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A LITERATURE REVIEW OF STUDIES ANALYSING AIR TRANSPORT SERVICE QUALITY FROM THE PASSENGERS' POINT OF VIEW

ABSTRACT

Evaluating air transport service quality is fundamental to ensure acceptable quality standards for users and improve the services offered to passengers and tourists. In the transportation literature there is a wide range of studies about the evaluation of public transport service quality based on passengers' perceptions; however, more recently, the evaluation of air transport service quality is becoming a relevant issue. Evaluating service quality in air transport sector represents a more stimulating challenge, given the complexity of air transport system in regards to the other systems; in fact, air transport service is characterised by a great variety of service aspects relating to services offered by the airlines and provided by the companies managing airports. The complexity of such a service requires a deep investigation on the methods adopted for collecting and analysing the data regarding passengers' perceptions. We propose this paper just for treating these interesting aspects and to provide an exhaustive literature review of the studies analysing service quality from the passengers' point of view, where the opinions of the passengers are collected by the Customer Satisfaction Surveys (CSS). We decided to select papers published within the last decade (2010–2020) in journals indexed in important databases such as Scopus and WoS.

KEYWORDS

airport services; airlines services; service quality; passengers' perceptions; data collection; data analysis; literature review.

1. INTRODUCTION

Air transport has become a fundamental transport mode because it allows us to reach destinations more easily and quickly. It plays a vital role in the economies of countries [1], being essential for global business and tourism. As an example, the lack of adequate transport systems could reduce the opportunities of development of territories whose livelihood depends on tourism [2]. For this reason, providing airport services characterised by high levels of quality is very important to make the travel more pleasant for the passengers, with the final objective to attract more users. The assessment of service quality plays an important role in all public transport systems [3, 4]. In the field of road and rail public transport, many studies dealt with the assessment of service quality based on users' perceptions [e.g. 5–8]. Only in recent years, this topic has become of interest also in the field of air transport, due also to the exponential increase in the number of passengers travelling by air [9]. For this reason, over the years, both researchers and air transport providers have increasingly worked to analyse the problem and find tools for improving service quality. However, the evaluation of air transport service quality could be considered more complex than the other transport modes because of the peculiarities of the air transport system. People travelling by air, in fact, are subject to conditions that people travelling by other transport modes do not experience. As an example, air passengers are constrained to arrive at the airport at least 40 minutes before the flight for a series of reasons. In fact, within the terminal area, services such as check-in, passport and security controls, baggage drop, customs and baggage claim are provided to departing and arriving travellers [10]. In general, people travelling by public transport modes experience services provided during the time

spent on board, as well as services offered at the public transport stops or stations where they take the means of transport. However, whereas a railway station or a bus stop represents places where passengers stay for a relatively short time, airport, on the other hand, has a prominent role in the travel experience of an air passenger. In addition, there is a great variety of services offered at the airports, as well as on flights. This fact makes the assessment of air transport service quality even more complex, and based on a differentiation of the characteristics of the services between those managed by the airlines and more linked to the flight, and those relating to the companies managing the airport services, more linked to the services offered at the airport. The major part of the studies in the literaconcerning air transport service quality, unlike for other public transport modes, treat the group of services prevalently experienced on board separately from the group of services experienced at the airport. This literature review arises from the desire to provide a picture of the most recent literature about air transport service quality, given the complexity of the service. We will consider only studies analysing service quality based on the passengers' perceptions. In addition, to provide a background concerning the service quality factors characterising air transport system, the review focuses on two main aspects: the methods for collecting the data (i.e., passengers' perceptions) and the methods for analysing the data. In other words, we want to provide information regarding the methods adopted by the various authors for registering the opinions of the passengers regarding the experienced services and the techniques or models proposed for analysing the collected data, in order to give ideas on which are the most suitable methods for assessing air transport service quality in various situations. More specifically, we decided to differentiate between studies analysing airport service quality and studies analysing airlines service quality for practical reasons, given the orientation in the literature to consider the two kinds of services separately.

