

Public Transport Quality and Travel Experience: The Italian Case Study

Armando Carteni (PhD)

Ilaria Henkel (PhD)

University of Naples Federico II, Italy

Abstract

Quality in public transport is an important driver for customer satisfaction and for the competition (in the market) among public transport operators. There are both standard and non-standard attributes that influence users choices. For example, among the standards one there are the punctuality and regularity of services, the on-board travel time (e.g. how much time and with what comfort/pleasure) and the cleanliness of trains/buses. While, among the non-standard perceived quality attributes probably the most impacting one is the aesthetic and the design values of transport terminals (hedonic quality). Starting from these consideration in this research was investigated the role of the hedonic quality of the terminals (e.g. aesthetic, service offered and comfort) within the overall quality perception of the travel (travel experience). The case study was the extra-urban bus services in Italy. A specific mobility survey was carried out in some Italian bus terminal. The analysis of the survey results shows that the willingness to pay for an high quality terminal is about the 30% of the actual ticket price. Furthermore, a travel experience effect was observed; the average perceived transport quality varies with the trip characteristic. Even if a passenger spend time (e.g. waiting for a bus) in an high quality terminal, the overall perceived quality of the trip is “low” for the users that carry out a “long trip” (e.g. the overall travel time greater than 2 hours or were used more than one transport mode, while the opposite occurs for the “short trips”. This results is the main original findings of this research and if confirmed will allow to conclude that the overall quality perception of an high quality terminal could be reduced (or even eliminated) if the overall travel is on average a "low quality" experience (e.g. elevated waiting times, not regular services, many interchange modes). This circumstance is known as "*travel experience effect*" and could be considered an explicit design variable in transport planning.

Keywords: Transportation planning, sustainable mobility, engineering, environment

Introduction

The quality in public transport is an important attribute that influence the customer satisfaction and could influence also the mobility choices (Cascetta and Carteni, 2014a). Mobility needs require to be satisfied through public transport services in order to reduce the private car usage especially in urban areas (Bordagaray et al., 2014, Carteni, 2014 and 2015). Quality is one of the main driver for public transport services and, for this reason, is important to identify which are the attributes perceived as relevant by the passengers (Cascetta and Carteni, 2014a, Carteni et al., 2016 and 2017). The quality of public transport can be analyzed from two different points of view: the service provider's and users' point of view (Cascetta and Carteni, 2014a). The quality for service provider depend on the target service quality (e.g. travel time, waiting time, and cost of ticket) which expects to offer (the quality expected) and the level of services that is actually achieved (real quality). From users' point of view the quality can be divided into: i) perceived quality (Cascetta and Carteni, 2014a; Wen et al., 2005; dell'Olio et al., 2010) and desired service quality, that is the target of quality which the user would like for receive (Cascetta and Carteni, 2014a; dell'Olio et al., 2011; Eboli and Mazzulla, 2008; Nkurunziza et al., 2012).

Among the quality attributes, the quality of the transportation terminals (e.g. rail station, bus terminal, airport terminals) is probably one of the most impacting on user perception. Since 1980 an architectural movement (Station Renaissance) promoted by rail operators spreads in Europe, aimed at satisfying customer expectations with respect to travel attributes such as on board comfort, safety in railway stations and the functionality and reliability of public transport services (Hensher and Prioni, 2002; Cascetta et al., 2014). According to this movement, the transport terminal become places where it is possible to carry out different activities (e.g. shopping, go to a restaurant) and had not the only function of waiting for the public transport services (Cascetta et al., 2014).

Several research has shown that the quality of the station influences the perceived quality of the whole trip. Cascetta and Carteni (2014b) showed that the urban hedonic value of a beautiful and comfortable transport terminal (users' willingness to pay for a high quality terminal) is 40-euro cents per trip (33% of the ticket price). This means that a user willingness to pay is 40 euro cents per an urban trip for using a service characterized by stations with high aesthetic and architectural standards and wait up to 5 minutes longer, or to walk up to 8 extra minutes to reach a beautiful station.

The perceived quality of the whole trip depends on both the terminal quality and on the quality of the services (transport modes) used along the trip. Hernandez et al., (2016) identify the design characteristics of a good urban transport interchange node (terminal) in order to increase the user's perceived quality.

