus designers and heating engineers to measure the interface temperatures for seat and back support at least for one passenger. This could be done by using so-called personalised ventilation systems.

In addition to previous studies, some general trends such as the individualisation of society and the demand for more privacy can be observed that affect customers' requirements. An upcoming trend in this context is 'the driving office': folding tables, adjustable backrest and footrest, and electronically controlled temperature. This also requires a bus that is comfortable, flexible and quick and that the quality is in balance with the price. A new evolution is the increasing attention that is paid to environmental-friendly buses and the use of electronics inside the public vehicles. For example with the provision of a 4G hotspot, Wi-Fi can be made available in a bus, the cleanliness of a bus, the feeling of safety, the accessibility, and the communication are important. Furthermore, the use of correct colors and materials can increase the emotional status of the passengers. Sometimes a better design, glass roof and confidential color tones can make all the difference.

Looking at the studies and trends mentioned in this section, it can be concluded that the bus could be considered from different perspectives: as a place that has to be accessible, safe, comfortable, and clean. The bus is also considered as a suitable place to work, relax, and eat. The perspectives refer to a variety of attributes related to the interior of a bus including physical attributes (seats, toilets, doors, windows, etc.), circumstances (crowdedness, temperature, dirt, noise, etc.) and information provision (announcements, presentations, etc.).

3 Research approach

The literature review resulted in a long list of attributes that might have an influence on travellers' preferences regarding the interior of buses. To study the influence of the attributes a stated choice experiment has been set up. Hensher et al. (2003) selected stated choice because 'some attributes of interest (e.g., air conditioning, low floor entry) may not exist today on many urban buses'. In a stated choice experiment, travellers' are invited to evaluate hypothetical choice alternatives (e.g., Hensher et al. 2005). The alternatives are defined using a set of attributes and attribute levels. The experiment offers the possibility to investigate non-existing alternatives and control all the attributes and accompanying levels of these alternatives. In addition, respondents can express their preferences for several alternatives by using rating, ranking, or making a choice.

The large number of possible influential attributes stimulated us to choose the hierarchical information integration (HII) approach as presented by various researchers (e.g., Oppewal et al. 1994; Molin and Timmermans 2009; Van Helvoort-Postulart et al. (2009); Richter and Keuchel 2012). The approach includes the possibility to handle a large number of attributes by combining attributes into smaller sets of decision constructs. HII structures complex decision problems by assuming that individuals categorize decision attributes into separate (high-order) decision constructs. It is assumed that individuals integrate information about attributes into constructs to form impressions of alternatives. The idea behind the HII method is to structure decision tasks to study and analyse each integration process separately and jointly. Oppewal et al. (1994) identified some problems and limitations related to previous use of HII and developed an approach of Integrated HII choice experiments. This approach was used in the current study. The approach suggests that a choice alternative is described by the attributes of one construct and summary measures for the remaining constructs.

In general, the following steps can be distinguished when setting up a stated choice experiment based on the HII approach.

- Step 1: Selecting interesting attributes.
- Step 2: Defining corresponding constructs.
- Step 3: Defining attribute levels for selected attributes.
- Step 4: Combining attribute and construct levels into choice alternatives.
- Step 5: Composing choice tasks.

Based on interviews with various bus designers and constructors (e.g. Van Hool NV, manufactory of buses in Lier, Belgium) and a visit of the 'Busworld Europe' exhibition in Kortrijk (Belgium), a list of 30 relevant attributes was composed. These attributes were grouped into six constructs based on the perspectives mentioned in the previous section. In each construct, the bus is considered from a different perspective: the bus as *accessible vehicle*, the bus as *sensory attractive vehicle*, the bus as *comfortable seating place*, the bus as *eating and drinking place*, the bus as *working place*, and the bus as *relax and entertainment place* (Fig. 1).

All constructs are described in more detail using five attributes per construct. For example, the construct 'Accessible vehicle' is detailed by means of the attributes space for standing (*Access*), type of support when standing (*Standees*), way of information presentation (*Announcement*), contents of provided information (*Announcement of*), and type of available bicycle rack (*Bicycle rack*). Each attribute consists of two attribute levels (Table 1).

