Travel experience on board urban buses: a comparison between Bristol and Brescia

Michela Bonera[1*], Giulio Maternini[1], Graham Parkhurst[2], Daniela Paddeu[2], William Clayton[2], David Vetturi[3]

[1] *Department of Civil, Environmental, Architectural Engineering and of Mathematics (DICATAM) - University of Brescia, Brescia, Italy*
[2] *Centre for Transport and Society (CTS) - University of the West of England, Bristol, United Kingdom*
[3] *Department of Mechanical and Industrial Engineering (DIMI) - University of Brescia, Brescia, Italy*

Abstract

Transport service suppliers try to provide faster trips to ensure users to spend as little time as possible travelling. On the other hand, previous studies have been conducted to investigate the value of travel time as an opportunity, and to consider interventions that can increase the perceived value of time so that reducing it becomes less important. Such studies seek to understand to what extent different activities are carried out, how personal objects are used, and how travellers' levels of sociability could influence their perceptions of the journey. The present paper extends the scope of the literature by reporting on a comparative investigation of two different contests, Bristol (UK) and Brescia (IT), by analysing the quality of time spent on board urban buses. The aim is to identify relationships between objective factors and users' perceptions, and to pinpoint similarities and differences between the two contexts. Furthermore, Travel Experience Indices have been developed to provide a quantitative evaluation of the travel experience.

Keywords: travel experience; travel time use; urban buses; customer satisfaction; customer satisfaction index.

1. The concept of travel experience

Providing people with pleasant public transports is crucial in order to foster more sustainable choices in their mobility habits. These choices are affected by several factors, mainly related to the transport system features and facilities provided (e.g. accessibility, availability, time schedule, information etc.). At the same time, personal experiences can also play a relevant role in the overall assessment of the service and its use. Understanding passengers' behaviour is therefore a core aspect that needs to be investigated, in order to encourage public transport use and enhance users' loyalty (Stradling et.al., 2007; Hill and Roche, 2007; Eboli and Mazzulla, 2010; Redman et al., 2012; Clayton, 2015; Klein, 2016). Although providing users with a transport service that has a high level of

---

[*] Corresponding author: Michela Bonera (m.bonera010@unibs.it)

performance is a priority in order to obtain a positive response, secondary factors should also be accounted when it comes to assess the overall transport service quality (Clayton, et al., 2016).

Travel time is considered one of the main parameters to define the service supply and it is associated with an economic value, which is translated into a transportation cost. The travel time value is related to a unit cost which varies depending on several parameters (e.g. individual wage, usefulness of the trip, travel condition etc.), so that the longer the travel time, the higher the total cost. That is why travel time savings are in general one of the main achievements expected from a transport system improvement (Victoria Transport Policy Institute, 2017; Fiorello and Pasti, 2003; Wardman, 2016). Several studies have been carried out to understand how travel time can be estimated not only in economic terms: according to the concept of "time as a gift", travel time can have a more subjective value, namely the opportunity for passengers to dedicate time on board to personal business or to have a "break" from everyday life (Jain and Lyons, 2008; Watts, 2008; Mokhatarian and Salomon, 2001). The possibility of spending time in a pleasant way on board depend on several factors, which are mainly related to the transport mean, travel duration and travel conditions (e.g. possibility to seat, crowding, etc), but also to a person's attitude, so that passengers travelling by different transport means can employ and perceive their time differently (Lyons & Urry, 2005).

Over the last decade, new research has been carried out, which aimed at investigating the concept of "travel experience", considering different public transport modes (Lyons et al., 2007; Jain and Lyons, 2008; Watts, 2008; Bissell, 2009; Lyons et al., 2012; Clayton et al., 2016). They examined people's journeys in terms of activities carried out, use of personal belongings and the influence of the social contest on passenger perception. Many of these researches showed that activities such as reading, looking around and working or studying, talking, resting and eating or drinking are more common among people. The availability and use of mobile devices showed a certain relevance, as a proof of the strong influence that technology has on people's lives (Wardman, 2016). Also, the social context showed a certain influence on a person's travel perception, given that on the bus, which is a public space, people can interact (Bissell, 2009).

The urban bus system still presents shortcomings, especially if compared to private cars (Steg, 2003), but it is the most widespread public transport means among middle sized cities, where the transport demand usually does not justify the implementation of a more innovative or performant system (Clayton, 2015; Montanari and Zara, 2006).

