Getting business people on the coach : a stated preference experiment for intercity long distance coach travel

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Abstract: From the middle of the 1990s, the traditional coach industry in Western Europe has been in decline. However, recent regulatory changes have created new opportunities in the sector of scheduled intercity services, resulting in fast growth of both coach lines and passengers traveling on these lines. Until now, operators have persuaded a public consisting mainly of students and people traveling for leisure purposes. In this paper we analyze whether business travelers could also be an interesting target group and what service characteristics are most convincing for them. For this purpose, we organized a stated preference experiment in which we gathered data from 63 Belgian business travelers. Analysis of the data revealed that for business travelers, price is the dominant factor in seducing customers. However, journey length, higher commercial travel speeds, ample leg space, on-board Wi-Fi and the entertainment system also play a role. Moreover, business travelers are prepared to pay for extra services. We conclude that when an adjusted service is offered, business travelers form an interesting (additional) target group for the intercity coach business. Our findings could be used by coach operators for product development and help to understand travel market segmentation, and eventually also have impact on developing a more sustainable travel policy.

Keywords: intercity coach, stated preference, modal choice, business travel

INTRODUCTION

For over two decades, the traditional coach market has been waning in most Western European countries (*1*). For instance, in the Belgian tourism market the number of long holidays (i.e., 4 nights or more) for which the coach was the main transport mode has declined from 1,250,000 in 1994 to less than 500,000 in 2014. Market share for coaches in the tourism market has also declined from 12% in the early 1990s to only 4.5% in 2014. The decline in volumes and market shares can be observed in all segments of the market and for all target groups (*2*). Long-distance shuttle services for instance, have lost many clients to low-cost airlines and the classic closed-doors tour-holiday by coach appeals to an ever more restricted group of travelers. Those customers that have remained loyal to the coach are rather traditional and conservative: they book their journeys through travel agencies instead of booking online, they prefer traditional destinations, and they are less interested in modern technologies (*2*). Consequently, coach companies risk getting trapped in a vicious circle: a traditional market discourages investments in modern marketing, innovative technologies and new concepts of travel. In turn, a conservative industry does not attract many new customers. To break this vicious circle, coach companies should invest more effort in developing new products and exploring new markets.

An example of such a new market has recently appeared through the liberalization of long distance scheduled coach services. In most countries in Western Europe, creating intercity connections by coach was for a long time seriously hampered (or even prohibited) by legislation aimed to protect national railway companies from competition. With the Transport Act of 1980, the UK was the first country to allow private companies to set up long distance bus connections. Sweden, Norway and Italy gradually liberalized their markets in the 1990s and early 2000s (*3*). However, the big break-through came with the opening up of the German market in 2013, and the French market in 2015.

Liberalized markets have seen a rapid development, both in demand and supply. In Germany, in 2016, 24 million travelers made use of the so-called *Fernbuslinien* (*4*), representing a quarter of the total coach market in Germany. In France, in the first year of

liberalization, over 5 million passengers traveled by intercity coach, representing an equally fast growth rate as in Germany. A few years' later, a dense network of scheduled coach services emerged that connects all mayor cities in Western Europe (*5*).

Research on the profile of travelers shows that in particular young people, students and people traveling for leisure purposes have made use of the intercity coach, with people traveling for business only making up a small amount of travelers (*1*). In this paper we want to investigate if and how more business travelers can be convinced to make use of the intercity coach. The remainder of this paper is structured as follows. The next section describes the evolution of the intercity coach market in Western Europe, especially after the liberalization of this market. The third section summarizes why people choose to ride a coach compared with other transport modes, with a particular focus on modal choices for business travel. To get better insights into this modal choice, we designed a stated preference experiment in which 105 Belgian business travelers participated. Details of this experiment are described in the fourth section and the results are presented in the subsequent section. The final section summarizes the major conclusions and discusses implications for the coach sector.

THE INTERCITY COACH MARKET IN WESTERN EUROPE

At the turn of the twentieth century, (collective) road transport started to challenge the then dominant mode of railway transportation. Motor coaches had some advantages over rail with regards to flexibility and cost, and were therefore particularly successful on less frequently used connections. However, companies operating these coaches soon started services that ran parallel to existing rail connections. Authorities reacted by creating legislation that tempered competition between two scheduled services. The legislation took different forms in different countries but nearly always favored the railway over the road. Consequently, private bus and coach companies focused on occasional services and subcontracting to large state-owned monopolists. Although, in the second half of the twentieth century these monopolists replaced some loss-making railway sections by road services, in most countries a network of long-distance scheduled coach services did not develop (*6*).