The stated choice experiment was set up according to the HII principles meaning that a choice task consisted of a detailed description of one of the constructs using the attributes and a global description of the other constructs. This global description was done using two levels of availability: poor/limited (−) or good/sufficient (+). The construct and attribute levels were combined into choice alternatives using a 2^{10} fractional factorial design (five columns for constructs, and

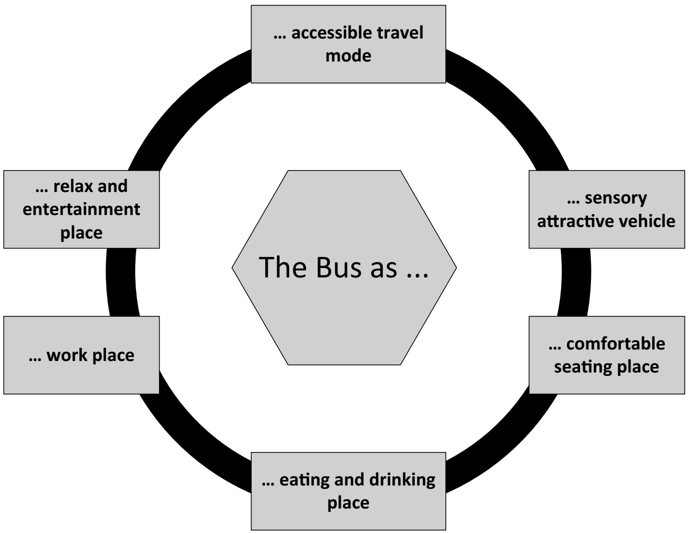


Fig. 1 Investigated constructs

Table 1 Details of constructs and corresponding attributes and attribute levels (Couwenberg 2014)

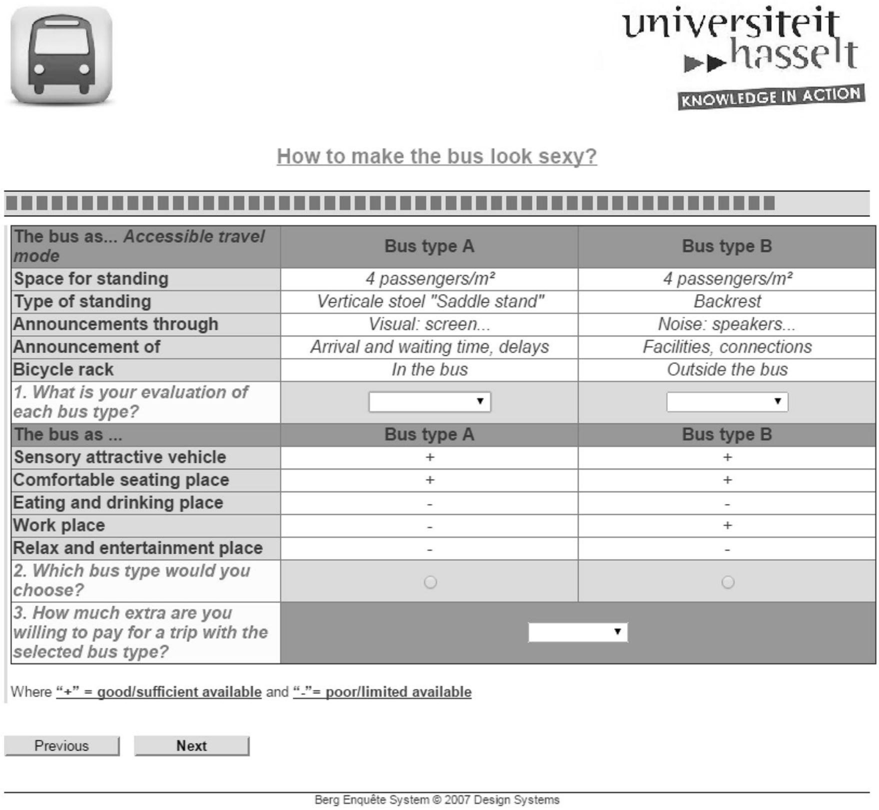
Construct The bus as …	Attributes	First attribute level	Second attribute level
Accessibility and announcement facilities			
'… an accessible travel mode'	1 Space for standing	Two passengers/m^2	Four passengers/m^2
	2 Type of standing	Backrest	Vertical seat (saddle chair)
	3 Announcement means	Audio: speaker, microphone	Visual: display, countdown
	4 Announcement message	Arrival times, delays, waiting time	Available facilities, connectivity
	5 Bicycle rack	In front or at back of the bus	Inside the bus
Sensory facilities			
'… sensory attractive vehicle'	1 Light	Atmospheric lighting	Accent lighting at footsteps, reading lamp
	2 Temperature	General heating and air conditioning	Individual seat heating and air conditioning
	3 Visibility side windows	Window cleaner	Sunlight protected
	4 Open bus	Large windows	Roof of glass
	5 Air	Hinged windows on the side	Hinged windows on the roof
Passengers seat comfort facilities			
'… comfortable seating vehicle'	1 Seat amount	More seating places	More standing places
	2 Seat on the side	Looking inside the bus	Looking outside the window
	3 Seat composition	Individual seat	Bench
	4 Seat options	Folding elbow/foot rest	Folding backrest 180^o
	5 Seat comfort	Standard seat	Spacious seat
Service facilities			
'… eating and drinking place'	1 Trashcan	One big trashcan	Individual trashcan per seat
	2 Cup	Cup holder inside the table	Cup holder on the side
	3 Catering option	Drink/eat machine available	Drink/eat machine not available
	4 Bathroom	Toilet	Washbasin
	5 Cleanliness	Mobile cleaning service during journey	Mobile cleaning service during breaks