Starting this consideration, aim of this research is twofold: i) investigated the role of the terminal quality (e.g. aesthetic, comfort and service offered) within the overall travel experience; ii) estimate the willingness to pay for an high quality terminal (e.g. high architectural standards and more services for passengers as: bar, restaurant, shops , free WI-FI). The case study was the extra urban Italian bus network. A specific mobility survey was carried out on the major Italian terminal bus to perform these aims.

The paper is divided into three sections; in the first one, some of the best practices regarding terminal quality was presented; in the second, the case study and the mobility survey was described. In the third part the main results of the analysis was reported, while in the last section the main conclusion and research prospective were presented.

High quality transport terminal: some best practices round the world

The trend of design high quality transport terminal, is widespread in the major cities round the world (e.g. the examples in USA, Figure 1). There are illustrious example also in Europe and recently the British newspaper The Telegraph has classified the main ones (Figure 2) proclaiming the Toledo station in Naples (Italy) one of Europe's most beautiful (Figure 3).

From an analysis of international best practices is possible to individuate the main characteristics of an high quality transport: architectural standards, traveler services, environmental sustainability and modal integration. For all the major case studies analyzed, appears that the accurate definition of the terminal architecture together the quality of services offered to the passengers (e.g. free Wi-Fi, restaurant, bar, shops) are the main elements that characterized an high quality public transport node. From a functional point of view, physical (long-term parking, both bus and rail stations) and modal (same ticket for all the modes) integration allows users to reduce the interchange time enlarging the perceived overall quality. Finally, in many case studies analyzed emerge a special attention to the environment through the use in the terminal of recycled or recyclable materials and/or energy saving both for lighting and for the indoor climate.



Figure 1. An example of high-quality terminals round the world (Cascetta and Gravagnuolo, 2016).

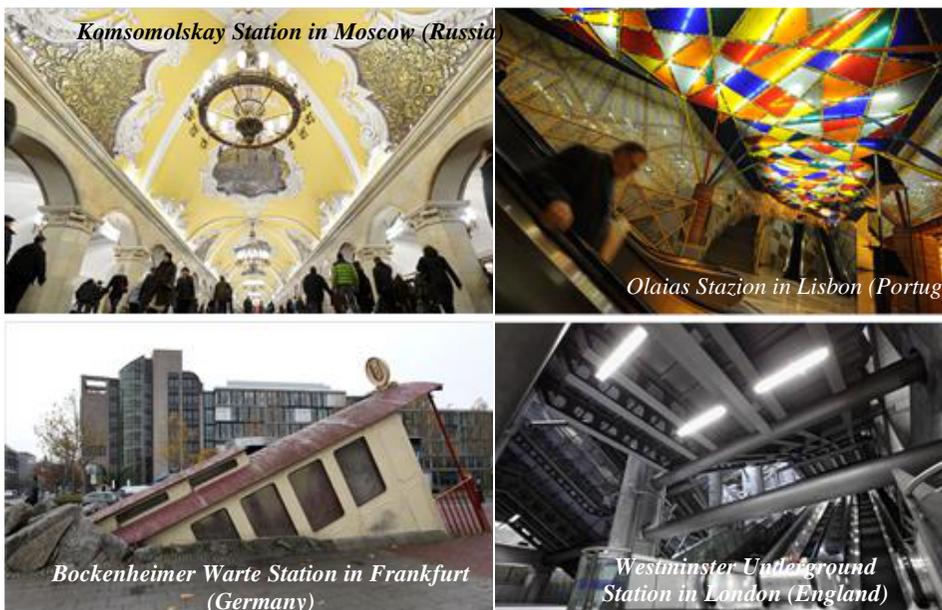


Figure 2. Some illustrious example of transport terminal classified by the British newspaper The Telegraph (Cascetta and Gravagnuolo, 2014).

The case study and the mobility survey

To evaluate the influences of the terminal quality in the overall travel experience, was carried out a mobility survey. The case study is composed from the main bus stations in Italy. The criteria used to choose the most representative bus terminals that compose the panel were:

- both terminal in large and small cities,

- terminals located in all the different parts of the country (north, central and southern Italy),
- both beautiful and traditional terminals (with and without special attention to architecture and design of the building);
- terminals with and without interchange among different transport modes (e.g. bus, train, private car).



Figure 3. The Toledo station: classified as “The most impressive underground railway stations in Europe” by the newspaper Telegraph (Cascetta and Gravagnuolo, 2014).

Five bus terminal were individuated:

1. Milan (north);
2. Rome (centre);
3. Naples (south);
4. Avellino (south);
5. Crotone (south).

The main characteristics of the panel are reported in Table 1.

