

AIIT 2nd International Congress on Transport Infrastructure and Systems in a changing world
(TIS ROMA 2019), 23rd-24th September 2019, Rome, Italy

Air Transport Service Quality Factors: a Systematic Literature Review

Maria Grazia Bellizzi^a, Laura Eboli^{a*}, Gabriella Mazzulla^a

^a*Department of Civil Engineering, University of Calabria, Ponte Pietro Bucci, cubo 46B, Rende (CS), 87036, Italy*

Abstract

Evaluating airport and airline services levels of quality can help to improve the services provided to passengers and tourists, and give them better travel choices. Transportation literature is rich of studies concerning the evaluation of public transport service quality, especially regarding road and rail services; however, in the last decades, also in the field of air transport, the measurement of service quality is becoming a relevant issue. Service quality evaluation in air transport sector seems to be more difficult as regards the other public transport modes. As an example, a relevant first issue concerns the diversity of the services offered by the airlines and the services provided by the companies managing the airports. In order to investigate on the measurement of air transport service quality, we propose this paper for treating some interesting aspects concerning this issue by exploring the literature review of the studies analyzing service quality from the passengers' point of view, where their opinions are collected by the well-known Customer Satisfaction Surveys (CSS). To provide convenient information of a certain level of quality, we selected papers published within the last decade (2008-2018) on journals indexed on the best database (e.g. Scopus, Web of Science).

© 2020 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Peer-review under responsibility of the scientific committee of the Transport Infrastructure and Systems (TIS ROMA 2019).

Keywords: airport services; airline services; service quality; literature review

1. Introduction

The socioeconomic development of a country necessarily relies on the improvement of all transport services. With the introduction of new technologies, transport industry has developed considerably in recent years, and as a consequence people habits and travel choices changed as well. In this context, air transport has a significant role.

* Corresponding author. Tel.: +39-984-496779.

E-mail address: laura.eboli@unical.it

Evaluating air transport service quality is important as it is for the other public transport systems. Providing high quality services satisfying passengers and tourists is a core competitive advantage to reach a relevant economic development (Chen, 2008). Travelers would be certainly more attracted by more modern airport infrastructures, and by more comfortable and safer airlines. When service quality does not meet the expectations of passengers, they become dissatisfied (Kau and Loh, 2006). For this reason, measuring air transport service quality based on the opinions of the passengers becomes vital for understanding the needs of the users and consequently improving the service.

The multicultural nature of air transport industry and the variety of the services offered in the airports (services on the land side) and in flight (services on the air side) make complex the assessment of quality.

While literature regarding the evaluation of road and rail public transport service quality is well established from many years (Allen et al., 2018; Allen et al., 2019; Eboli et al., 2018a; Eboli et al., 2018b), literature concerning air transport service quality is relatively recent. A first substantial issue concerns the complexity of the various characteristics of the services, which can relate on the airlines and the companies managing the airport services. In the literature, the major part of the studies treats separately these two groups of characteristics; a growing number of researchers analyzed air transport services by distinguishing the factors concerning the services offered in the airports from the ones provided by the airlines. The aim of almost all the studies is to investigate on the various service attributes and to determine which are the attributes mostly influencing the quality of the overall service. There is a large variety of methodologies proposed and/or adopted for analyzing the services. There are some differences among the studies in terms of design and collection of the experimental data used for applying the various methods.

In this work, we want to propose a systematic literature review of the most relevant papers dealing with air transport service quality. Specifically, we analyzed papers proposing the evaluation of service quality on the land and the air side as well based on passengers' opinions, expressed in terms of rates. The main selection criteria of the papers concerned: the year of publication, which had to fall within the last decade (2008-2018), and the journal, which has to be highly qualified. Other authors proposed literature reviews on this field, but as a part of papers where they propose their contribution to the literature with new methodologies or case studies. However, Spasojevik et al. (2017) proposed a paper on literature review of air transport studies providing a general framework of the studies published in the period 2000-2014, without describing the methodologies proposed by the authors. Differently from such a kind of paper, we want to give a more specific framework of the most recent studies, oriented to highlight the differences in terms of methodology and survey design. A such review would be a useful instrument for guiding researchers in designing the survey for collecting data about air transport service quality from the passengers' point of view, with the final aim to identify the possible critical service aspects.