Table 1 (continued)

Construct The bus as …	Attributes	First attribute level	Second attribute level
Working facilities			
'… work place'	1 Table	Fixed tables	Folding individual table
	2 Coat rack	In front or at back of the bus	Coat hook near your seat
	3 Luggage rack	In front or at back of the bus	Above the seats
	4 Wi-Fi	Free limited Wi-Fi	Paid unlimited Wi-Fi
	5 Socket	Free limited energy use	Paid unlimited energy use
Entertainment facilities			
'… relax and entertainment place'	1 Television	With news, advertisement, courses	With movies, series
	2 Television through	Individual display in headrest	Streaming options for own devices
	3 Audio entertainment	General background music	Individual audio system with music, etc.
	4 Reading material	Daily free newspaper	Free library
	5 Steward	Always on the bus	On the bus during special events

five columns for attributes). The smallest number of profiles of this design consisted of 12 profiles. The profiles were randomly combined in sets of two. These two choice alternatives form the choice task (Fig. 2).

Respondents were asked to evaluate the detailed constructs (Evaluation 1, see Fig. 2), make a choice between two bus interiors (Evaluation 2), and indicate the amount of money they want to pay extra (compared to the current price of 1.00 euro for a short bus trip) for the chosen bus interior (Evaluation 3). Each respondent was asked to evaluate six different choice tasks, each with another detailed construct. The choice tasks were included in an internet-based questionnaire and distributed across individuals with different background: employees and students of the university, family and friends, and respondents from previous studies. In the introduction of the questionnaire, respondents were told that the study focuses on standard buses used in urban and regional public transport services.



universiteit hasselt KNOWLEDGE IN ACTION

How to make the bus look sexy?

The bus as... Accessible travel mode	Bus type A	Bus type B
Space for standing	*4 passengers/m²*	*4 passengers/m²*
Type of standing	*Verticale stoel "Saddle stand"*	*Backrest*
Announcements through	*Visual: screen...*	*Noise: speakers...*
Announcement of	*Arrival and waiting time, delays*	*Facilities, connections*
Bicycle rack	*In the bus*	*Outside the bus*
1. What is your evaluation of each bus type?		
The bus as ...	**Bus type A**	**Bus type B**
Sensory attractive vehicle	+	+
Comfortable seating place	+	+
Eating and drinking place	-	-
Work place	-	+
Relax and entertainment place	-	-
2. Which bus type would you choose?		
3. How much extra are you willing to pay for a trip with the selected bus type?		