The decision to provide such review arose also from the absence of papers proposing literature review on air transport service quality. In fact, in the air transport field the proposed literature review included other aspects, such as air transport and tourism research in general [11], and the changing interests of academics publishing in air transportation [12]. First, we provide a section describing the method adopted for making the review. This is followed by the section concerning the studies analysing airport services, divided into three subsections having the aim to provide an overview of the service quality factors investigated in the various studies, to examine the methods of data collection, and the methods of analysis. Successively, a section regarding airlines services is organised in an analogous manner. Finally, a section of main findings and a section of conclusions are presented in the end.

2. RESEARCH METHOD

The aim of this section is to present the research method adopted for organising the proposed literature review, and in particular all the criteria considered for selecting the studies and classifying them in the most convenient manner. The main aim of this literature review is to provide to the researchers in the field of air transport service quality and the practitioners of the sector a useful tool for studying and analysing the treated issue, and to give a clear idea of the advances in this subject.

First of all, we have classified the literature studies in terms of types of analysed service. As specified above, the major part of literature studies differentiate between services provided at the airport and managed by the airport companies, and services provided by the airlines, mostly concerning the flight. Considering the complexity and the large variety of the service aspects experienced by the air passengers, the major part of the studies focused only on one category of services at a time. Moreover, the collection of the data is quite different for the two types of services, which is one of the main reasons why researchers analysed only one typology. More specifically, data regarding airport service factors are generally collected at the airport by interviewing the departing passengers at the departure gates or lounges, who are waiting the flight departure and have sufficient time to be interviewed. Moreover, considering that they are staying in the airport before departing, they are able to provide their opinions about the airport services even if they did not travel yet, having a perception of the service factors characterising the airport. On the contrary, the collection of opinions about the airline services is quite complex; in fact, from the literature it emerges that there is a great variety of collection of the data. The major part of the studies choose to analyse data collected at the boarding gates of the airport, as well as the case of the airport services, but in this case the

collected opinions have to refer to a previous flight, given that the interviewed departing passengers have not travelled yet. For this reason, the questionnaires can be administered only to users who either purchased a flight ticket or considered the analysed airline in the past. A more detailed discussion of the differences in data collection is reported below.

All the papers appearing in this review were published within the last decade (2010–2020) in journals indexed in important databases such as Scopus and WoS. *Table 1* reports a classification of the papers with respect to the journal. As we can see, most of the papers were published in the Journal of Air Transport Management, which is the transportation journal mostly specialising in publishing papers dealing with air transportation.

As mentioned in the introduction, our review is organised by considering two main research aspects: the methods for collecting the data and the methods for analysing them. The methods for data