In the following, we propose the main section of the paper, where we described the selected studies by highlighting some specific aspects differentiating them, such as the type of service attributes analyzed (airport services, airline services), the kind of judgement expressed by passengers (satisfaction, importance, and so on), the evaluation scales adopted for collecting passengers' opinions (Likert, verbal, numerical, and so on), the way for collecting data (face-to-face, online, and so on), and other useful information. After, we discuss the proposed literature review, and we end the paper with the main conclusions about the work.

2. Literature review

2.1. The selection of the literature studies

The first most important differentiation among the selected literature studies concerns the kind of service analyzed. As specified above, in the literature there exists a relevant number of studies analyzing the services provided in the airport, and as many studies analyzing the services provided by the airlines. Due to the complexity and the numerousness of the service aspects that interest the users travelling by air, the major part of the studies analyzing only one of this two categories of services.

Unlike the other public transport users travelling on road or rail, air passengers are inevitably forced to pass more time on the airport and to experiment some services that are provided in the airport before making the flight, where they will experiment other kinds of services. Another important reason of this differentiation is that the services provided in the airport are managed by companies managing airport services, while the services provided during the flight are managed by the airlines companies. Also the collection of the data is quite different for the two kind of

services, and it is one of the main reasons why researchers analyzed only one kind of service. We selected fourteen studies analyzing services provided in the airport, and as long fourteen studies concerning flight services provided by the airlines. As specified above, the papers were published on journal indexed on the best database such as Scopus and Web of Science. Most of the papers were published on the Journal of Air Transport Management (Table 1).

Table 1. The main two categories of selected studies differentiated according the journal where they were published.

Studies analyzing airport services	Studies analyzing airline services
<i>Journal of Air Transport Management</i>	<i>Journal of Air Transport Management</i>
Bezerra and Gomes (2015)	Hu and Hsiao (2015)
Bezerra and Gomes (2016)	Hussain (2015)
Lubbe et al. (2011)	Jiang and Zhang (2016)
Lupo (2015)	Li et al. (2017)
Pandey (2016)	Liou et al. (2011a)
Pantouvakis and Renzi (2016)	Tsafarakis et al. (2017)
<i>Tourism Management Perspective</i>	<i>Journal of Hospitality and Tourism Management</i>
Brida et al (2016)	Lim and Tkaczynski (2017)
	Wu and Cheng (2013)
<i>Journal of Applied Security Research</i>	<i>Transportation Research Part A</i>
Ceccato and Masci (2017)	Chen (2008)
<i>Euromed Journal of Business</i>	<i>Applied Soft Computing</i>
Eboli and Mazzulla (2009)	Chou et al. (2011)
<i>Service Business</i>	<i>Research in Transportation Business & Management</i>
Jeon and Kim (2012)	Suki (2014)
<i>Expert Systems with Applications</i>	<i>Journal of Business Research</i>
Liou et al. (2011)	Koklic et al. (2017)
<i>Kasetsart Journal of Social Sciences</i>	<i>Transportation Research Part E</i>
Sricharoenpramong (2018)	Kuo (2011)
<i>Research in Transportation Business & Management</i>	<i>Tourism Management</i>
Suki (2014)	Liou et al. (2011b)
<i>Transportation Research Procedia</i>	
Bellizzi et al. (2018)	

As mentioned in the introductory section, we analysed specific aspects of the studies reported in table 1. As an example, we registered that several authors analysed air service quality on the basis of only satisfaction rates, while other researchers considered also importance rates. The ways for collecting were different among the various studies: some researchers adopted the traditional face-to-face interviews, while others preferred or were forced to collect the data online. The various studies are also for this reason differentiated in terms of sample size. Many differences were registered in the evaluation scales adopted for collecting passengers' opinions: Likert scale is one of the most adopted scale together with other verbal scales; someone used a numerical scale.

