Measuring Tourists' satisfaction with public Transport in Munich, Germany

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Abstract

This study investigates the use of public transport by tourists in the city of Munich, Germany. It seeks to understand how passengers perceive public transport services and which factors influence their level of satisfaction. Data were collected from a survey in April and May 2012 with a random sample at selected tourist sites in Munich. Factor analysis resulted in four different service dimensions namely comfort, services, accessibility and others. Tourists were found to be moderately satisfied with public transport services in Munich and their perceptions are independent from most factors.

1. Introduction

Despite bringing many economic and social benefits, tourism is not without negative impacts, especially on the environment. Tourists cause 4.4% of global CO_2 and large part of it (75%) comes from transport (Dubois, Peeters, Ceron, & Gössling, 2011; Peeters & Dubois, 2010). Transport is undoubtedly a vital component in the tourism system and is influential to the tourist experience at the destination. There is evidence, for instance, that satisfaction with public transport may influence a visitor's satisfaction with the destination (Thompson & Schofield, 2007). Public transport plays an important role in sustainable tourism development. However, to promote public transport use, it is important to have an excellent and effective system. Transport services should be demand-oriented and a good knowledge of customer behavior is thus critical. This paper examines the use of public transport by tourists in the city of Munich, Germany. It seeks to understand how tourists perceive public transport services and which factors influence their satisfaction.

2. Literature Review

Customer satisfaction with public transport

Measuring customer satisfaction with public transportation service has always been an important topic both in transportation research and practice. Diana (2012) examined the degree of satisfaction of multimodal travelers with public transport services in Italy. Nine service aspects were measured. The author found that satisfaction and frequency of use of urban transit are not correlated. Public transport was of greatest use in the city centers, followed by towns of above 50 thousands inhabitants. Smaller towns and suburbs saw little use of transit. Besides, satisfaction levels tended to be highest in smaller towns and lowest in metropolitan areas.

A study of travel mode switching in Switzerland showed that satisfaction and attitudes were related to behavior and habits (Abou-Zeid, Witter, Bierlaire, Kaufmann, & Ben-Akiva, 2012). Those who switched to public transport tended to be more satisfied than those who did not. Furthermore, as often found in customer satisfaction studies, expectation is another factor influencing satisfaction with public transportation experience.

Felleson and Friman (2008) reported on an annual transnational public transport customer satisfaction study in eight European cities. Four satisfaction dimensions were delineated from a factor analysis of 17 attribute-related statements, namely system, comfort, staff and safety. However the results are not consistent in all cities, meaning that public transport services were perceived differently. Several factors contribute to the variation of customer perceptions including those related to the management aspect (how the services were provided) and those of personal group (culture and tradition).

Travel time is another factor influencing public transport satisfaction: longer travel time results in lower satisfaction (Gorter, Nijkamp, & Vork, 2000). Similarly, crowded or unreliable services and long wait-times often made customers less satisfied (Cantwell, Caulfield, & O'Mahony, 2009).

Several public transport service aspects were examined in the literature and the most important items identified varied accordingly. Lai and Chen (2011) believed service quality and perceived value should receive greatest attention to improve customer satisfaction. Tyrinopoulos and Antoniou (2008) nonetheless emphasized the differences of customer perception between different transit operators due to their specific characteristics and service conditions . In general the most important satisfaction attributes across transit operators are service frequency, vehicle cleanliness, waiting conditions, transfer distance and network coverage. However the results are varied among the transit systems. In her study of customer satisfaction with public transport in Indonesia, Budiono (2009) identified two groups of service attribute. The soft quality factor includes security issues and comfort while the functionality quality comprises frequency, travel time,

punctuality and time. The author believed that the functional factor is more influential and thus should receive more attention to improve the customer satisfaction.

Several authors have explored the users' level of satisfaction with public transport. However, most studies focus on the local residents and little research has examined the use of this service by tourists.