As a result, the present paper extends the scope of the literature by reporting on a comparative investigation of two different contests, Bristol (UK) and Brescia (IT), by analysing how passengers spend their time on board, in order to analyse whether they can, to some extent, benefit from their journey time and understand how the service can be improved.

This research was carried out in cooperation with the researchers of the Centre for Transport and Society (UWE, Bristol), and their previous experience was taken as a reference in order to perform a comparison between the case studies (Clayton, et al., 2016).

2. Methodology to investigate passengers' travel experience

Statistical tools such as descriptive statistics and regression analysis have been employed to investigate the concept of travel experience and the statistical software SPSS was used to perform such analysis. The descriptive statistics provided a clearer view of

the sample characteristics, while the regression analysis allowed to detect the relationships among the several variables and parameters that were collected. Lastly, travel experience indices were defined, to highlight the strengths and weaknesses of the travel experience.

A questionnaire was designed for study purposes, by following the template of the one previously employed for the research done in Bristol in 2011 (Clayton, et al., 2016). Passengers were asked to answer a specifically-designed questionnaire while on board, in order to collect more reliable information about their travel experience.

Due to the aim of the research, questions were only related to specific topics and did not consider the common parameters usually included in service quality assessment (CEN, 2002). Before delivering the questionnaire, a few minutes were taken to allow passengers to have enough time to undertake their journey in the most ordinary way as possible. The activity took place in spring 2017 during weekdays, from early morning to late afternoon.

2.1 Case study overview

The city of Bristol (UK) and Brescia (IT) were chosen as case study areas. Both the cities had recently been ranked among the best cities in their country for their public transport networks (Bristol received the European Green Capital Award in 2015 and Brescia's transport system was named among the most attractive ones in Italy in 2017).

In order to obtain more comparable data, similar bus routes were selected in the two cities, based on length and coverage of the itinerary (e.g. served areas, directions relative to the city centre) and attractors (e.g. universities, train stations, city centres or other major places). Seven routes were chosen, four in Bristol and three in Brescia and a comparison between the two samples was performed.

A sample of 1,355 passengers was collected, 801 in Bristol and 554 in Brescia. Most of the interviewees were ordinary users (72% in Bristol, 87% in Brescia), 16-34 years old (65% in Bristol, 63% in Brescia), women (57% in Bristol, 66% in Brescia) who had no car available for the same trip (81% in Bristol, 85% in Brescia). Passengers were travelling mainly for work (26% in Bristol, 29% in Brescia) and education (22% in Bristol, 24% in Brescia) and their trip was about of 10-20 bus stops long (53% in Bristol, 49% in Brescia). Smartphones were the most common object that people had (81% in Bristol, 96% in Brescia) and used the most (55% in Bristol, 64% in Brescia), along with food (22% in Bristol, 21% in Brescia) and books (11% in Bristol, 11% in Brescia). People often spent their time on the bus in activities related to mobile device use (68% in Bristol, 55% in Brescia), such as browsing the Internet (34% in Bristol, 25% in Brescia), accessing social networks (34% in Bristol, 21% in Brescia), calling or texting (36% in Bristol, 31% in Brescia) and listening to music (32% in Bristol, 14% in Brescia). Other common activities were window gazing (57% in Bristol, 39% in Brescia), talking to other people (28% in Bristol, 33% in Brescia) and in Bristol reading for leisure (18%). Responses regarding a personal perception of the journey are reported in Table 1 and

Table 2 and show an overall positive evaluation of a passenger's travel experience.

Table 1. Passengers' perceptions about their travel experience.

Question	Topics	Bristol (%)	Brescia (%)
"What do you think about riding the bus in general?"	I don't like it	12.6	11.2
	I neither like it nor dislike it	38.5	35.7
	I like it	45.2	51.4
1 - "How was your time on the bus today? Enjoyable or boring"	Boring	33.1	14.0
	Neither boring nor enjoyable	36.0	25.0
	Enjoyable	30.8	61.0
2 - "How was your time on the bus today? Relaxing or stressful"	Stressful	18.6	16.6
	Neither stressful nor relaxing	24.8	20.4
	Relaxing	56.6	63.0
3 - "How was your time on the bus today? Comfortable or Uncomfortable"	Uncomfortable	20.5	17.8
	Neither un-comfy nor comfy	22.0	18.0
	Comfortable	57.5	64.2
4 - "How was your time on the bus today? Useful or wasted"	Wasted	9.6	11.7
	Neither wasted nor useful	11.1	10.4
	Useful	79.2	78.0

Table 2 Passengers' ease in doing activities or toward other people' behaviour.