This situation first began to change in the UK with the Transport Act of 1980 that allowed private companies to establish freely scheduled bus or coach services. In the late nineties, Norway and Sweden gradually entered the path of liberalization, as did Italy in 2007. However, it was the liberalization of the German (2013) and the French (2015) markets that was the game changer for the European intercity coach market. Before reform in the different member states, international scheduled services had already been liberalized. However, their development was seriously hampered by the prohibition to selling national tickets in large European countries. With liberalization in France and Germany, the creation of a dense pan-European network of bus connections suddenly became much more evident. This dynamic even affected small European countries such as Belgium that have not changed their legislation, but saw numerous new international coach connections develop on their territory.

During the first years of liberalization in the UK, fierce competition between operators led to a considerable increase in the number of services offered, some improvements in comfort level and a decrease in price. National Express was the only company that could maintain a nationwide network and survive. Consequently, the British market turned into a quasi-monopoly, which put growth on hold both for ridership and service innovation. Analysts argued that new companies had a hard time competing because they lacked access to the bus terminals

that served as the central points for information and sale (*7*). In the early 21st century, the democratization of the internet opened the way for the curbside bus model. The possibility of online sales and promotion made the presence in bus terminals less important, which brought down entrance costs resulting in more competition and a new market dynamism (*8*).

Although times had changed between 1980 and 2013, the story of the liberalization of the German market is remarkably similar. Once the new legislation was in place, a period of fierce competition began, leading to a fast growth in ridership and rapid consolidation on the supply side (*9*). Currently the dominant player has a market share of over 90% and ridership has hit a ceiling (*4*).

To summarize, market deregulation in several European countries has resulted in the creation of a dense pan-European network of intercity coach connections. The fast growth in ridership shows that intercity bus connections satisfy a latent demand that was present in the population (*3, 10, 11*). Therefore, the question arises what kind of people are using these new transportation services. Studies on the demographic profile of coach travelers show that their average income is lower than for the general population, and many of the clients do not own their own car. Passengers tend to be younger on average and students are heavily overrepresented. In most cases, coach users travel alone to meet friends or family or for leisure purposes. People traveling for business reasons only make up between 3% (UK) and 18% (Spain) of the clients (*1, 8, 12–14*). In the next section, we review the literature, considering why and under which circumstances travelers in general, and business travelers in particular, prefer to use a coach over any other transport mode. As such, we are looking first to answer the questions if and how business travelers can be convinced to travel by intercity coach.

DETERMINANTS OF THE PREFERENCE FOR INTERCITY COACH TRANSPORT

For a long time, rail systems were believed to attract significantly more passengers compared with bus/coach systems, even if both systems offer similar level-of-service (LOS) characteristics such as travel time, fares, frequency and the number of transfers. Given the choice between seemingly equivalent systems, travelers are believed to prefer rail over bus/coach. This preference for rail may be explained by "soft" or rather intangible factors such as reliability, comfort and safety, for which rail is often perceived to be superior. Vuchic and Stanger, for example, confirmed that most attributes favor rail services (*15*). Their study is based on a comparison of two very different types of services in different metropolitan areas: the Lindenwold "Hi-Speed Line" (between Philadelphia, Pennsylvania, and Lindenwold, New Jersey) and the Shirley Highway Busway (between Washington, D.C., and Richmond, Virginia). This situation does not, however, really represent a true choice context between rail and bus. It would be better to have information from corridors where both transit modes coexist and compete. Kottenhoff and Lindh, for example, present such evidence from Blekinge, in the south of Sweden (*16*). In January 1992, a new high-standard train service replaced a combination of existing old rail cars and standard coaches. Furthermore, 18 months later a new high comfort coach service was introduced as a complement to the train timetable and to increase the number of departures. In 1994, 500 passengers were interviewed of which almost half were carried out on board trains and buses respectively. Respondents who used the coach service indicated that this is mainly because the coach departure time was more convenient. The majority however prefers a train service above an express coach service for journeys longer than one hour. Also, the modern express coach is valued lower compared with the train service,

and this is even more evident among train riders. However, investing in additional leg-room in coaches might convince at least some of the train passengers. Coach passengers' value 10 cm (4 inch) more leg-room in coaches at about 5% of the fare, whereas train passengers value this at about 13% of the fare.