Where "+" = good/sufficient available and "-"= poor/limited available

Previous Next

Berg Enquête System © 2007 Design Systems

Fig. 2 Example of choice task; bus as an accessible travel mode

4 Data collection

The invitations to take part in the questionnaire were distributed among friends, family, and employees and students of Hasselt University. In total, 592 respondents have filled out the online questionnaire. Socio-demographic details of the respondents are presented in Table 2. It appears that there are a few more females than males in the sample. The distribution across the age and education levels is more or less equal. Approximately 35% of the respondents are using the bus frequently (one or more times per week) and 71 respondents indicated that they never use the bus. Their opinions are also considered relevant, so the evaluations of these respondents are included in the analyses. The distribution across characteristic levels is sufficient to continue the intended analyses but unfortunately, the sample cannot be considered as representative for the Belgian population. A comparison with the data of the Flemish Mobility Survey (OVG4) shows considerable differences between the personal and travel characteristics of the current sample and the OVG4-sample.

Table 2 Personal characteristics of the respondents

Characteristics	Levels	Survey		OVG4[a]
		Frequency	Percentage	Percentage
Gender	Female	347	58.6	50.8
	Male	245	41.4	49.2
Age	22 years and younger	204	34.5	21.8
	Between 22 and 33 years	196	33.1	14.2
	33 years and older	192	32.4	63.9
Education	Low (secondary school)	200	33.8	37.8
	Medium (high non-university)	146	24.7	33.6
	High (university and higher)	246	41.6	28.7
Bus use	Frequent (≥ once per week)	212	35.8	14.7
	Average (once per month)	182	30.7	29.1
	Infrequent (< once per month)	127	21.5	56.2[b]
	Never	71	12.0	
Travel time bus	15 min or less	149	28.6	13.2
	From 16 to 25 min	157	30.1	23.2
	From 26 to 35 min	83	15.9	19.5
	More than 35 min	132	25.3	44.0
	Never use the bus	71	–	–
Total		592	100.0	100.0

[a]Flemish travel survey: http://www.mobielvlaanderen.be/ovg

[b]Includes both infrequent and never

5 Model analyses

The analysis in this paper focuses on the choices made by the respondents. To analyse the stated choices regarding the interiors of public buses standard multinomial logit modeling is used (e.g., Van Helvoort-Postulart et al. 2009). As mentioned before, the model includes six constructs, each consisting of five attributes. In the questionnaire, respondents are asked to rate the constructs in a stated preference experiment. Formally, the utility model is expressed as follows (Eqs. 1 and 2):

$$U_i = V_i + \varepsilon, \tag{1}$$

$$V_i = \beta X_{cj} + \gamma C_j + \eta_{ic} + \varepsilon_{jn}. \tag{2}$$

In these equations U_i is the respondents' utility for using a bus type i. V_i is the respondent-specific utility for the choice task. X_{cj} is a vector of the detailed attributes of construct c in profile j and β is a vector of parameters for the effects of these attributes on the respondent's utility. C_j is a vector of values of the constructs i that are not presented at the detailed level, and γ is a vector of parameters for the effects of these values on the consumer's utility. Finally, ε_{jn} is an error component in the utility function that captures, among other things, measurement errors on the part of the researcher. This error component is assumed to be Gumbel distributed and drives the logit probability structure. Normally a Gumbel distribution is used to model the distribution of the maximum (or the minimum) of a number of samples of various distributions. η_{ic} is a construct-specific intercept correction in case that construct c is presented at the detailed level, with the mean η_c and random error component τ_{ic} (Eq. 3):

$$\eta_{ic} = \eta_c + \tau_{ic}. \tag{3}$$

For the multinomial logit model the equation as stated below is used (Eq. 4):

$$P(J_i) = \frac{\exp(U_i)}{\sum exp(U_i)} \tag{4}$$

$P(J_i)$ gives the expressions of the probability for alternative i. Therefore, the utility (U_i) has to be related to the overall utility ($\sum U_i$).