Topic	Possible answers	*"How comfortable are you in…?"*		*"How comfortable are you if other passengers…?"*	
		Bristol (%)	Brescia (%)	Bristol (%)	Brescia (%)
1_Making phone calls	Not at ease	33.9	46.8	26.2	33.8
	Neither at ease nor not at ease	14.4	16.2	17.1	18.2
	At ease	42.9	34.6	48.7	46.2
2_Listening to music	Not at ease	9.0	28.5	11.4	10.3
	Neither at ease nor not at ease	4.5	3.1	8.6	9.7
	At ease	75.4	65.9	70.9	78.4
3_Using a laptop	Not at ease	51.9	77.4	12.6	10.6
	Neither at ease nor not at ease	13.2	10.3	12.4	10.1
	At ease	20.3	8.8	63.4	76.7
4_Talking to strangers	Not at ease	37.0	42.5	13.5	21.0
	Neither at ease nor not at ease	20.6	15.0	14.9	15.3
	At ease	32.5	40.0	61.5	60.9
5_Eating or drinking	Not at ease	27.5	68.2	23.8	40.6
	Neither at ease nor not at ease	17.9	10.5	13.2	13.0
	At ease	43.1	18.2	52.1	44.5

2.2 Personal or objective factors which affect travel perception

Regression analysis allowed to detect correlations between objective variables and perception statements. Specifically, the responses to the questions of Table 1 were considered as dependent variables while predictors were all the other features gathered through the questionnaire, which were related to activities done, object used and other trip characteristics. Five separate models were built, one for each of the questions related to travel time perception (Table 1).

The goodness of fit was assessed through the p-value, which represents the degree of significance of the model; correlation resulting from the analysis needs a p-value lower than 0.05 to be considered acceptable. Referring to the single predictors only the ones with p-values lower than 0.05 have been reported here, based on a three-level significance

scale: * p-value <0.05; ** p-value <0.02 and *** p-value <0.01. The "Est." parameter indicates the magnitude of the correlation and whether it is direct or inverse. Owing to the structure of the algorithm, correlations were calculated by referring to the higher value of response of the dependent variable that, in this case, was the one associated with the most positive response to each question. The results of the regression analysis are shown below in

Table 3.

Activities undertaken on board, as well as some objects used, had a certain influence on travel-time perception. In Bristol it resulted that passengers who used mobile devices for their personal activities (e.g. browsing Internet, emails, reading or listening to music) were more likely to have a pleasant trip, whereas making personal calls on the bus, as well as accessing social networks, influenced the trip perception negatively. On the other hand, resting and talking with other people had a positive influence in Brescia, whereas eating or working/studying was related to a less comfortable trip. Seat availability and crowding level on board had a negative influence among Brescia bus passengers, whereas this correlation was not recorded in Bristol. This was also confirmed by the fact that people felt more comfortable during non-peak hours, thus when it is more likely to find less people on board. This variability between the two cities may be owed to the fact that Italian buses provide a lower number of seats to guarantee more space for people to flow on board. On the other hand, English buses present the completely different interior setting, thus more seats are provided to guarantee a higher level of comfort. This feature, of course, can affect many other aspects of the travel experience such as feeling at ease to move and carry objects on board.

In both the cities, young people (14-26 years old) evaluated more negatively their journey experience: this record is significant since young people should be the main target the transport agencies must commit to in order to enhance their desire to use public transportation.

Referring to the bus as a public space, in both the cities a higher level of social disposition - or social comfort – encouraged an overall positive judgement. This means that people at ease with other passengers were more likely to have a positive and satisfying experience on the bus. It is a personal and cultural factor, yet an opinion shared by the two samples. Despite this, making the bus a more pleasant and liveable environment could lead to positive benefits. Acting on rules or providing the bus with more elements that show how to behave on board would aid to improve the public environment. Cultural elements or advertisements can attract people and provide a better shared space.

On the one hand, these results emphasized again how travel perception is a very subjective factor, therefore the positive value associated with travel time cannot be generalised. On the other hand, thanks to the regression analysis, it was possible to identify some aspects of an ordinary journey that, indeed, positively affected a passenger's perception more than others. These observations helped to understand what the aspects of the service supply were that needed to be improved, in order to meet passenger expectations.