Another alternative source of data is from stated preference surveys (SPS) in which travelers are asked to respond to hypothetical scenarios of coach and rail services. It is interesting to note that such SPS often do not find a particular preference for rail over coach services (*17*, *18*). SPS are not only useful in determining the overall preference for a specific transport mode, but also to value the specific attributes of this transport mode (*19*). With respect to coach services, almost all studies found traditional LOS attributes such as travel time and cost to be highly significant (*17*, *18*, *20*). Findings related to rather intangible attributes such as reliability, comfort and safety are more mixed. For example, Ahern and Tapley (*18*) found that comfort defined by having a toilet on-board a coach was significant, but it obtained an unexpected negative sign. This might indicate that the presence of on-board services only is not sufficient; the quality of these services should also be guaranteed. Toilets on-board coaches or trains are indeed often poorly maintained. Furthermore, reliability is often found to be insignificant, but several studies point out that the existing coach services already perform well and therefore respondents might rate reliability as less important (*18*, *20*)

However, these previously mentioned studies do not specifically focus on business trips. It is nevertheless important to control the travel purpose in the evaluation of a coach alternative as people on business-trips tend to assign different levels of importance to their attributes of choice. In their practical guide to the demand for public transport, Balcombe et al. point out that an employer is likely to be less sensitive to a fare increase than a passenger paying his or her own fare if a local business journey needs to be made (*21*). Consequently, very low price elasticities are generally found for business trips with public transport. Moreover, business travelers value time much more compared with people traveling for other purposes, particularly if the chosen mode is public transport. However, most existing evidence on modal choices for business trips focus on the choice between airplane, car, or train (*22–24*). For example, Fowkes et al. found that a short journey time and convenient departure time are important factors for long-distance business trips by airplane, car and train (*25*). In addition, the ability to work while traveling was found to be an important reason to choose the train above the other modes. Many business travelers did not perceive the coach as a viable option because it is considered to be very slow compared with other transport modes. In addition to the journey length and departure times, other quality of service factors might determine modal choices for business trips. Balcombe et al. summarized the values for such quality of service factors and, even though these values apply to rail transport, it might be useful to consider these for coaches too (*21*). For instance, business travelers paying for themselves particularly value a quiet environment, whereas business travelers whose employers pay particularly value free drinks and a quality newspaper or magazine. Having breakfast or a light snack on-board is valued lower by business travelers compared with leisure travelers. In addition, business travelers value the availability of free car parking or taxis.

To summarize, coaches are generally valued lower than competing modes of transport by all travelers. Investing in travel times, comfort and on-board facilities might increase the attractiveness for travelers in general and business travelers in particular. However, evidence is missing on the modal choices for business trips using coaches compared with other modes

of transport. The remainder of this paper therefore describes the details of a stated choice experiment conducted among business travelers that was constructed to answer these questions.

METHOD

In our stated preference experiment, we confronted business travelers with hypothetical offerings and asked them whether, given the price and level of service offered, they would buy a ticket for the coach or whether they would prefer to travel by another mode. The design used was a Bayesian D-optimal partial profile design that considers the no-choice option (*26*).

We selected the participants from the consumer panel of GFK-Belgium, a firm that maintains a demographically representative sample of consumers from the different regions of Belgium that are willing to participate in surveys. As we wanted to focus our research on business travelers, we only selected those people that indicated they sometimes traveled for business to cities such as Paris, Amsterdam or Cologne. Potential participants were pre-screened by asking them whether they would, under certain conditions of price and luxury on board, ever consider traveling to such places by coach. Only those giving a positive answer (44%) were invited to participate in the experiment. In total 105 respondents completed the experiment, but only 63 questionnaires satisfied all quality criteria and were included in the analysis. The experiment was conducted online and participants were asked to participate through mailed invitations. During the experiment participants had to choose 16 times between two coach trip alternatives or the option to not take the coach and take any other transport mode such as the car, train or airplane instead. Each participant received questions for one of the five destinations under study: Paris, Lille, Frankfurt, Cologne and Amsterdam. The participants first had to choose from nine pick-up locations in Belgium: Bruges, Ghent, Antwerp, Charleroi, Brussels, Hasselt, Namur, Liège and Arlon. The pick-up location remained the same throughout the experiment. Next, 16 choice sets of coach trip alternatives were presented at random. The trips differed in the level of service including Wi-Fi (yes/no), an individual power plug (yes/no), catering (none/light snack/hot meal), leg space (standard/luxurious), and entertainment system (collective/individual). An example choice set used in the experiment is shown in Figure 1.