Table 1 – Selected studies according the journal where they were published

Studies analysing airport services		Studies analysing airline services	
Journal of Air Transport Management	Allen et al. (2020) [23] Arif et al. (2013) [24] Bezerra & Gomes (2015) [25] Bezerra & Gomes (2016) [16] Bezerra & Gomes (2020) [27] Del Chiappa et al. (2016) [29] Jiang & Zhang (2016a) [37] Lee & Yu (2018) [43] Lubbe et al. (2011) [30] Lupo (2015) [45] Martin-Domingo et al. (2019) [42] Pandey (2016) [32] Pantouvakis & Renzi (2016) [18] Rocha et al. (2016) [38]	Journal of Air Transport Management	Atalay et al. (2019) [65] Basfirinci & Mitra (2015) [51] De Jager et al. (2012) [71] Farooq et al. (2018) [57] Hu & Hsiao (2016) [50] Hussain et al. (2015) [59] Jiang & Zhang (2016b) [67] Keshavarz Ghorabaee et al. (2017) [69] Li et al. (2017) [64] Liou et al. (2011) [56] Lucini et al. (2020) [77] Martín et al. (2011) [73] Medina-Muñoz et al. (2018) [61] Shah et al. (2020) [54] Tahanisaz & Shokuhyar (2020) [62] Tsafarakis et al. (2018) [34]
Tourism Management Perspective	Bezerra & Gomes (2019) [26] Brida et al. (2016) [35] Gitto & Mancuso (2017) [41]	Journal of Hospitality and Tourism Management	Lim & Tkaczynski (2017) [72] Wu & Cheng (2013) [1]
Transportation Research Part A	Nesset & Helgesen (2014) [31]	Transportation Research Part A	Kuo & Jou (2014) [60] Wen et al. (2014) [74]
Journal of Applied Security Research	Ceccato & Masci (2017) [28]	Applied Soft Computing	Chou et al. (2011) [63]
Research in Transportation Business & Management	Suárez-Alemán & Jiménez (2016) [40] Tseng (2020) [39]	Research in Transportation Business & Management	Bellizzi et al. (2020) [70] Suki (2014) [49]
International Business Research	Park & Jung (2011) [22]	Journal of Business Research	Kos Koklic et al. (2017) [68]
Expert Systems with Applications	Kuo & Liang (2011) [44] Liou et al. (2011) [13]	Expert Systems with Application	Leong et al. (2015) [52]
Journal of Retailing and Consumer Services	Hong et al. (2020) [36] Prentice & Kadan (2019) [33]	Transportation Research Part E	Kuo (2011) [66] Wen & Lai (2010) [75]
Tourism Review	Bogicevic et al. (2013) [14]	Tourism Management	Han et al. (2012) [58] Liou et al. (2011) [55]
Kasetsart Journal of Social Sciences	Sricharoenpramong (2018) [21]	The TQM Journal	Namukasa (2013) [48]
Journal of Service Marketing	Geng et al. (2017) [20]		

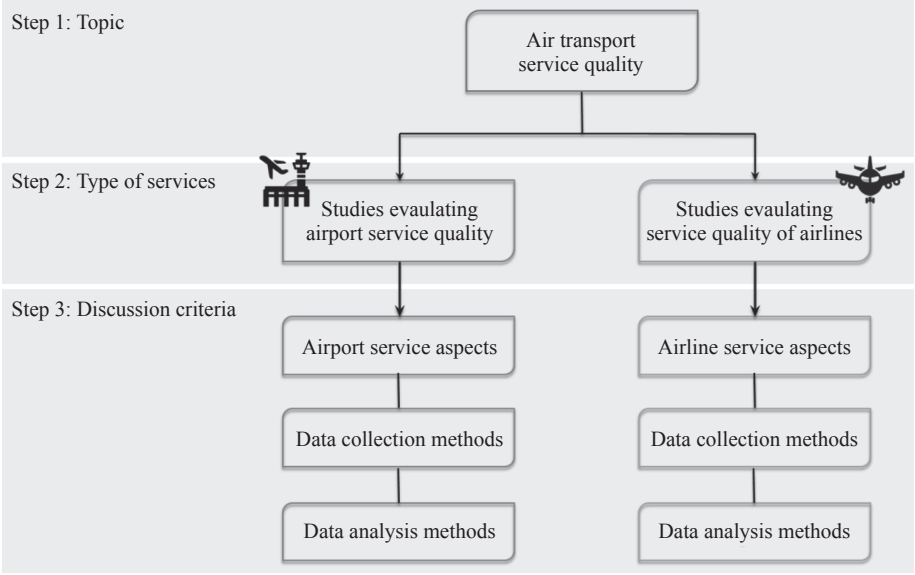

Figure 1 – Structure of the literature review

collection include the type of survey (face-to-face, online, etc.), the method for passengers to express their opinions (satisfaction rates, importance rates, or both), the evaluation scales adopted for collecting passengers' opinions (Likert scale, verbal scale, numerical scale, and so on). Finally, the papers were classified on the basis of the methodologies adopted for analysing the collected data. The structure of our review is shown in *Figure 1*. 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 perceptions of air passengers for measuring air transport service quality.