In the following subsections describes the mobility surveys and the main results. The city of Milan, with a population of 1.2 million of inhabitants, has a standard (from an architectural point of view) bus terminal with an interchange node from bus to metro services. The main services offered to the passengers are bar, restaurant, public phones, WC and a comfortable waiting room. The city of Rome (capital city in Italy), with a population of 2.6 million of inhabitants, has a traditional bus terminal with an interchange node from bus to both rail and metro services. The main services offered to the passengers are bar, restaurant, public phones and WC. The city of Naples (city in South of Italy near Pompei, Amalfi e Sorrento), with a population of about 1 millions of inhabitants, has a traditional bus terminal with an interchange node from bus to both rail and metro services. The main services offered to the passengers are bar, restaurant, shops, phones. The small city of Avellino, with a population of 427 thousand inhabitants, has a traditional bus terminal without any interchange node and services. The small city of Crotone, with a population of 171 thousand inhabitants, has an high quality bus terminal with an interchange node from bus to rail services. The main services offered to the passengers are bar, restaurant, shops, phone, WC and waiting room.

Table 1. The main characteristics of the panel

	Cities and Town	Populations of the city (millions)	Architectural standards	Passenger Services	Interchange node
Nord	Milan	1.2	Traditional	bar, restaurant, phone, WC waiting room	yes
Central	Rome	2.6	Traditional	bar, restaurant, WC, phone	yes
Southern	Naples	1.0	Traditional	bar, restaurant, shops, phone	yes
	Avellino	0.4	Traditional	-	no
	Crotone	0.2	High quality	bar, restaurant, shops, phone, WC waiting room	yes

Starting from this panel, in May 2016 it was carried out a mobility survey at bus terminals composing the panel. The method used is a CAWI (Computer-Assisted Web Interviewing) survey, developing a dedicated App. All the previous said, the sample considered consist in 1,100 extra-urban travellers stratified (according to the population of the cities) random selected from the cities in the panel. The survey has revealed the following information:

- socio-economic information's (e.g. gender, age, occupation);
- trip characteristics (e.g. origin and destination, transport modes used, tickets, trip purpose among systematic and non-systematic);
- perceived quality of transport, rating different attributes: i) level of services (e.g. travel time, waiting time); ii) architecture quality of the passenger building; iii) services offered to the passengers (e.g. restaurant, bar, shop);
- declared willingness to pay (in terms of percentage increase in the ticket) for an high quality terminal (e.g. high architectural standards and more services for passengers as: bar, restaurant, shops , WI-FI).

The main results of the analysis and conclusion

The analysis of the results shows that the major part of the users (between 54% and 57%) move for systematic purposes (work and study). About 56% of the users respondent in a bus terminal localized in the main cities (Milan, Rome and Naples) move with an extra-urban bus service occasionally (low frequency trips). By contrast, the trip frequency is high (about 62%) in the case of bus terminal located in the small cities (Crotone and Avellino).

With reference to the quality of the bus services (on- board services), for all terminals analysed, there is, on average, a medium-high perceived quality in terms of travel time, waiting time and regularity of the service (Figure 4).

From the analysis of the preferences expressed about the quality of services offered in the bus terminal, was observed that for the bus stations in Milan, Rome and Avellino the quality is perceived as "low" for the 73% of the respondents, while in Crotone (the most beautiful terminal bus of the panel) is perceived as "high quality" for 70% of the passengers; while in Naples there is a "medium quality" perceived for the 63% of the travellers (Figure 5).

From the aesthetic point of view, the bus terminal of the panel were perceived as "low quality" for 75% of the passengers in Milan, Rome, Naples and Avellino, while is perceived as "high quality" for 80% of the users in Crotone (Figure 6.)

An in deep analysis shows that the perceived quality varies within the characteristic of the whole trip (a travel experience effect was observed). Even if a passenger passes through an high quality terminal, the overall quality of the trip is perceived as “low” for the 46% of the users that carry out a “long trip” (travel time of “low quality” and greater than 2 hours) or used more than one transport mode (if at least one is of “low quality” e.g. subway and bus; bus and train). The opposite occurs for the “short trips”.