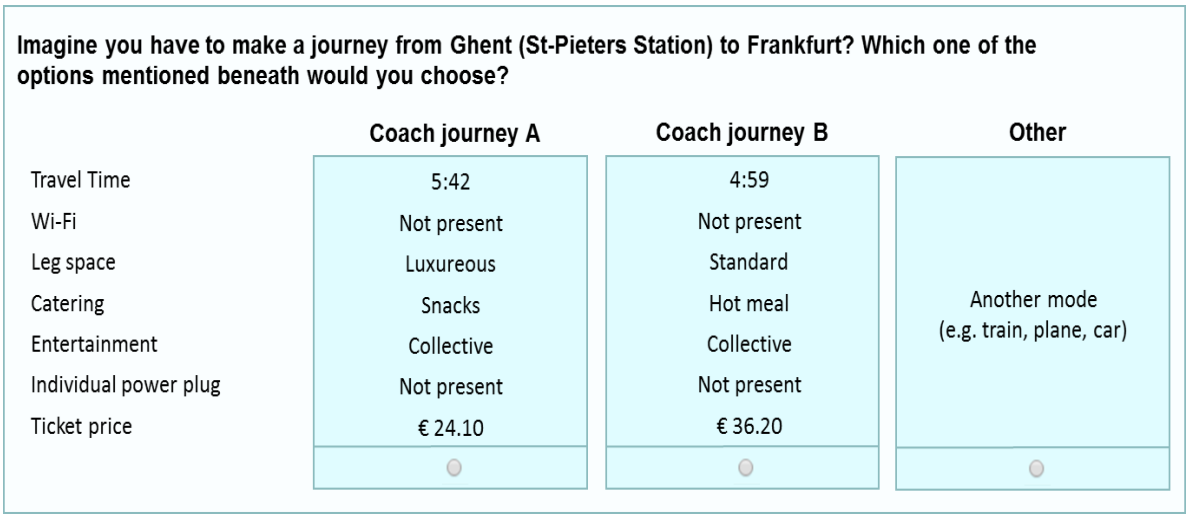

FIGURE 1 Example of a stated preference choice set

The trip alternatives also differed in price (between 6 and 37 euro) and travel time (between 1 and 8.5 hours). To determine the ticket price we made an analysis of the market situation in Belgium in 2015. A regression analysis revealed a negative exponential relationship between distance and price per kilometer. This functional relationship was then used to determine an average price level for every combination of pickup location and destination. Additionally, for every combination, a cheap and an expensive price alternative were calculated. The cheap version offered a 50% discount, whereas the costly version was 50% more expensive. To determine the travel time, the travel times mentioned in offerings from different intercity coach companies based in Belgium in 2015 were analyzed. Commercial speeds varied between 60 and 80 kilometers per hour. Therefore, 70 km/h was used as the average speed version, 80 km/h as the fast speed version and 60 km/hour as the slow speed version. Participants were only shown specific prices and travel times. As a consequence, they were not aware whether they were offered a discount, an average or a more expensive ticket. In addition, they did not know whether they were confronted with a fast, average or slow speed version.

We also collected information on the participants in the experiment, that is their age, travel frequency, educational level, profession, gender and the time they needed to reach their pickup location. This information as well as descriptive statistics on the different variables in the study can be found in Table 1.

In our stated preference experiment, we also introduced a so-called no-choice alternative (i.e., the option to travel by "any other mode"). For such an experimental design, statistical analysis can be performed using the nested logit model or using the multinomial logit (MNL) model with a no-choice constant. Following Haaijer, we preferred the latter option because it is easier to estimate and because it outperforms the MNL model on predictive fit (*27*, *28*). The models were estimated in JMP 12.0.