3. STUDIES EVALUATING AIRPORT SERVICE QUALITY

3.1 Airport services

The wide range of services and facilities provided at the airports makes them complex systems [13]. In fact, in an airport there are many different activities dealing with several operations such as, for example, aviation, security controls, shopping, etc. Considering the wide range of terminal activities, it is not possible to find within the airport-related literature a single way to classify them. Generally, the air travel experience of passengers is composed of two major components: airport ground service and in-flight service [14]. The first ones are those closely linked to the airport management, and they are also called "landside operations" [13]. In the literature there are different ways to classify these types of activities, which passengers experience in different terminal areas: access interface, processing area, and flight interface [15]. As an example, authors such as Bezerra & Gomes [16] distinguish the process activities (e.g. security screening, passport control) from the discretionary ones (getting a coffee, shopping, exchanging money). The same activities can be distinguished also in aeronautical service and commercial service [17]. In any case, despite these differences in classification of activities, the attributes used to evaluate airport service quality are similar among the authors [18].

According to the Airport Council International (ACI), customer satisfaction depends on many factors: some of them are within the airport's control (e.g. cleanliness, ease of wayfinding, variety of shops, comfort of departure areas, reliability of escalators and moving walkways); others may or may not be within the airport's control, such as security controls and baggage delivery; and finally there are those not within the airport's control, such as speed of airline check-in, level of airfares, and range of flights offered [19].

For practical reasons, the main service aspects found in the analysed literature are reported in *Table 2*. Most studies analysed almost all service aspects, while few authors have decided to focus their attention only on particular aspects [e.g. 20, 21]. From the analysis of literature review, a certain complexity and variety of airport services emerges. For this reason, it is extremely important to identify those methodologies that try to determine the most relevant airport service aspects for passengers.

Table 2 – Selected studies for airport services differentiated by service aspects

Service aspect	Studies analysing the service
Airport accessibility	[14, 24, 39]
Airport external signposting	[18, 30]
Airport parking	[13, 14, 32, 36, 37, 38, 43]
Ground transportation connecting the airport	[13, 24, 30, 32, 36, 37, 38, 39, 42]
Connecting flights	[31, 32, 37]
Information displays	[13, 16, 22, 23, 25, 26, 27, 28, 30, 32, 35, 36, 37, 39, 42, 43, 44]
Information sound system	[28, 35, 39]
Information facilities	[13, 18, 24, 28, 31, 35, 44, 45]
Signposting inside the airport/Wayfinding	[14, 16, 18, 24, 25, 26, 27, 28, 30, 32, 35, 36, 37, 38, 39, 43, 44]
Walking distance and/or facilities (escalators, elevators, moving walkways)	[13, 16, 22, 25, 26, 27, 28, 32, 33, 36, 37, 38, 41, 42, 44, 43]
Check-in procedure (Staff, waiting time, self-facilities)	[14, 16, 23, 25, 26, 27, 30, 32, 33, 37, 38, 39, 41, 42, 43, 44]
Passport/Customs/Immigration procedure	[13, 24, 30, 32, 36, 37, 38, 39, 42, 43, 44, 45]
Waiting areas/Lounges	[14, 16, 22, 24, 25, 26, 27, 30, 31, 32, 37, 39, 41, 42, 43]
Airport staff (Courtesy, Friendliness, Professionality)	[13, 14, 16, 18, 21, 22, 24, 25, 26, 27, 29, 30, 31, 35, 36, 39, 40, 42, 43, 44, 45]
Cleanliness	[13, 14, 16, 18, 22, 23, 25, 26, 27, 29, 32, 33, 35, 38, 39, 40, 41, 43, 44, 45]
Air conditioning/Thermal comfort	[16, 18, 20, 23, 25, 28, 33, 35, 36, 37, 38, 41, 44]
Noise/Acoustic comfort	[16, 20, 25, 28, 33, 38]
Lighting	[18, 28, 35, 36, 37, 45]
Ambience/Comfort/Atmosphere/Decor	[13, 18, 20, 22, 23, 28, 29, 30, 32, 33, 35, 36, 37, 39, 40, 43, 44]
Toilets/Washrooms (Availability, Cleanliness)	[13, 16, 24, 25, 26, 27, 28, 31, 32, 36, 37, 38, 39, 41, 42, 43, 45]
Luggage carts	[14, 16, 24, 25, 32, 36, 37, 38, 39, 41, 43, 45]
Baggage delivery procedure	[23, 30, 31, 32, 36, 37, 38, 41, 42, 43, 45]
Safety	[16, 18, 22, 25, 26, 27, 28, 32, 33, 35, 36, 43, 45]
Security procedure (Staff, Waiting time)	[13, 16, 14, 18, 23, 24, 25, 26, 27, 28, 32, 33, 36, 37, 41, 42, 43, 44, 45]
Shopping/Rental services (Availability, Staff, Prices)	[13, 14, 16, 22, 24, 25, 26, 27, 30, 32, 36, 37, 41, 43, 44, 45]
Restaurants/Bars (Availability, Staff, Prices)	[13, 14, 16, 22, 24, 25, 26, 27, 29, 30, 32, 33, 36, 41, 42, 43, 44, 45]
Money exchange/Cash machines/ATMs	[13, 16, 25, 26, 27, 32, 36, 37, 38, 41, 42, 43, 44, 45]
Telephone/Internet facilities/Business centers	[14, 30, 32, 38, 43]
Wi-Fi connection	[14, 26, 27, 32, 36, 37, 38, 41, 42, 43]
Charging stations	[14, 37]
Special services	[24, 35]
Prayer rooms/chapels	[24]
Childrens' play areas	[22, 41, 37]
Pharmacies	[22]
Smoking area	[37, 41]