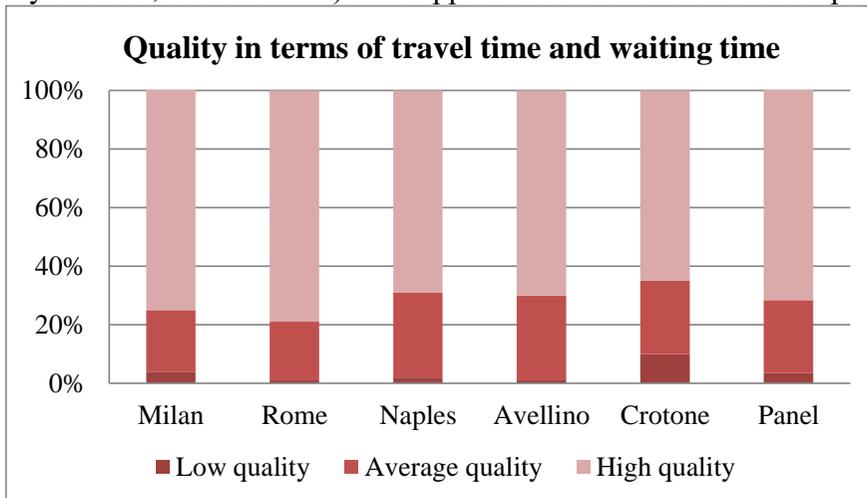


Figure 2. Perceived quality in terms of the level of services

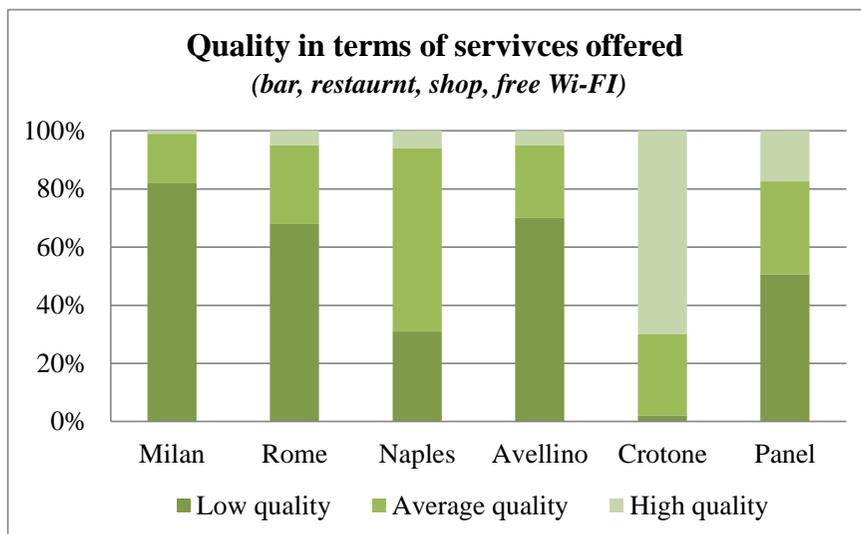


Figure 3. Perceived quality of the services offered in the terminals

Furthermore, the survey results show that about the 75% of the travellers, are available to pay up to 30% more for the ticket price for having an high quality terminal.

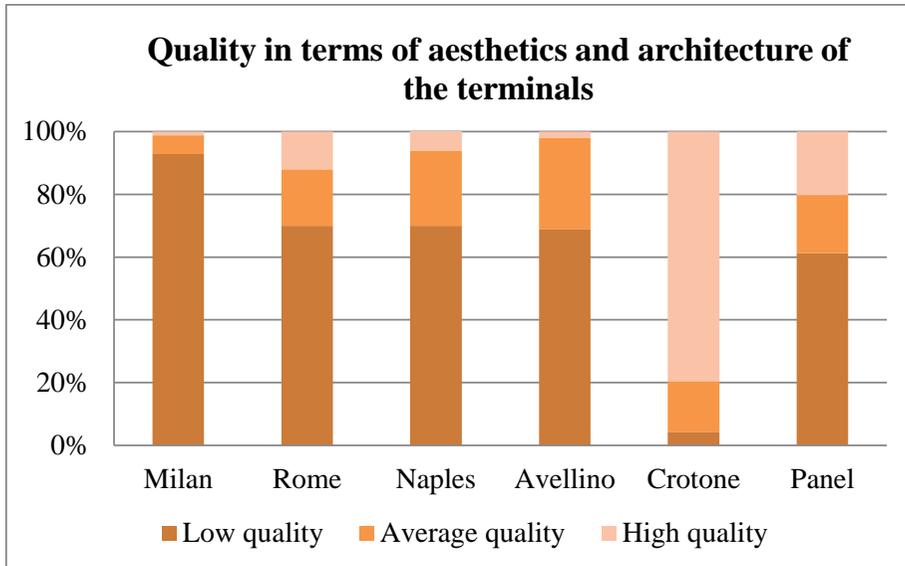


Figure 4. Perceived quality of the aesthetics and architecture of the terminals

The perceived quality of the overall trip with an high quality transport terminal