Tourists' use of public transport

Tourists exhibited a diverse perceptions and transport attitudes (Dallen, 2007). Their satisfaction with transport is influenced by several factors. Stradling et al. (2007) argued that age and frequency of use are the most influential while factors such as household income, car availability and gender are less significant. A study in Turkey and Mallorca, however, identified cultural background as an important impact (Kozak, 2001). For example, British tourists are more satisfied with local transport services during their summer holidays than the Germans. Other influences to satisfaction include word-of-mouth communication, purchase intention and complaining behavior (Kim & Lee, 2011). Dimensions of public transport performance measured suggested similarities between overseas visitors and local users (Thompson & Schofield, 2007).

Thompson and Schofield (2007) studied the relationship between public transport performance and destination satisfaction. Their case study of tourists in Greater Manchester showed that tourists' evaluation of public transport performance slightly influenced their satisfaction with the destination. The authors emphasized the importance of public transport's ease-of-use as it has great impact on satisfaction than efficiency and safety.

Public transport is considered as an additional tourism product, which adds to the total tourist experience. However, despite high investment costs and potential value, some public transport systems are still not favored by visitors (Bramwell, 1998). Meeting and even better exceeding customer expectation is essential for high growth rates (Teye & Leclerc, 1998). In order to attract more users, transport service suppliers should focus on understanding customer motivation, behavior and satisfaction.

3. Methodology

To examine the tourists' use and satisfaction with public transport in Munich, data were collected from a visitor survey. Questionnaire-based survey is standard in research on customer behavior (see, for example, Bansal & Eiselt, 2004; Fellesson & Friman, 2008; Le & Pearce, 2011; Pearce, 1993) and this method is also adopted in this study. Due to time and labor constraints, self-administered survey was opted.

Following the pilot tests, the survey was conducted in April and May 2012, resulted in 380 useable questionnaires. Data were analyzed in two steps. First, tourists' levels of satisfaction with each service aspect were compared by means, median and mode. Second, principle component analysis with Varimax orthogonal rotation method was adopted to delineate the underlying dimensions that were associated with the satisfaction with public transport in Munich. Factors were extracted using the following criteria: an eigenvalue greater than 1 and factor loadings greater than 0.5. A reliability analysis (Cronbach's alpha) was used to assess the correlation between variables of each identified factor. All factors with an α reliability above 0.50 were accepted for the purpose of this study.

4. Findings

a. Respondents' profile

The sample includes 380 respondents, of which haft was female. Younger people are over-represented with 40% being in the age of 18-29 years old. Most public transport users are well-educated (48% being university/college graduates and 14% being post-graduates). German is the largest group of visitors (21%) and all other European visitors represent 51%. A majority of the users (87%) indicated no health restriction.

Almost half of the sample (48%) has previously been to Munich. A stay of 2-3 days is most common (41%), followed by 4-6 days (32%). Most visitors traveled with their friends (31%), partner (23%), and family or relatives (22%). The majority of them visited Munich on holiday (54%) or for VFR purposes (22%).

b. Visitors' satisfaction with public transport in Munich

Respondents were asked to indicate how satisfied they were with public transport with regard to sixteen service dimensions. Table 1 illustrates a comparison of the service items by means, median and mode (in descending order by means). Visitors tended to be satisfied with most service aspects of public transport in Munich as shown by the fact that almost all items (except *ticket price*) have a score above 3.0 (neither dissatisfied nor satisfied). Characteristics of public transport in Munich which were highly appreciated (M>=4.00, somewhat satisfied) include *punctuality*, *reliability*, *network connection* and *service frequency*. Items received lowest scores are *staff service*, *comfort while waiting at bus stops or train stations* and *ticket price*. These items were also most mentioned in visitors' comments and suggestions for service improvement.

In addition to detailed assessment of satisfaction with specific aspects of the public transport services, respondents were asked to rank their overall satisfaction. Findings indicated a high level of satisfaction with public transport in Munich with a mean score of 4.08 and mode of 4.0 (Table 1).