Finally, there is a great variety also in terms of methodologies adopted for analysing the collected data. In the following subsections, we try to give to the reader a picture of the methodologies adopted for the collection and the analysis of the air passengers' perceptions for measuring air transport service quality.

2.2. Survey data collection: evidences from the literature review

Concerning the studies investigating on airport service factors, the method of collecting the data are similar among them; in fact, for almost all the studies, the data were collected at airport and specifically by interviewing the departing passengers at the departure gates or lounges.

When the objective is to analyze the services offered in the airports, there is the advantage to interview the passengers while they are waiting for the flight departure, and therefore to exploit the availability of the passengers who are not in a hurry because in general their sole engagement is to wait the time of the flight departure. They have the possibility to provide their opinions about the services provided by the airport even if they did not travel yet, because they are staying in the airport and they have a perception of the service factors characterizing the airport.

A very different case is when the objective is to analyze the services provided by the airlines, in other words the services used by the passengers during the flight. In this case, from the analysis of the literature studies shown in the column on the right of table 1, we discovered that there is a great variety of collection of the data.

The major part of the studies analyze data collected at the airport and specifically at the boarding gates or anyway in the departure area, but the collected opinions have to obviously refer to a previous flight, given that in the departure area passengers are waiting the flight and therefore they have not travelled yet. For this reason, the questionnaires can be addressed only to people who purchased a ticket of flight or either considered the analyzed airline in the past; as an example, Wu-Cheng (2013) considered the passengers who had used the airline services during the past 12 months. Only two studies analyzed data collected during the flight, and specifically Chou et al. (2011) and Li et al. (2017). Instead, for the studies by Liou et al. (2011a, 2011b), the questionnaire was distributed at the boarding gate of several airports and collected at the exit doors after the baggage claim. In these specific cases, passengers could refer to the current flight. Two studies analyzed data collected from self-administered questionnaires compiled neither in the airport nor during flight. Specifically, the study by Suki (2014) analyzed data from residents who had flown regularly with a certain company in the preceding six months, whereas in the work by Koklic et al. (2017) an online survey was adopted in which people reported the opinions about a specific airline for the most recent travel within the past twelve months.

Both studies investigating on airport and airline services are differentiated in terms of kind of opinions collected through the questionnaire (Figure 1a).

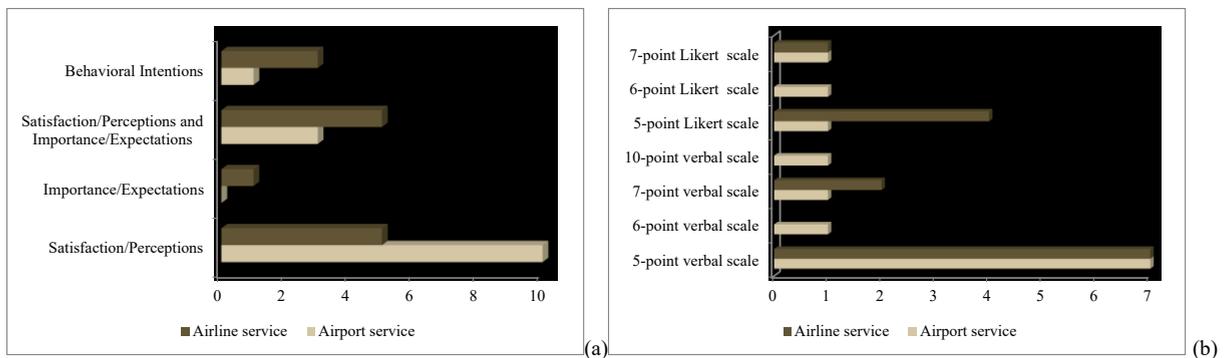


Fig. 1. Number of studies classified according to the kind of data (a) and the evaluation scale (b)

There are studies investigating only on perceptions or satisfaction with the service. In other words, people provide their judgments on the used services indicating their level of satisfaction with the various service aspects, or providing a rate on the performance of the service aspects.