The software package NLOGIT 5.0 (Economic Software Inc. 2012) is used to estimate the model parameters. Effect coding is used to represent the effects of the constructs and the attributes (e.g., Hensher et al. 2005). Because of some estimation problems, two separate models are estimated: one including all constructs, and one including all the corresponding attributes. Both estimated models were tested against a model with all coefficients equal to zero (null-model) using the Log-likelihood Ratio Statistic (LRS). The results of the construct model are presented in Table 3.

It appears that the estimated model outperforms the model with all parameters zero. The value of LRS equals 999.09, while the Chi square distributed test-value

Table 3 Model estimation results, construct model

Construct	Parameter	Significance
Accessible vehicle	0.2348	0.0000
Sensory attractive vehicle	0.1560	0.0011
Comfortable seating place	0.7754	0.0000
Eating and drinking place	0.1097	0.0004
Work place	0.1689	0.0000
Relax and entertainment place	0.1151	0.0007
Goodness-of-fit		
Log-likelihood null	− 2462.0588	
Log-likelihood optimal	− 1962.5141	
LRS (six degrees-of-freedom)	999.0894	
Rho-square	0.203	

for six degrees-of-freedom is equal to 12.59. This means that the model is able to identify differences between the various model parameters. The value of the Rho-square (0.203) shows that the model is well able to predict the observed choices. All estimated parameters are significant indicating that all constructs influence the travelers' choices significantly. If the level of a construct is good/sufficiently (coding + 1), the probability of a bus type increases. The greatest influence can be expected from the constructs 'Comfortable seating place' and, at some distance, 'Accessible vehicle'.

Table 4 presents the results of the corresponding attribute model. In this case, the estimated model outperforms the model with all parameters equal to zero. The value of LRS is equal to 1053.73 (test-value: 43.77). Based on the Rho-square value of 0.214, it can be concluded that the model is well able to predict the observed choices. Almost all parameters significantly influence the utility of a bus type. For finding the influence of each attribute, the model parameter has to be multiplied with the code of the levels: level 1 with code − 1 and level 2 with code + 1 (for different levels see Table 1). For example, if the available standing space in a bus is equal to two passengers per square meter (level 1), the utility of a bus type increases with 0.2520. In the case of four passengers per square meter (level 2), the utility of a bus type deceases with 0.2520. Most influential attributes are the type of trashcans, mobile cleaning service, location of coat rack, location of luggage rack, programming of board television, and presence of a steward. For these attributes the following levels increase the utility of a bus type: individual trashcan per seat, mobile cleaning service during breaks, coat and luggage rack in front or at the back of the bus, board television with movies and series, and stewards on the bus during special events.

When looking at the travelers' willingness-to-pay when they could use the preferred bus type, it appears that more than 35% of the travelers do not want to pay an extra (on top of the regular price of 1.00 euro) amount of money (Fig. 3). Approximately 20% of the travelers are willing to pay 0.25 euro extra for a bus trip when the suggested interior is offered. Almost 25% indicate that they want to pay 0.50