Table 3. Regression analysis output

Category	Predictor	Bristol		Brescia	
		Sig.	Est.	Sig.	Est.
Journey general perception: like or dislike					
Social Disposition	More sociable	***	.295	***	.174
Travel-time activity	Sleeping	*	.808	**	1.165
	Using mobile device	**	.797		
	Eating	***	0.972		
Gender	Female	**	.517		
Sitting/standing	-			*	-.865
Age range	16-24	***	-1.257		
	25-34	***	-1.406		
Journey experience: Enjoyable or Boring					
Patronage level	Free seats			*	.950
Social Disposition	More sociable	***	.251	***	.205
Travel-time activity	Reading for leisure	***	.916		
	Sleeping			*	.969
	Eating	**	1.088	*	-1.643
	Using mobile devices	***	1.223		
	Talking			*	.451
Carried and used items	Food	**	-.789		
	Electronic games	**	-3.628		
	Newspapers			*	-5.032
	Magazines			*	2.190
Sitting/standing	-			***	-1.180
Age range	16-24			*	-.836
	55-64	***	-1.132		
Journey experience: Relaxing or stressful					
Social Disposition	More sociable	***	.354	***	.164
Travel-time activity	Sleeping	**	.1.160		
	Eating			*	-1.636
	Talking			***	.718
	Making personal phone calls	*	-.507		
	Using mobile devices	**	.745		
Carried and used items	Magazines			***	2.552
	Books			*	-1.209
Journey purpose	Business trip			*	-2.129
Sitting/standing	-			***	-1.519
Journey experience: Comfortable or uncomfortable					
Time of day	10am – 12pm			*	.689
Punctuality	On time	***	0.819		
Patronage level	Free seats			***	1.311
Social Disposition	More sociable	***	.246	***	0.261
Travel-time activity	Working/studying			**	1.125
	Talking			***	.584
	Using mobile devices	***	.1.056		
	Accessing social networks	*	-.517		
Carried and used items	Magazines	*	2.087	**	2.478
	Smartphones			***	.689
Sitting/standing	Standing			*	-.922
Age range	16-24			**	-.918

	Journey experience: Useful or wasted				
Car availability	Not available	-	-	*	-.617
Social Disposition	More sociable	**	.129		
Travel-time activity	Making personal phone calls	*	-.539		
	Using mobile devices	***	1.006		
	Gazing around			**	-.452
	Talking			***	.655
Carried and used items	Magazines	-	-	*	2.548
Gender	Woman	*	.387		
Age range	16-24	-	-	*	-1.023

3. Travel experience indices

Transport service suppliers assess their delivered service through quantitative parameters, in order to have a clear feedback of their service performances. Likewise, it seemed to be interesting and useful to return a quantitative measure also for a passenger's travel experience evaluation. Therefore, based on responses to questions shown in Table 1 (question 1 to 4) and

Table 2, three indices were provided, corresponding to different travel experience aspects that were identified:

- TPI (Travel time Perception) - "How was your time on the bus today. (adjective)?"
- CAI (Comfort in Activity) - "How comfortable are you in doing (activities) on board?"
- SEI (Social Environment) - "How comfortable are you if others (do activities) on board?"

The formula employed is the *Modified Customer Satisfaction Index* (Paddeu, et al., 2017). Owing to its structure, which represents a weighted average of responses, it allows to pinpoint boundary results, thus higher and lower esteems, by introducing an amplifying coefficient α_{mod}.

$$CSI_{mod} = \frac{1}{q} \cdot \frac{1}{n} \cdot \sum_{j=1}^{q} \sum_{i=1}^{n} x_{ij} \cdot \frac{w_j}{w_{j\prime}} \cdot \alpha_{mod} \qquad (1)$$

$n = interviewees\ numbers;$
$q = parameters\ number;$
$x_{ij} = score\ of\ the\ i-user\ to\ the\ j$
$\qquad\quad - parameter\ expressed\ in\ a\ 1\ to\ 10\ point\ scale;$
$w_j = weight\ given\ to\ the\ j-parameter;$

$$w_{j\prime} = \frac{1}{q} \cdot \sum_{j=1}^{q} w_j\ , average\ of\ weights; \qquad \alpha_{mod} = \frac{x_{ij}}{5}\ , amplifying\ coefficient.$$

The α_{mod} modifies the weighted average by doubling it if x_{ij} is equal to 10 ($\alpha_{mod} = 2$), strongly decreasing it if x_{ij} is equal to 1 ($\alpha_{mod} = 0.20$), while it does not vary if x_{ij}

is equal to 5, since $\alpha_{mod} = 1$. Indices results are expressed in a 1-20 point scale, with a range distribution as follows: very negative (1-5), negative (6-10), neutral (11-12), positive (13-16) and very positive (17-20).

