



Evaluating web site service quality in public transport: Evidence from Taiwan High Speed Rail

Yung-Hsiang Cheng*

Department of Transportation and Communication Management Science, National Cheng Kung University, No. 1, University Road, Tainan City 701, Taiwan, ROC

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ABSTRACT

More and more public transport system passengers plan their trips by using website services. The passengers' perceived service quality of a website plays a crucial role in recognizing the satisfaction of a transportation service chain. This study aims to investigate the passengers' perception of electronic service quality (e-SQ) delivery through the Taiwan High Speed Rail's (THSR) website, by adopting the Rasch measurement model to measure a subjective latent construct: perceived e-SQ. The Rasch model can compare person parameters with item parameters, which are then subjected to a logarithmic transformation along a logit scale to clearly identify which e-SQ measurement items are appreciated by certain passengers. Analytical results show substantial differences between the perceived e-SQ of various personal characteristics such as age, income, and trip types. Empirical results also demonstrate that passengers are most satisfied with the website's accuracy of information and introduction to the THSR stations' surrounding area, but are not satisfied with instructions when a transaction fails as well as the carriage layout of the THSR. Our analytical results also identify which service items lead to the perceived e-SQ difference between business trip and leisure trip passengers. The relationship between the two main attribute dimensions – quality of transportation information provided and quality of website services – are also further examined. The empirical results can help a transportation system service operator to better understand how passengers perceive e-SQ and to suggest what should be improved.

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1. Introduction

The provision of comprehensive and reliable traveler information such as routing, published schedules, fares and promotion information, reservations, online ticketing, and feeder system coordination is essential to plan and execute a journey (Lyons and Harman, 2002). The Internet can be chosen as a medium to provide these services, though website services can also present complex and detailed information and interactive functionality for travelers (Molin and Timmermans, 2006; Peng and Huang, 2000). While the maturity of the Internet has changed the known business processes and the strategies of the enterprises (Yoon et al., 2006), it has indeed become one of the most important distribution channels in many industries, such as in retailing, hotels, and banking (Connolly et al., 1998; Choi and Kimes, 2002; Yao and Liu, 2005; Eriksson and Nilsson, 2007). With regard to the High Speed Rail (HSR), passengers using website services to search for related travel information and to make reservations have grown rapidly. Approximately 25% of TGV (French High Speed Rail train) passengers book their train tickets and itineraries through the Société Nationale des Chemins de Fer Français, French National Railways (SNCF's) website.

* Tel.: +886 6 2757575x53227; fax: +886 6 2753882.

E-mail address: yhcheng@mail.ncku.edu.tw

There has been increased attention put upon website service quality, or the so-called electronic service quality (e-SQ) (Loiacono et al., 2007; Zeithaml et al., 2002; Parasuraman et al., 2005; Collier and Bienstock, 2006; Yi and Gong, 2008; Chang et al., 2009). With the increasing use of the Internet and the continuing improvements in computer technology, customers' requirements for e-SQ as provided by enterprises have become more critical (Parasuraman et al., 2005; Bressolles et al., 2007). E-SQ is thus an indispensable element when evaluating customer satisfaction for overall service quality. Providing well-organized websites and attracting e-SQ are considered essential challenges for enterprises. Therefore, the measurement of e-SQ is quite important to understand the customers' perceived service quality and to help system service providers improve their services.

Service quality is considered as a latent trait, which cannot be directly observed, and is derived from the combinations of other independent latent variables with known variables (De Battisti et al., 2005, 2010). Traditional perceived service quality uses the ordinal scale to measure the subjects' perceptions, but the scores provided by the Likert scale based on ordinal-scaled data indicate that common statistics analysis methods might not be appropriate to analyze these surveys (Wright and Mok, 2004). Item responses on a Likert-type scale are ordinal data, but these numbers only indicate an ordered relationship and cannot be considered measures (Merbitz et al., 1989; Wright and Linacre, 1989). The scores allocated to each category are not true numbers based on ordinal scales, and therefore arithmetical operations and parametrical statistics based on ordinal scales are invalid (Decruynaere et al., 2007). Furthermore, Vittersø et al. (2005) verified that survey-based comparisons with ordinal raw score data are misleading. Consequently, research on service quality applies the Rasch model, because the model transforms the ordinal scale data into additive interval-scaled data and makes statistical methods available for further analysis (Brentari and Golia, 2008; De Battisti et al., 2010).