The major part of the reviewed studies analyzed only this kind of opinions. However, a respectable number of studies investigated on both perceptions and expectations about the service, requested often in terms of satisfaction and importance rates. In these cases, in addition to the opinions about the performance of the various service aspects, passengers are requested to express also what they expect from the service and therefore to provide a rate of importance on each of the analyzed service aspect.

Only one study investigated just the expectations; in fact, Lim and Tkaczyuski (2017), probably for avoiding the problem linked to the necessity of interviewing people after a flight or however asking for their opinions about a recent flight, requested to a sample of students only their expectations about the services provided by the airlines; even if a person has not travelled recently, he/she is able to express the expectations about a service. Finally, a restricted number of studies investigated on satisfaction and/or expectations together with the passengers' behavioral intentions, which represent their intentions to reuse the service or to recommend it to other people, and so on. The studies based on the collection of behavioral intentions are more complete and innovative and need more sophisticated approaches of analysis, and for this reason they are less than the others.

Another differentiation of the literature studies concerning the collection of the data regards the evaluation scales adopted for collecting passengers' opinions (Figure 1b). The scales are very variegated, in terms of number of levels but also the kind of levels. The major part of the studies refers to evaluation scales on 5 levels, some on judgement from "very poor" (or "very bad") to "very good" (or "excellent"), and other on satisfaction levels from "strongly dissatisfied" to "strongly satisfied" or also from "very unsatisfied" to "very satisfied". The scales requesting a level of satisfaction predominate as regards the other kind of scale that are known in the literature as "performance scales" (Devlin et al., 1993). Analogously, when also expectations or importance rates are requested, the scale varies from "very low" to "very high", or "not very important" to "very important". A limited number of studies adopted scales on seven points. Only two studies adopted scales on a number of points different from 5 or 7: the study by Ceccato and Masci (2017) using a scale on 10 levels, and the study by Eboli and Mazzulla (2009) adopting a 6-point scale. There are some studies adopting Likert scales (5-point, 6-point or 7-point) according to which a level of agreement or disagreement with some sentences is expressed.

2.3. Methods of data analysis: evidences from the literature review

The methodologies adopted or proposed for analyzing the data collected from the air passengers can be more or less sophisticated.

From the studying of the papers selected for the proposed literature review, it emerges that there are some authors proposing simple descriptive statistical analyses, or Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), or linear and logistic regression, while a large number of researchers aim to more advanced approaches, such as Structural Equation Modelling (SEM), or Multi-Criteria Decision-Making (MCDM), or Fuzzy theory, or Probit models. There are some authors who adopted other kinds of methods not included in the above mentioned ones: an author adopted the Kano model, one paper proposed a decision rules approach, one paper applied an Importance-Performance analysis, and one paper proposed a Rasch modelling technique (Table 2).

From table 2 we can observe that there is a large number of studies oriented towards regression models and SEM, which can be seen as an advanced regression model where latent constructs can be considered. These kinds of techniques are very suitable for analyzing customer satisfaction data expressed in terms of rates. Specifically, studies analyzing airport service quality are more oriented on regression models, while studies analyzing airlines services on SEM. We could verify that the studies aiming to investigate also on the behavioral intentions adopted the SEM approach, because it permits to model well the relationship among different constructs, such as satisfaction, expectation, and behavioral intentions.

As reported in Lupo (2015), in the field of airport service quality evaluation, differently from the studies investigating on service quality of other public transport modes, several studies have focused on the deterministic nature of the multi-criteria decision process (e.g. Kuo, 2011; Liou et al., 2011), while others have taken into account uncertainty and the imprecise numeric values of decision data (e.g. Chou et al., 2011). Some authors, as we can observe from table 2, combined these two kinds of approach.

Some other authors preferred to apply techniques developed just for analyzing customer satisfaction data such as the Importance-performance analysis, or the Kano model (Kano et al., 1984).