RESULTS

Table 2 lists the results of the no-choice multinomial logit model on the stated preference data we gathered from our sample of business travelers. As can be seen in the table, not all respondent-level variables mentioned in Table 1 are entered in the model for which the results are presented. As respondent-level variables have to be entered as interactions, the full model is too large to be estimated. The model presented is a more parsimonious model in which only significant interaction terms are retained.

The parameters estimated show the effect of the journey feature on the utility of the coach alternatives for the respondents. The parameter for Wi-Fi indicates that having Wi-Fi on board increases the utility of the coach by 0.54 (=0.27+0.27). Offering luxurious leg space also has a positive effect. However, the magnitude of the effect depends on how frequently the respondent travels, as is shown by the significant interaction effect of leg space and travel frequency. Respondents traveling monthly or more value leg space most, whereas the effect for the other groups is smaller. Offering catering also has a positive effect, as offering snacks increases the utility and offering a hot meal increases it even further.

As was the case for luxurious leg space, the effect of an individual entertainment system on board depends on the respondent's frequency of travel. Although the effect is positive for the most frequent travelers (traveling monthly or more), such a system does not make the coach more attractive for less frequent travelers.

TABLE 1 Variables used in the study

COACH JOURNEY ATTRIBUTES AND LEVELS

Price	Speed	Wi-Fi	Leg space
Cheap	*Fast*	*Present*	*Standard*
Average	*Average*	*Not present*	*Luxurious*
Expensive	*Slow*		

Catering	Entertainment system	Power plug	Journey length (hours:minutes)
No catering	*Collective*	*Present*	*Mean* 2:24
Snacks	*Individual*	*Not present*	*SD* 2:06
Hot meal			

RESPONDENT-LEVEL VARIABLES

Age		Travel frequency		Educational level		Profession	
Mean	45	*Less than once a year*	8%	*Bachelor*	33%	*Employee*	48%
SD	11	*About once a year*	17%	*Higher secondary*	14%	*Manual worker*	8%
		Multiple times a year	68%	*Lower secondary*	3%	*Other*	5%
		Monthly or more	6%	*Master*	46%	*Retired*	5%
				No degree	3%	*Self-employed*	14%
						Staff member	21%

Pickup location		Destination		Time to pickup location (min.)		Sex	
Antwerp	16%	*Amsterdam*	21%	*Mean*	26	*Men*	71%
Arlon	2%	*Cologne*	22%	*SD*	17	*Women*	29%
Bruges	5%	*Frankfurt*	22%				
Brussels	44%	*Lille*	19%				
Charleroi	5%	*Paris*	16%				
Ghent	13%						
Hasselt	5%						
Liège	10%						
Namur	2%						

The presence of a power plug on board is the only travel feature for which there is no evidence that it exerts any effect on the utility of the coach.

The relationship between the journey length and utility was best represented by a second order polynomial term. As is evident from the graphical representation of the relationship in Figure 2, the utility of the coach journey increases until a journey length of about 4 hours and then starts to decrease again. The coach seems to be most attractive for journeys between 2 and 6 hours. For shorter journeys, the effort of coming to the pickup location probably decreases the attractiveness relative to the car. On the other hand, for very long journeys planes and high-speed rail start to take over.

TABLE 2 Results of the no-choice multinomial logit model

	Estimate	Std. Error	L-R ChiSquare	DF	Prob>ChiSq
Wifi	0.27	0.0612	19.6810	1	0.000
Ample legspace	0.43	0.0859	26.7480	1	0.000
Ample legspace*Trip frequency			10.3850	3	0.016
Less than once a year	-0.20	0.1565			
About once a year	-0.12	0.1225			
Multiple times a year, but not monthly	-0.21	0.0950			
(Monthly or more=reference category)					
Catering			9.0800	2	0.011
None	-0.18	0.0662			
Snacks	0.02	0.0604			
(Hot meal=reference category)					
Individual entertainment	0.24	0.0849	8.5150	1	0.004
Individual entertainment*Trip frequency			15.6090	3	0.001
Less than once a year	-0.43	0.1597			
About once a year	-0.03	0.1220			
Multiple times a year, but not monthly	-0.17	0.0954			
(Monthly or more=reference category)					
Power plug	0.05	0.0550	0.6920	1	0.405
Journey length	0.01	0.0038	8.6740	1	0.003
Journey length^2	0.00	0.0000	8.8330	1	0.003
Speed			28.7470	2	0.000
60 km/h	-0.42	0.0823			
70 km/h	0.08	0.0594			
80 km/h					
Price	-0.07	0.0065	119.9750	1	0.000
No-choice parameter	0.35	0.2257	2.5780	1	0.108