Table 4 Model estimation results, attribute model

Construct	Attributes[a]	Parameter	Significance
Accessible vehicle	1. Access	– 0.2520	0.049
	2. Standees	– 0.2146	0.007
	3. Announcement means	0.1450	0.008
	4. Announcement message	0.3643	0.000
	5. Bicycle rack	0.2853	0.000
Sensory attractive vehicle	1. Light	– 0.1608	0.038
	2. Temperature	– 0.3094	0.000
	3. Visibility side windows	0.0495	0.334
	4. Open bus	– 0.1749	0.010
	5. Air	–[b]	–
Comfortable seating place	1. Seat amount	0.5184	0.000
	2. Seat on the side	0.0547	0.481
	3. Seat composition	– 0.1104	0.041
	4. Seat options	0.5938	0.000
	5. Seat comfort	0.5343	0.000
Eating and drinking place	1. Trashcan	1.5862	0.000
	2. Cup	– 0.9918	0.000
	3. Catering option	– 0.1445	0.044
	4. Bathroom	0.1303	0.174
	5. Cleanliness	1.0256.	0.000
Work place	1. Table	0.5795	0.000
	2. Coat rack	– 2.3454	0.000
	3. Luggage rack	– 1.2198	0.000
	4. Wi-Fi	0.7853	0.000
	5. Socket	–	–
Relax and entertainment place	1. Television	1.9493	0.000
	2. Television through	– 0.7126	0.000
	3. Audio entertainment	– 0.0347	0.583
	4. Reading material	0.5120	0.001
	5. Steward	1.3112	0.000
Goodness-of-fit			
Log-likelihood null		– 2462.0588	
Log-likelihood optimal		– 1935.1930	
LRS (30 degrees-of-freedom)		1053.7316	
Rho-square		0.214	

[a]For details see Fig. 2

[b]No estimates available

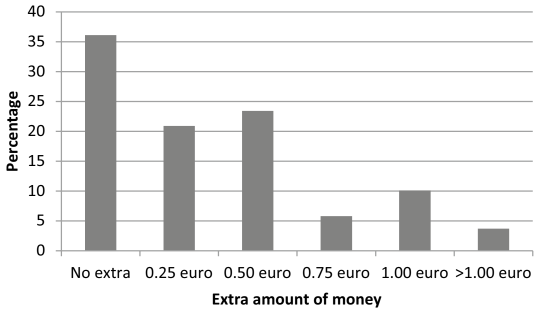


Fig. 3 Willingness-to-pay for preferred bus interior (N = 3552)

euro more and approximately 20% even want to pay 0.75 euro, 1.00 euro, or more than 1.00 euro extra for a bus trip when the bus meets the preferred interior. For this paper, the data concerning the travelers' willingness-to-pay is not investigated in more detail.

6 Conclusions

This paper presents some details of a study of travelers' preferences regarding bus interiors. Using the principles of stated preference experiments and hierarchical information integration, a large number of attributes is investigated. The study delivers various insights into the contribution of constructs and corresponding attributes on travelers' preferences regarding bus interiors for buses on urban routes. For all investigated constructs, it appears that the presence of good/sufficient quality of the bus interior significantly influences the utility of a bus type in a positive way. Also, several corresponding attributes influence the utility of a bus type significantly. Based on the estimated model parameters, it can be concluded that the most influential attributes are the type of trashcans, mobile cleaning service, location of coat rack, location of luggage rack, programming of on-board television, and presence of a steward.

The insights can help bus companies and constructors to improve their services and buses in order to attract more bus travelers. Special attention has to be paid to the bus as comfortable seating place. Relevant measures in this context are to increase the amount of standing places, replace benches by individual seats, provide seats with folding backrest of 180°, and provide more spacious seats. Travelers also prefer a bus as accessible vehicle. To achieve this, the following measures could be implemented: provide pitches with backrest, visual display of available facilities and connecting travel options, and provision of bicycle rack inside the bus.

The current study has some limitations that can be the subject of future research. First of all, more attention has to be paid to the composition of the research sample. Unfortunately, the current sample does not represent the Belgian population/traveler. If possible, in future research both bus users and non-bus users have to be approached to get better insights in requirements of both groups of travelers. Given this shortcoming also other issues could be considered in more detail. The most important issue concerns the possibility for the travelers to experience the various interiors in a real-world situation (feel, smell, etc.). This also concerns the limited level of visualisation of the various attributes that are included in the questionnaire. However, the results of this study could be used to set up a real-world experience. Another issue concerns the analysis of the choice data. In this paper, two standard multinomial logit models are estimated. Other model types such as the latent class model and the mixed logit model could also be explored. The same holds for a more detailed search for an appropriate integrated model that includes both constructs and corresponding attributes. Finally, more detailed attention can be paid to the relation between bus types and willingness-to-pay.

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