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Guidance Provision for Increasing Quality of Service of Public Transport

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Abstract

Travellers formulate their optimal strategy to follow for their trip, every time they may shift to another mode. Trip generalized cost is perceived based on quality of service aspects and type of traveller. One of the most known models to assess service quality is the GAP model, proposed by Parasuraman *et al.* (1985), which considers both consumer and provider beliefs, expectations, perceptions and standards. The present paper deals with the fifth GAP of the model, known as the quality GAP, thus expected versus perceived quality of service, for the assessment of the transit service quality. This GAP has been estimated for the case of the transit system in Greece. An internet based questionnaire was used to collect user expectations and perceptions of 26 selected transit quality indicators, based on a 5 point likert scale. Then, a decision tree was developed, using the J48 algorithm, which linked user perceptions and expectations with the overall service quality assessment. The decision tree analysis depicts the importance of various quality components in the generalized cost estimation. Findings showed that the performance indicator "Availability of information by phone, mail", was the most crucial parameter for the overall assessment of the service, while both performance and importance variables participated in the tree formulation. Tree paths provide guidance for transit operators and/or decision makers for increasing the quality of their services and at the same time enhance performance efficiency and operation profitability.

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Keywords: transit quality of service, gap model, decision trees, j48 algorithm

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1. Introduction

Transit Quality of Service (QS) seems to affect significantly transit choices and user perceptions. A lot of research has been conducted aiming to analyse user perceptions on Quality of Service of public transport operations (TRB, 1999; Tsami and Nathanail, 2014a; Tsami and Nathanail, 2014b). QS is commonly examined based on users' perceptions and evaluations. The difference between actual and perceived QS has been examined by a number of researchers (Tsami and Nathanail, 2012; Eboli and Mazzulla, 2007; Eboli and Mazzulla, 2008; Eboli and Mazzulla, 2011; De Ona *et al.*, 2010; Dell Olio *et al.*, 2010), but the perceived level of QS (Dell Olio *et al.*, 2010) seems to be the one that reflects the QS of a system from users' point of view.

Quality of Service parameters were also examined considering their impact on trip choices (Glerum *et al.*, 2011), usually focusing on users' perceptions and performance assessment. Tsami and Nathanail (2014) considered transit quality parameters influence on the "optimal strategies" users develop before transit choices, while Glerum *et al.* (2011) examined individuals' perceptions on quality parameters regarding their influence on travellers' mode preferences.

Tsami and Nathanail (2014) examined the level of significance users recognize on transit quality of service indicators, aiming at developing a framework of analysis of QS in a transit network, by investigating the key factors that influence travel choices based on the perceived general quality formulation of the users. In terms of this analysis a decision tree was developed classifying the quality indicators based on the security against crimes on bus indicator, which was the most crucial parameter affecting the decision making process in the overall quality of service assessment. The next two most important parameters in that analysis were the information by phone, mail and the cleanliness of bus exterior.

The socioeconomic characteristics of the travellers and their personal preferences formulate their perception regarding QS. User perceptions on transit quality of service were also analysed based on a gender classification proving that women travellers had higher expectations from quality parameters (Tsami and Nathanail, 2014c). It was also pointed out that stop location is the most important attribute to a gender classification of transit quality of service attributes, followed by the indicator of information by phone and mail.

2. Methodology

The quality of a service has mostly been studied in terms of marketing, as it comes from social and business sciences. One of the most known models to assess service quality is the GAP model, proposed by Parasuraman *et al.* (1985), to investigate the service quality gaps in an organization considering at the same time both costumers' and marketers'/operator's' beliefs, expectations, perceptions and standards. Five GAPs have been examined in terms of this model, between: 1) users' expectations and operators' perceptions of users' expectations, 2) operators' perceptions of users' expectations and service quality specifications, 3) service quality specifications and service actually delivered, 4) service delivery and the communications to users about service delivery and 5) users' expectations and perceived services. The present paper deals with the fifth GAP of the model, known as the quality GAP, and uses it as the attribute which leads users to the decision of selecting a transit service.

The data of the present study were collected in terms of an online Customer Satisfaction Survey (CSS) that took place during August 2012. A number of 211 completed questionnaires were collected and analysed.

The survey was structured in three discrete parts. In the first one the sample socioeconomic characteristics were collected along with a question to address the overall service quality of the Greek transit systems. In part two, a 5-point likert scale evaluation of the importance level of 26 selected transit quality of service indicators took place, where the highest importance was indicated by the rating value of 5 and the lowest by the rating value of 1. Similarly, in the third part, respondents were asked to evaluate the performance of the same indicators (in a 5-point likert scale), where the lowest value of 1 reflected the lowest performance level and the value of 5 the highest. The data collected from the questionnaire parts 2 and 3 were used to develop a decision tree that considered the importance travellers recognize and their perceptions of the performed transit quality of service indicators in the overall quality of service assessment.

The decision tree was developed using the J48 classification algorithm using the Waikato Environment for Knowledge Analysis (WEKA) open data mining software.