As we presented different commercial speeds for the same trajectories, we are able to model the effect of speed regardless of journey length. Speed logically has a positive effect, resulting in a decreased utility for the slowest journeys. Also, in line with expectations, the effect of price on the utility of a bus alternative is negative and highly significant.

The no-choice alternative was not significant, so we can say there is no evidence that the participants in our survey preferred either the coach or another mode of transport (*27*). As only people that would consider traveling by coach were included in the survey, this result is also in line with expectations.

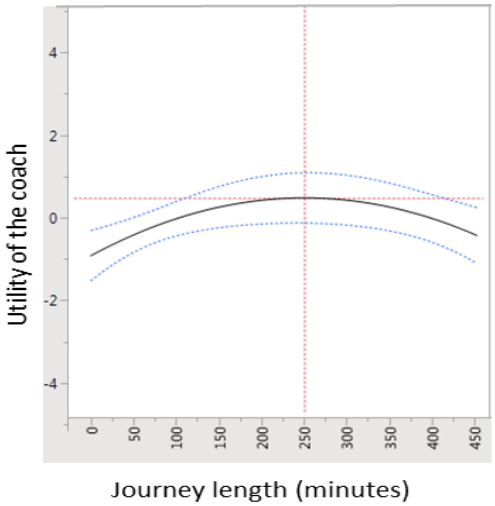

FIGURE 2 Effect of journey length

Figure 3 shows us the relative importance of the different parameters in the model. The values shown are based on the negative logarithm of the p-values expressed as a percentage of the strongest real effect (i.e., as a percentage of the value for price). We can see that price is the dominant factor in predicting coach utility. Ample leg space is the second most important factor, followed by speed and Wi-Fi. The difference in importance between these last three characteristics is rather small, but the difference from price is very large. This finding underscores the importance of price for the attractiveness of the coach, even for this specific group of people traveling for business purposes.

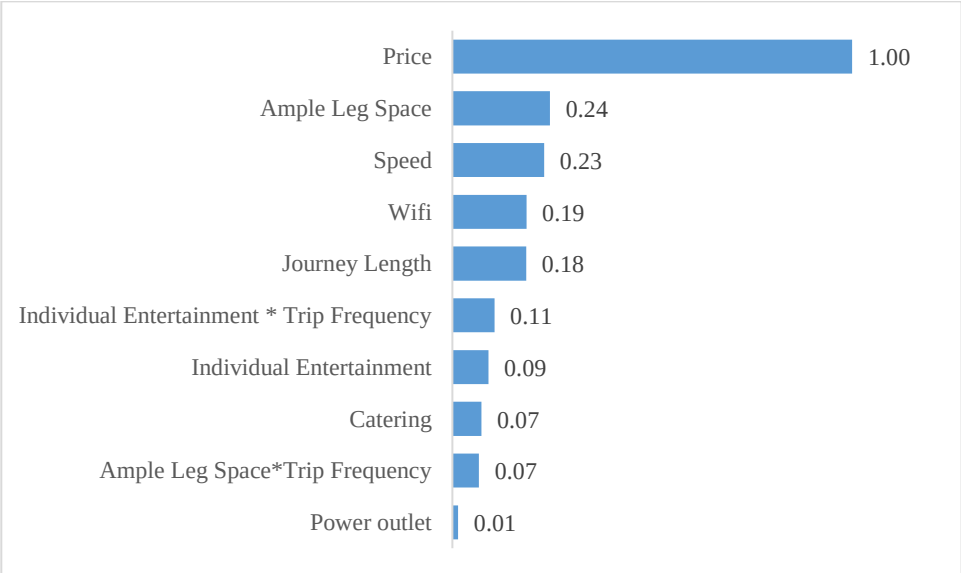

FIGURE 3 Relative importance of parameters

To further illustrate the effect of the service characteristics, we estimated the willingness to pay (WTP) for the attributes studied. Given the significant interaction of travel frequency with individual entertainment and ample leg space, the WTP for the service characteristics depends on the frequency of travel of the respondent. In Figure 4 we show the results of averaging WTP over the different travel frequency categories, whereas Figure 5 shows the results split up by travel frequency.