3.2 Data collection

Passenger opinions are generally collected at the airport by interviewing the passengers directly. The interviews can be addressed to the departing, arriving, and transfer passengers. Each of these groups have a different set of needs and wishes when they use different facilities at the airport [22]. Departing passengers are the most available to be interviewed, because they are not in a hurry and their sole engagement is to wait for the time of their flight departure [13, 18]. On the other hand, the arriving or transfer passengers could be in a hurry to leave the airport or to reach the gate of the next flight, respectively. In the existing literature, most of the studies are based on data collected by interviewing departing passengers [e.g. 13, 16, 20, 21, 23–34]. A certain number of studies, however, are based on data obtained by interviewing all airport passengers (departing, transfer, and arriving passengers) [35–39] (*Table 3*).

Generally, when the survey is addressed to the departing, transfer, and arriving passengers, the interviews take place directly in the airport face-to-face [13, 18, 23, 24, 29, 31, 35, 38] or through self-administered questionnaires [16, 21, 22, 25–27, 30, 32, 36, 37, 39] Otherwise, when the goal is to reach a large number of air travellers' opinions, various data collection tools are adopted, such as: online questionnaires sent by email [40] or other platforms where users leave their airport evaluations as Skytrax [41], Twitter [42], Facebook [33], Google reviews [43] or in an airport review website [14]. Finally, in the revised literature there are some studies that analyse the opinions of travel experts [44, 45] (*Table 3*).

The literature studies differ also in terms of types of opinions collected through the questionnaire. We can collect: (1) satisfaction/perceptions data; (2) importance/expectations data; (3) behavioural intentions.

There are studies investigating only perceptions or satisfaction with the service, which represent the opinions of the passengers on the experienced services. Specifically, people provide their judgments on the used services indicating their level of satisfaction with the various service aspects [16, 18, 20, 23, 25, 28, 29, 35] or providing a rate on the performance of the service aspects [22, 24, 36, 44, 45]. Liou et al. [13] requested both the perceptions and satisfaction levels with the service.

On the other hand, a respectable number of studies also investigated expectations about the service, which are requested often in terms of importance rates [21, 30, 32, 37, 39]. In these cases, in addition to the opinions on the performance of the various service aspects, passengers are requested to express also what they expect from the service, providing a rate of importance on each analysed service aspect.