Table 1: Satisfaction with service aspects – Compare means

Service aspect	Mean	Median	Mode	SD
Punctuality	4.21	4	4	0.867
Reliability	4.19	4	4	0.845
Network connection	4.11	4	4	0.823
Service frequency	4.00	4	4	0.913
Convenience of the time schedule	3.98	4	4	0.869
Accessibility of the train stations and bus stops	3.96	4	4	0.830
Accessibility of the vehicles	3.95	4	4	0.861
Safety on board	3.87	4	4	0.890
Ease-of-use	3.87	4	4	0.721
Information	3.85	4	4	0.905
Cleanliness of the vehicle	3.67	4	4	0.978
Space on vehicle	3.66	4	4	0.921
Seat availability	3.55	4	4	0.916
Staff service	3.49	3	3	0.960
Comfort while waiting at the bus stops or train stations	3.44	3	3	0.892
Ticket price	2.93	3	3	1.158
Satisfaction in general	**4.68**	**4**	**4**	**0.694**

The 16 service dimensions were subjected to factor analysis using SPSS 16.0, which resulted in four factors, explaining 66.4% of the total variance (Table 2). Each factor was labeled according to the appropriateness of individual items it included.

Factor 1, "*Comfort*", (α=0.87) explains 21.8% of the variance. It includes five variables and reflects the conditions and facilities of the vehicles and stations.

The second factor (α=0.86) includes five items describing different service aspects and therefore was labeled "*Services*". It explains 18.9% of the total variance.

"*Accessibility*" is the third factor (α=0.82) which includes two aspects indicating the accessibility of the train stations, bus stops and the vehicles. The factor explains 13.1% the total variance.

Including four different aspects, the last factor was labeled "*Others*" (α=0.67) and explains 12.6% of the total variance.

Table 2: Factor analysis of public transport service dimensions

Service aspect	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
Comfort				
Space on vehicle	.836			
Cleanliness of the vehicle	.794			
Seat availability	.775			
Comfort while waiting at bus stops or train stations	.735			
Safety on board	.701			
Services				
Punctuality		.802		
Reliability		.799		
Service frequency		.698		
Convenience of the time schedule		.624		
Network connection		.597		
Accessibility				
Accessibility of the train stations and bus stops			.821	
Accessibility of the vehicles			.677	
Others				
Ticket price				.712
Ease of use				.656
Staff service				.637
Information				.589
Eigenvalue	6.72	1.66	1.21	1.03
Variance (%)	21.80	18.90	13.11	12.63
Cumulative variance (%)	21.80	40.70	53.81	66.44
Reliability coefficient	.87	.86	.82	.67

c. Relationship between satisfaction and other variables

The relationship between satisfaction with public transport and other variables were tested using Spearman Test. Results show that satisfaction with public transport was independent from most variables (demographic and trip related characteristics) except for *country of residence* and *ease-of-use*. In particular, there is a slight connection between tourists' country of residence and their satisfaction with public transport (r_s=0.128). Asian and visitors from the US and Canada tended to be more satisfied. The German and other European visitors were more critical in comparison. In addition, the tourists' perception with public transport' ease-of-use moderately influence their satisfaction (r_s=0.374). The easier it is for the respondent to use public transport systems (self-assessment), the more satisfied they are.

5. Conclusions

Transport is an essential element in the tourism systems. As tourism cannot exist without transport, sustainable tourism strongly links to sustainable mobility (Høyer, 2000). Public transport plays a vital role in sustainable tourism development. However there is little information on tourists' use of public transport at the destinations. This paper contributes to the understanding of tourists' satisfaction with public transport and the factors influence their perception. Four service dimensions were identified, which are *comfort*, *services*, *accessibility* and *others*. Public transport services in Munich were positively evaluated by the tourists and their perceptions are independent from most factors. Passengers were most satisfied with the systems' punctuality, reliability, network connection and service frequency. On the other hand, ticket price received the lowest rate and perceived as "expensive" and "complicated". Tourists also suggested improvement of waiting facilities at bus stops and train stations. Other areas needed further attention include staff service, seat availability and space and cleanliness on the vehicle.

Improving customer satisfaction is vital to the future development of public transport. Further studies are necessary to better understand the tourist transport behavior and how to improve their experience with public transport. Future research should also investigate the best tourist public transport practices and effective policies to encourage a modal shift to alternative transport.

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