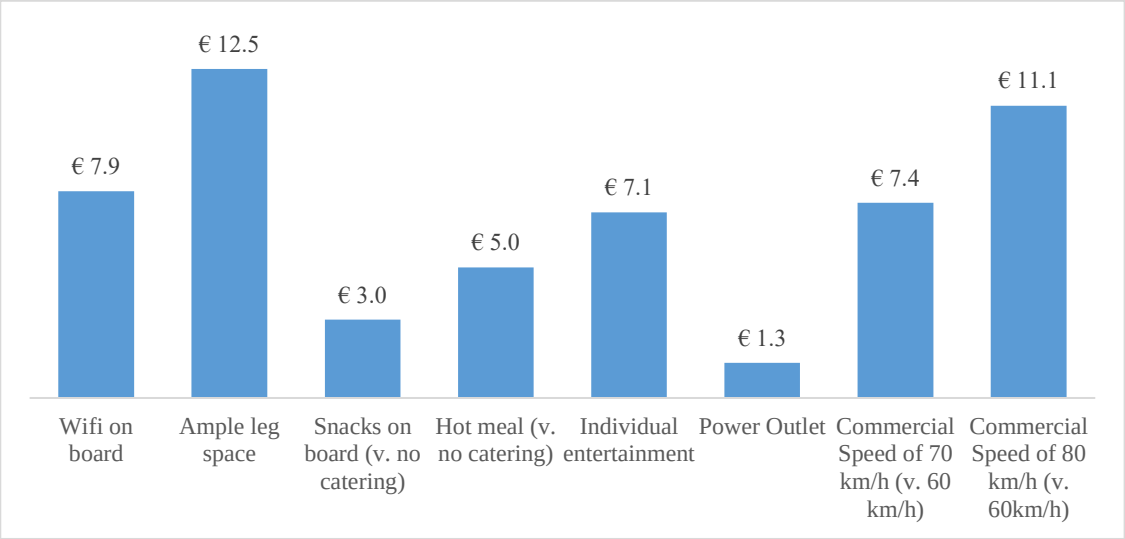

FIGURE 4 Estimated willingness to pay (average over travel frequencies)

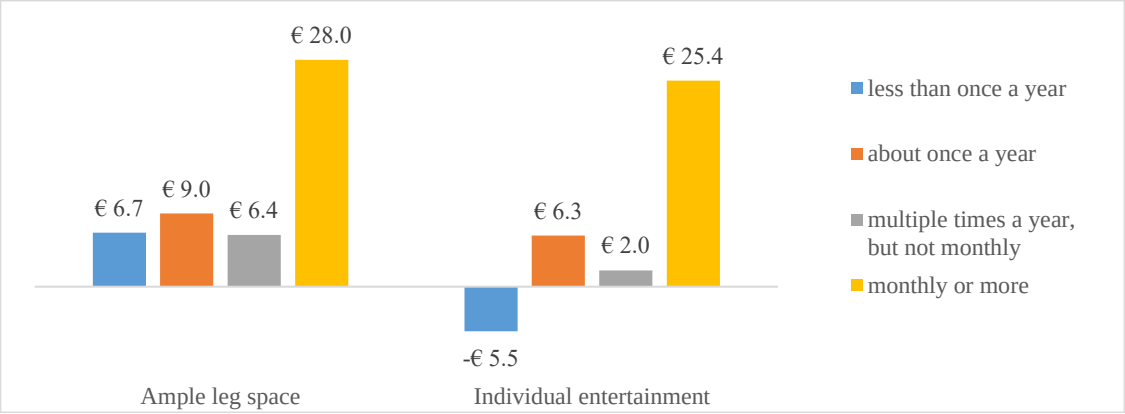

FIGURE 5 Estimated willingness to pay by travel frequency

The results show that ample leg space allows coach operators to drive up their ticket prices by 12.5 euros. The most frequent travelers in particular are willing to pay extra for this feature (WTP estimated at 28 euros), less frequent travelers are only willing to pay between 6.4 and 9 euros. Increasing speed from 60 to 70 km/h allows the operator to increase the ticket price by 7.4 euros. Driving commercial speed up to 80 km/h allows a further increase of 11.1 euros. On-board Wi-Fi is worth 7.9 euros and individual entertainment 7.1 euros. As we have seen previously, the attractiveness of individual entertainment is also dependent on the travel