Several iterations were performed, in which the factors w_j were assigned to different combinations of values, in order to obtain the best and worst result for each of the three indices:

- Case A: all parameters have the same weight;
- Case B: each parameter is considered individually;
- Case C: each parameter is considered with a weight twice as high as the others;
- Case D: each parameter is considered with a weight three times as high as the others;

Table 4. Travel Experience Indices results

Case	Bristol					Brescia				
	Travel Perception Index (TPI) Iterations									
	I1	I2	I3	I4	I5	I1	I2	I3	I4	I5
A			10.6					11.8		
B	7.3	9.9	11.1	14.1	-	10.8	11.2	11.2	14.1	-
C	10.0	10.5	10.7	11.3	-	11.6	11.7	11.7	12.3	-
D	9.5	10.4	10.8	11.8	-	11.5	11.6	11.6	12.6	-
	Comfort in Activity Index (CAI) Iterations									
A			9.7					6.6		
B	9.9	16.2	5.2	8.9	8.5	6.8	12.6	2.4	3.9	7.2
C	9.8	10.8	9.0	9.6	9.5	6.7	7.6	5.9	6.2	6.7
D	9.8	11.6	8.4	9.5	9.4	6.7	8.3	5.4	5.8	6.8
	Social Environment Index (SEI) Iterations									
A			11.9					11.2		
B	10.7	14.7	12.4	10.2	11.9	8.8	14.3	13.7	8.3	11.0
C	11.7	12.4	12.0	11.6	11.9	10.8	11.8	11.7	10.8	11.2
D	11.6	12.7	12.1	11.4	11.9	10.5	12.1	12.0	10.4	11.2

In
Table 4 results are shown for both Bristol and Brescia indices. For all the indices, case B shows a wider gap between the highest and the lowest value obtained with the iterations and it is notable that for both the cities, boundary values are associated with the same iterations, thus the same topic.

Travel time perception: the highest value of the TPI (14.1 in Bristol, 14.1 in Brescia) is related to I4, when the journey utility is singly considered; the lowest value of the TPI (7.3 in Bristol, 10.8 in Brescia) is related to I1, when the journey pleasantness is singly considered. That means that people were satisfied with the utility perception of the bus trip, whereas they were unsatisfied with its pleasantness.

Comfort in activity, which is the highest value of the CAI ,(16.2 in Bristol, 12.6 in Brescia) is related to I2, when the comfort in listening to music is singly considered; the lowest value of the CAI (5.2 in Bristol, 2.4 in Brescia) is related to I3, when the comfort in using a laptop is singly considered. This means that people felt at ease when listening to music on board, whereas they did not when using a laptop.

The Social Environment Index: the highest value of the SEI (14.7 in Bristol, 14.3 in Brescia) is related to I2, when the comfort with others listening to music is singly considered; the lowest value of the SEI (10.2 in Bristol, 8.3 in Brescia) is related to I4,

when the comfort with others talking is singly considered. This means that people felt at ease when others were listening to music on board, whereas they did not when others were talking.

The CSI_{mod} formula, compared to a simple weighted average of responses, allowed to highlight the aspects of travel time that passengers indicated as being the most negative and therefore of greatest interest for the, therefore of greatest interest for the transport agencies. Moreover, if integrated with the information obtained from the regression analysis, those results could be useful to understand not only where but even how to intervene, in order to better a passenger's travel experience.

4. Conclusion

The research aimed at contributing to the existing literature about the concept of travel experience and its evaluation. To study this new concept, the comparison between two middle-size cities, Brescia and Bristol, has been presented to show the main similarities and differences between the two different case studies, focusing on the passengers of the urban bus system.

Thanks to the indices and the regression analysis, it was possible to highlight the most relevant elements about satisfaction and dissatisfaction with journey experience, (especially emphasizing the negative responses). Referring to the response to the questions included in Table 1, it emerged that the second most frequent response was associated with the "indifferent" perception. It is recommended to consider that category of users, since their evaluation could strongly affect the overall service quality assessment, especially after any change in the service supplied. Hence, it is necessary to understand which are the factors that mostly affect passenger's travel experience, in order to reach the approval of those who stated that they were "neither satisfied nor unsatisfied" with some of the aspects of the bus trip.

According to the results, suggestions can be given for the service improvement: enhance the quality of the spaces by providing a more comfortable and liveable environment with more facilities (e.g. seat availability, interior design etc.), which allow passengers to employ their time on board in a more comfortable, pleasant and effective way (e.g. WIFI connection, on board newspaper or magazine). Also, a clearer regulation on board would help, to make people feel more at ease in a public space such as a bus.