Table 2. The main two categories of selected studies differentiated according the proposed methodology for analyzing data.

Methodology	Studies analyzing airport services	Studies analyzing airline services
Descriptive statistics	Sricharoenpramong (2018)	
EFA and/or CFA	Bezerra and Gomes (2016)	Lim-Tkaczynski (2017)
Importance-Performance analysis	Lubbe et al. (2011)	
Regression models	Bellizzi et al. (2018) Bezerra and Gomes (2015) Brida et al. (2016) Ceccato and Masci (2017) Eboli and Mazzulla (2009)	
Kano model		Hu-Hsiao (2016)
Decision rules approach	Liou et al. (2011)	
SEM	Jeon and Kim (2012) Suki (2014)	Chen (2008) Suki (2014) Hussain (2015) Koklic et al. (2017) Wu-Cheng (2013)
MCDM	Lupo (2015) Pandey (2016)	Kuo (2011) Liou et al. (2011a) Liou et al. (2011b) Tsafarakis et al. (2017)
Fuzzy theory	Lupo (2015) Pandey (2016)	Chou et al. (2011) Kuo (2011) Li et al. (2017)
Probit or Logit models		Jiang and Zhang (2016)
Rasch modelling technique	Pantouvakis and Renzi (2016)	

3. Discussion and main conclusions

The main important difference between the studies analyzing airport services and those analyzing airlines services regards data collection. In the first case, interviewers have the possibility to ask passengers their opinions about the service before their departure, because they used or they are using the services when they are contacted by the interviewers. In the second case, if the interviews are effected while passengers wait the flight departure, which is a good moment for collecting information, passengers have not used yet the services provided by the airlines during the flight. In addition, if for an interviewer can be easy to contact the passengers in the airport or access upon authorization or to acquire the data collected from the airport agencies, the case is different for the airlines, which unlikely make the collected data available for analyses made by other subjects, or to give the authorization to perform the interviews during the flight. Therefore, in this case the major part of studies analyze data collected before the flight departure even if referred to a previous flight, or data collected online concerning a travel made recently. Generally, a period within the past six or twelve months is considered, because a larger time period would result too far for remembering well the flight and provide reliable information and opinions.

The studies investigating only on satisfaction or perceptions are more than the others. There are several reasons for this evidence. First of all, it is simpler to collect only one kind of opinions avoiding to fatigue the respondents with a large number of questions. In fact, asking passengers to express also importance rates increases the length of the questionnaire and could undermine the accuracy of the survey (Hernandez et al., 2016). Secondly, some studies have demonstrated that when importance levels are requested directly to the users, they tend to give importance to all the service aspects (Eboli and Mazzulla, 2010), while it can result more convenient to calculate the importance levels from the perceptions levels by relate the satisfaction with the service aspects with the satisfaction with the overall service.

Concerning the evaluation scales, we can note that the major part of the studies adopted scales are odd, and specifically 5-point scales. But some researchers believe a 5-point scale is totally inappropriate for customer satisfaction studies because scales with fewer points can be more susceptible to inflated results. In addition, by providing an even number of choices, neutrality is not allowed. It should be highlighted that probably for the major part of the studies reported in our literature review, the data were provided by the companies managing the services that evidently do not consider the advantages of a scale as regards another scale.

From the analysis of the literature review in terms of methodologies proposed for analyzing the data, we can highlight that some authors aim to methods of regression, traditional or more advanced such as SEM, which are suitable for analyzing customer satisfaction data because the objective of the major part of the works is to identify the service aspects mostly influencing the overall service quality. On the other hand, some authors considered an important aspect of the customer satisfaction data, linked to their uncertainty. In fact, the linguistic assessment of human perception and expectation can be incomplete and vague, such that representing it by means of an exact numerical value may prove unrealistic. In addition, evaluation of service quality presents intrinsic complexity aspects related to the nature of services. In such a situation, FST (Zadeh, 1965) represents an effective approach to handle uncertainty of human preferences. Another research stream is based on the application of MCDM methods that permit to evaluate an integrated service level and make suggestions for improvement (Tsafarakis et al., 2017).