frequency. The most frequent travelers are willing to pay a premium of 25 euros for the service, while the less frequent travelers prefer a collective service.

Finally, the WTP for snacks is 3 euros and for a hot meal 5 euros. This is rather low, certainly when one considers the additional costs associated with this service. The WTP for the power plug can be ignored as the coefficient was not significantly different from zero.

CONCLUSIONS AND FURTHER RESEARCH

From the mid 1990s the traditional coach industry in most Western European countries has been in decline. However, recent regulatory changes have created new opportunities. In Germany and France deregulation of intercity coach services was followed by a rapid growth in both supply and demand. Nevertheless, the majority of travelers embracing the coach are students and people traveling for leisure purposes. The question arises as to if and how intercity coach services can appeal to business travelers. A review of the literature showed that coaches are generally considered less appealing, but that investments in luxury, on-board facilities and travel time can stimulate attractiveness. In this study we conducted a stated preference experiment to investigate if and how such investments can convince business travelers to get on board.

The results of our experiment show that price is the dominant factor in attracting passengers. This might be surprising since one could expect business travelers to be less price sensitive. After all, it is generally observed that business travelers place a high value on time, and are very concerned about maximizing the productivity of their travel time. Additionally, many business travelers do not pay for travel themselves, which also decreases price sensitivity in many cases (*21, 29*). However, other studies have already pointed to the importance of the price-factor in modal choice in general, and for the choice of buses in particular (*18, 30*). Intercity buses are a very price competitive mode of transport and even though their level of service and comfort might be as good as that of other modes, price remains a predominant factor determining their relative attractiveness.

This said, other factors also play a role. Speed, ample leg space and on-board Wi-Fi can stimulate business travelers to prefer using intercity buses. In addition, they are willing to pay for the extra services. Clearly, these services are important for increasing the productiveness of their journey, a key factor for business travelers as mentioned previously. Entertainment did affect attractiveness, but mostly so for frequent travelers. Catering also had a negative effect, but the WTP can be considered to be low relative to the cost of the service. On the contrary, we did not find any evidence of the effect of an individual power plug. Journey time was probably too short to make the presence of a power plug a necessity. Additionally, such services are increasingly considered standard services that should be offered on the journey, and therefore do not present an added value. Finally, a second-order polynomial relationship between the utility of the coach trip and journey length was revealed. Journeys between 2 and 4 hours were found to be most attractive.

To summarize, the intercity coach operators could potentially attract more people traveling for business purposes than they do currently, if an adjusted service was offered. Furthermore, although price remains a key factor for these customers, offering additional services that can increase the productivity of their journey, results in a higher willingness to pay for coach tickets.

These empirical findings open up several avenues for further research. Firstly, this research project looked at the attractiveness of intercity coach travel in general, but did not consider the competitive position of the coach vis-à-vis specific other travel modes (train, plane, etc.). It would be interesting to investigate under which conditions the coach competes with these specific modes. Secondly, as our experiment has been conducted on a Belgian public only, it is unclear whether and how the specific national context of the country influences our conclusions. As such, repeating the experiment in countries with a recently liberated bus market (Germany, France, etc.) or with a strong bus culture (Spain, Turkey, etc.) could increase our insights on the matter. Also, it could be interesting to see how this young market in Belgium evolves in the near future and whether this affects the attitude of the public toward the service. Finally, on a more abstract level, research should address the role that the intercity coach can play in the sustainable transport systems of tomorrow.

The authors confirm contribution to the paper as follows: study conception and design: SL, VVA, FW, RK, DPC; data collection: SL; analysis and interpretation of results: SL, RK, VVA, FW; draft manuscript preparation: SL, VVA, FW. All authors reviewed the results and approved the final version of the manuscript.

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