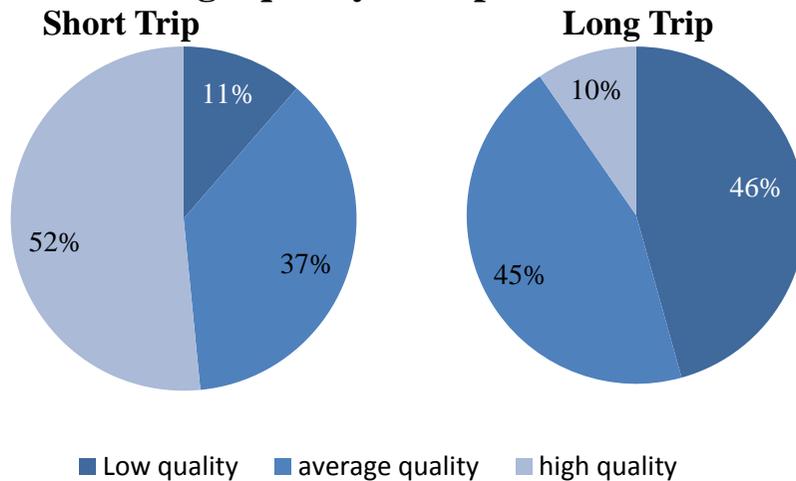


Figure 5. The role of an high quality terminal in the perceived quality of the overall trip with an high quality transport terminal

Willingness to pay for an high quality terminal

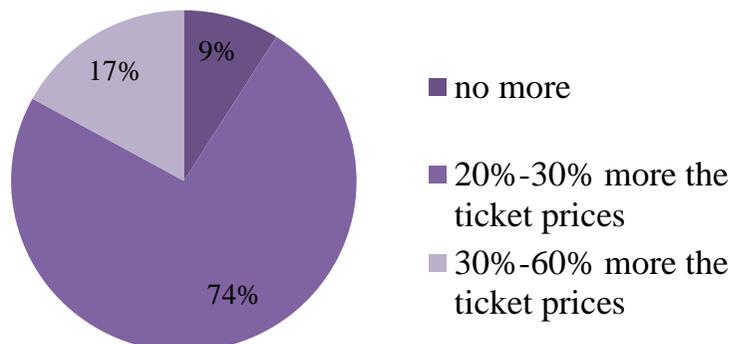


Figure 6. The willingness to pay for an high quality terminal (e.g. high architectural standards and more services for passengers as : bar, restaurant, shops , free WI-FI)

Conclusion

The aim of this research was to investigate the role of the terminal quality (e.g. aesthetic, comfort and service offered) within the overall travel experience. In May 2016 a mobility survey was carried out at this scope at Italian case study.

The analysis of the results shows that the perceived quality varies within the characteristic of the whole trip (a travel experience effect was observed). Even if a passenger passes through an high quality terminal, the overall quality of the trip is perceived as “low” for the 46% of the users that carry out a “long trip” (travel time of “low quality” and greater than 2 hours) or used more than one transport mode (if at least one is of “low quality” e.g. subway and bus; bus and train). The opposite occurs for the “short trips”.

This results in the main original findings of this research and if confirmed allow to conclude that even if in a journey, a passenger passes through an high quality terminal, the overall perception of that transport node could be reduced (or even eliminated) if the overall journey is of "low quality" (e.g. high waiting times, irregular services, many interchange modes).

This circumstance is known as "travel experience effect" and must be an explicit design variable in transport planning (Cascetta et al., 2015)

Starting from these results, one of the research perspectives will be the estimation of a discrete choice model (e.g. Logit Model) able to quantify the willingness to pay for an high quality terminal.

One of the possible application will be the estimation of the delta (with respect to a traditional service) number of users attracted by an high quality public transport service characterized by high quality interchange nodes (as proposed, for example, in Carteni et al. (Carteni et al., 2016).

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