Even though the here proposed methodology brought to light relevant elements about travel experience, the passenger's perception of a bus journey is extremely subjective and therefore not easy to investigate: further experiments should be undertaken to pinpoint other critical aspects of the service.

For this study, researchers only collected specific information that alone cannot explain the whole sphere of the travel experience. Despite these shortcomings, the proposed analysis can indeed be a beneficial tool for public transport agencies by providing them with support in the decision-making to improve the service supplied and therefore encourage people to use the public transport.

Also, the traffic psychologists could help in deepening the concept of "travel experience", by providing their contribution to investigate users' mobility habits and travel choices, thus provide a better understanding of what stays behind users' behaviour when they need to choose a public transport. Their support can be combined with the previous findings to build a more comprehensive view of the topic: thanks to their expertise, psychologists can add, for instance, more specific information and requests to

the questionnaire in order to collect even more specific information related to users' perceptions and relate them to the other variables, in order to obtain more focused and reliable results.

References

Bissell, D., 2009. Moving with others: the sociality of the railway journey. In: The cultures of alternative mobilities - Routes less travelled. Farnham, UK: Ashgate Publishing Ltd.

CEN, 2002. EN 13816:2002 Transportation - Logistics and services - Public passenger transport - Service quality definition, targeting and measurement, Brussel: s.n.

Clayton, W., 2015. The Bristol Method: how to increase public transport use, Bristol: s.n.

Clayton, W., Jain, J. & Parkhurst, G., 2016. An ideal journey: making bus travel desirable. Mobilities, pp. Vol. 12:5, 706-725.

Eboli, L. & Mazzulla, G., 2010. A methodology for evaluating transit service quality based on subjective and objective from passenger's point of view. Transport Policy, pp. Vol.18:172-181.

Fiorello, D. & Pasti, G., 2003. Il valore del tempo di viaggio. Guida tecnica ed applicativa, Milano: s.n.

Hill, N. & Roche, G. a. A. R., 2007. Customer satisfaction: the customer experience through the costumer's eyes. London: Cogent Publishing Ldt.

Jain, J. & Lyons, G., 2008. The gift of travel time.. The Journal of Transport Geography, pp. Vol.16:81-89.

Klein, N., 2016. More than just a bus ride: the role of perceptions in travel behaviour. Urban Studies, Volume 54, pp. 2490-2503.

Lyons, G., Jain, J. & Holley, D., 2007. The use of travel time by rail passengers in Great Britain. Transportation Research Part A Policy and Practice, pp. Vol.41:107-120.

Lyons, G., Jain, J., Susilo, Y. & Atkins, S., 2012. Comparing rail passengers travel time use in Great Britain between 2004 and 2010.. Aberdeen, UK, s.n.

Lyons, G. & Urry, J., 2005. Travel time use in the information age. Transportation Research Part A: Policy and Practice, pp. 257-276.

Mokhatarian, P. L. & Salomon, I., 2001. How derived is the demand for travel? Some conceptual and measurement considerations. Transportation research, Volume 35 (A), pp. 695-719.

Montanari, L. & Zara, A. e. G. S., 2006. Salvarsi dal traffico. Governo, regole, soluzioni e tecnologie per una mobilità urbana di qualità. Milano: Il Sole 24 Ore.

Paddeu, D., Fancello, G. & Fadda, P., 2017. An experimental customer satisfaction index to evaluate the performance of city logistics services. Transport, pp. Vol.32:262-271.

Redman, L., Friman, M., Garling, T. & Hartig, T., 2012. Quality attributes of pubblic transport that attract car users: a research review. Transport Policy, pp. Vol.25:119-127.

Steg, L., 2003. Can public transport compete with the private car?. International Association of Traffic and Safety Sciences - IATSS, 27(2), pp. 27-35.

Stradling, S., Carreno, M., Rye, T. & Noble, A., 2007. Passenger perceptions and the ideal urban bus jouney experience. Transport Policy, 14(4), pp. 283-292.

Victoria Transport Policy Institute, 2017. Transportation Cost and Benefit Analysis II - Travel Time Costs, s.l.: s.n.

Wardman, M. L. G., 2016. The digital revolution and worthwhile use of travel time: implications for appraisal and forecasting. Transportation, 3(43), pp. 507-530.

Watts, L., 2008. The art and craft of train travel. Social & Cultural Geography, p. Vol.8.