From our literature review study, we can conclude that there is a large variety of methods both for collecting the data and for analyzing them, and that it is difficult to understand if all the methods are suitable, or which are the best methods for analyzing air transport service quality. Therefore, it is important to investigate much more on the literature of the sector of air transportation, which is an emerging sector in the field of public transport service quality analysis. This paper wants to be a first step for providing a systematic literature review that can be useful both for researchers and for practitioners in order to identify the most suitable methods for collecting the opinions of the passengers, and for determining the most critical or the most important service aspects for the passengers, with the final aim to improve the services and to provide high levels of service quality to the users.

References

- Allen, J., Eboli, L., Forciniti, C., Mazzulla, G., Ortúzar, J.D., 2019. The role of critical incidents and involvement in transit satisfaction and loyalty. *Transport policy*, 75, pp. 57-69.
- Allen, J., Eboli, L., Mazzulla, G., Ortúzar, J. de D., 2018. Effect of critical incidents on public transport satisfaction and loyalty: an ordinal Probit SEM-MIMIC approach. *Transportation*, 1-37. <https://doi.org/10.1007/s11116-018-9921-4>
- Bellizzi, M.G., Eboli, L., Forciniti, C., Mazzulla, G., 2018. Air Transport Passengers' Satisfaction: an Ordered Logit Model. *Transportation Research Procedia* 33, 147–154.
- Bezzerra, C. L., Gomes, C. F., 2015. The effects of service quality dimensions and passenger characteristics on passenger's overall satisfaction with an airport. *Journal of Air Transport Management* 44-45, 77–81.
- Bezzerra, C. L., Gomes, C. F., 2016. Measuring airport service quality: A multidimensional approach. *Journal of Air Transport Management* 53, 85–93.
- Brida J.G., Moreno-Izquierdo, L., Zapata-Aguirre, S., 2016. Customer perception of service quality: The role of Information and Communication Technologies (ICTs) at airport functional areas. *Tourism Management Perspectives* 20, 209–216.
- Ceccato, V., Masci, S., 2017. Airport Environment and Passengers' Satisfaction with Safety. *Journal of Applied Security Research* 12.3, 356–373.
- Chen, C.F., 2008. Investigating structural relationships between service quality, perceived value, satisfaction, and behavioural intentions for air passengers: Evidence from Taiwan. *Transportation Research Part A* 42, 709–717.
- Chou, C.C., Liu, L.J., Huang, S.F., Yih, J.M., Han, T.C., 2011. An evaluation of airline service quality using fuzzy weighted SERVQUAL method. *Applied Soft Computing* 11.2, 2117–2128.
- Eboli, L., Forciniti, C., Mazzulla, G., 2018a. Spatial variation of the perceived transit service quality at rail stations. *Transportation Research Part A: Policy and Practice* 114, 67-83.
- Eboli, L., Forciniti, C., Mazzulla, G., 2018b. Formative and reflective measurement models for analyzing transit service. *Public Transport, Planning and Operations* 10, 107-127.
- Eboli, L., Mazzulla, G. 2009. An ordinal logistic regression model for analysing airport passenger satisfaction. *EuroMed Journal of Business* 4.1, 40–57.
- Eboli, L., Mazzulla, G., 2010. How to capture the passengers' point of view on a transit service through rating and choice options. *Transport Reviews* 30(4), 435–450.
- Hernandez, S., Monzon, A., de Oña, R., 2016. Urban transport interchanges: A methodology for evaluating perceived quality. *Transportation Research Part A* 84, 31–43.