The Rasch model helps researchers to compare the satisfaction level of various groups' customers and e-SQ measurement items on the same axis (De Battisti et al., 2010). De Battisti et al. (2010) have applied the Rasch model for measuring the quality and customer satisfaction of the service provided by company ABC by using three different application methods such as the single model, overall model, and the dimensional model. Nicolini and Salini (2006) applied two non-classic methods, decision tree analysis and Rasch analysis, to evaluate customer satisfaction by considering British Airways as a case study. However, differential item functioning (DIF) was not further conducted in these previous studies to identify which items can derive different perceived service quality for diverse sub-groups of customers.

There are several other research efforts which cover website quality in the transportation sector (Lubbe, 2007; Chen and Kao, 2009; Chen, 2008). Chen (2008) demonstrated a relationship between service quality, perceived value, overall satisfaction, and behavioral intention for international airlines passengers through a structure equation model (SEM). Chen and Kao (2009) explored the relationships between process quality, outcome quality, satisfaction, and behavioral intentions from the context of online travel agencies and also by the SEM model. Lubbe (2007) examined the effect of Internet apprehension and website satisfaction on air travelers' adoption of an airline website by conducting a survey addressing the loyalty members.

Most of the relevant studies focused on air transport instead of HSR passengers, who have some different travel behavior characteristics compared to air transport passengers. Air transport passengers often use the travel agency as an essential channel to seek travel information and for ticket purchasing. The website service of an air carrier can be considered as only one of the various searching tools for certain passengers. On the other hand, an HSR operator often uses railway station ticket counters to sell tickets and offer timetable brochures. Therefore, the HSR website service can be considered as a pivotal tool for travel information searching, trip planning, reservations, and ticket purchasing, because of the limited distribution channels of an HSR. Moreover, an HSR's competitive advantage over other travel modes on certain trip routes is obvious, and HSR plays a dominant role in this market (200–700 km) (Cheng, 2010). On the other hand, air transport passengers have more mode choices for their trips. We address the HSR operator with a quasi-monopoly position role in the market to measure the e-SQ of THSR, which seems to have much more interesting findings than the website of the examined air carrier, which is only one of many system operators in the intercity transportation market. Therefore, the findings of our present paper can derive some interesting comparison results between e-SQ in the air and for a HSR.

Perception differences lead to a variety in people's beliefs and intentions, and they eventually have an impact on people's behaviors. Choi et al. (2005) indicated that customers' needs and expectations are not homogeneous. Since each customer's anticipation of services is different, the perceptions of these customers' service quality are deservedly varied. In past studies, researchers have demonstrated that group differences do exist in the users' perception of service quality (Choi et al., 2005; Ekinci et al., 2003; Wei et al., 2005). In order to realize different groups' perceptions toward e-SQ, researchers categorized their subjects into several groups according to the characteristics of each research, and the most general sorting are based on demographic factors, such as gender and age (Choi et al., 2005).

Compared to the extensive literature on e-SQ, relatively few research studies have focused on e-SQ delivery through railway websites. Therefore, this study contributes to developing a revised measurement item scale for the Taiwan High Speed Rail (THSR) website by attempting to use the Rasch method (a modern psychometric approach) to measure the e-SQ of THSR from various demographics and passengers' perspectives to improve it for certain social demographic passengers' needs. Our study investigates the perceived e-SQ difference of various social demographic passengers' characteristics by using ANOVA analysis and to identify which items can derive the different perceived service quality by using DIF analysis. The present study also contributes to examining the other countries' proven website services such as the Shinkansen in Japan, the ICE in Germany, and the TGV in France as our essential service items for measuring e-SQ of the THSR's system service.

The organization of this study is divided into five sections. The key research topics are identified in the introduction section. Section 2 reviews the relevant literature, addressing the theoretical backgrounds of website service quality, and dis-

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