- Hu, K.C., Hsiao, M.W., 2016. Quality risk assessment model for airline services concerning Taiwanese airlines. *Journal of Air Transport Management* 53, 177–185.
- Hussain, R., Al Nasser, A., Hussain, Y.K., 2015. Service quality and customer satisfaction of a UAE-based airline: An empirical investigation. *Journal of Air Transport Management* 42, 167–175.
- Jeon, S., Kim, M., 2012. The effect of the servicescape on customers' behavioural intentions in an international airport service environment. *Service Business* 6, 279–295.
- Jiang, H., Zhang, Y., 2016. An investigation of service quality, customer satisfaction and loyalty in China's airline market. *Journal of Air Transport Management* 57, 80–88.
- Kano, N., Seraku, N., Takahashi, F., Tsuji, S., 1984. Attractive quality and must-be quality. *Jpn. Soc. Qual. Control* 39–48.
- Koklic, M.K., Kukar-Kinney, M., Vegelj, S., 2017. An investigation of customer satisfaction with low-cost and full-service airline companies. *Journal of Business Research* 80, 188–196.
- Kuo, M.S., 2011. A novel interval-valued fuzzy MCDM method for improving airlines' service quality in Chinese cross-strait airlines. *Transportation Research Part E* 47, 1177–1193.
- Li, W., Yu, S., Pei, H., Zhao, C., Tian, B., 2017. A hybrid approach based on fuzzy AHP and 2-tuple fuzzy linguistic method for evaluation in-flight service quality. *Journal of Air Transport Management* 60, 49–64.
- Lim, S.S., Tkaczynski, A., 2017. Origin and money matter: The airline service quality expectations of international students. *Journal of Hospitality and Tourism Management* 31, 244–252.
- Liou, J.J.H., Hsu, C.C., Yeh, W.C., Lin, R.H., 2011b. Using a modified grey relation method for improving airline service quality. *Tourism Management* 32, 1381–1388.
- Liou, J.J.H., Tang, C.H., Yeh, W.C., Tsai, C.Y., 2011. A decision rules approach for improvement of airport service quality. *Expert Systems with Applications* 38, 13723–13730.
- Liou, J.J.H., Tsai, C.Y., Lin, R.H., Tzeng, G.H., 2011a. A modified VIKOR multiple-criteria decision method for improving domestic airlines service quality. *Journal of Air Transport Management* 17, 57–61.
- Lubbe, B., Douglas, A., Zambellis, J., 2011. An application of the airport service quality model in South Africa. *Journal of Air Transport Management* 17, 224–227.
- Lupo, T., 2015. Fuzzy ServPerf model combined with ELECTRE III to comparatively evaluate service quality of international airports in Sicily. *Journal of Air Transport Management* 42, 249–259.
- Pandey, M.M., 2016. Evaluating the service quality of airports in Thailand using fuzzy multi-criteria decision making method. *Journal of Air Transport Management* 57, 241–249.
- Pantouvakis, A., Renzi, M.F., 2016. Exploring different nationality perceptions of airport service quality. *Journal of Air Transport Management* 52, 90–98.
- Spasojevic, B., Lohmann, G., Scott, N., 2017. A systematic literature review on air transport and tourism: analysis from 54 journals during the period 2000–2014. CAUTHE 2016 Conference Proceedings. Council for Australasian University Tourism and Hospitality Education, Feb. 2016.
- Sricharoenpramong, S., 2018. Service quality improvement of ground staff at Don Mueang International Airport. *Kasetsart Journal of Social Sciences* 39, 15–21.
- Suki, N.M., 2014. Passenger satisfaction with airline service quality in Malaysia: A structural equation modeling approach. *Research in Transportation Business & Management* 10, 26–32.
- Tsafarakis, S., Kokotas, T., Pantouvakis, A., 2017. A multiple criteria approach for airline passenger satisfaction measurement and service quality improvement. *Journal of Air Transport Management* 68, 61–75.
- Wu, H.C., Cheng, C.C., 2013. A hierarchical model of service quality in the airline industry. *Journal of Hospitality and Tourism Management*. 20, 13–22.
- Zadeh, L.A., 1996. Fuzzy logic computing with words. *IEEE Trans. Fuzzy Syst.* 4, 103–111.