Finally, a restricted number of studies investigated satisfaction and/or expectations together with the passengers' behavioural intentions [26, 27, 31, 33] representing their intentions to reutilise the service or recommend it to other users or potential ones. The studies based on the collection of behavioural intentions are more complete and innovative, and need more sophisticated analysis approaches (*Table 3*).

Another differentiation of the literature studies in terms of data collection is regarding the evaluation scales adopted for collecting passengers' opinions. The scales are very variegated, in terms of type and number of levels. The major part of the studies refers to evaluation scales on 5 levels [13, 16, 23,

Table 3 – Selected studies for airport services by data collection methods

Type of passengers	Departing	All	
	[13, 16, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34]	[35, 36, 37, 38, 39]	
Type of survey	Face-to-face	Self-administered	Online
	[13, 18, 23, 24, 29, 31, 35, 38]	[16, 21, 22, 25, 26, 27, 30, 32, 36, 37, 39]	[14, 33, 40, 41, 42, 43]
Type of opinion	Only satisfaction/perceptions	Satisfaction/perceptions Importance/expectations	Behavioural intentions
	[13, 16, 18, 20, 22, 23, 24, 25, 28, 29, 35, 36, 44, 45]	[21, 30, 32, 37, 39]	[26, 27, 31, 33]
Type of scale	5-point	7-point	Other
	[13, 16, 22, 23, 24, 30, 32, 36, 37, 39, 45]	[26, 27, 29, 31, 33, 35]	[18, 28]

24, 30, 32, 37, 39, 45], where the levels represent judgements from "very poor" (or "very bad") to "very good" (or "excellent"), or satisfaction levels from "strongly dissatisfied" (or "very unsatisfied") to "strongly satisfied" (or "very satisfied"). Analogously, the most adopted scales for requesting expectations or importance rates vary from "very low" to "very high", or "not very important" to "very important" [30, 32, 39]. A limited number of studies adopted service quality seven-point scales [26, 27, 29, 31, 35], or ten-point scales [28]. Finally, some studies adopted Likert scales (5-point, 6-point, or 7-point) according to which a level of agreement or disagreement with some statements is expressed [18, 22, 33, 36] (*Table 3*).

3.3 Data analysis

In the literature concerning airport services, almost all the studies aim to determine the attributes influencing the overall service quality the most; these attributes represent the crucial aspects that a company should consider for improving the service and satisfying the users. As stated above, the variety of the services offered in the airport, and the multicultural nature of air transport industry in general, make the assessment of service quality quite complex. Therefore, over the years, researchers have always tried to use methodologies capable of synthesising the phenomenon as much as possible.

The methodologies adopted or proposed for analysing the data collected from the air passengers can be more or less sophisticated. From the analysis of the papers selected for the proposed literature review, it follows that some authors proposed simple descriptive statistical analyses [21, 24], Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) [16], or regression models [25, 28, 35, 37, 40], while a large number of researchers adopted more advanced approaches, such as Structural Equation Modelling (SEM) [22, 23, 26, 27, 31, 33, 36], Multi-Criteria Decision-Making (MCDM) [32, 38, 44, 45], Fuzzy theory [29, 32, 44, 45], Sentiment Analysis [41–43], or Importance-Performance Analysis (IPA) [30, 32, 37, 39]. Finally, one study adopted the Kano model [20], one paper proposed a decision rules approach [13], and one paper proposed a Rasch modelling technique [18] (*Table 4*).

Authors applying EFA, CFA, or regression models have the principal aim of identifying the key service aspects. As an example, from the EFA conducted by Bezerra & Gomes [25], it emerged that the airport service quality can be explained by seven factors, and from the regression analysis the dimensions with the highest effect on airport service quality are related to comfort and cleanliness inside the terminal. On the other hand, Brida et al. [35] obtained from a Principal Component Analysis (PCA) five different components, and from the results of a Logit model, they concluded that airports should improve mainly the way of communicating flight information.

Table 4 – Selected studies for airport services by data analysis methods

Data analysis method	Studies adopting the method
Simple descriptive statistical analysis	[21, 24]
EFA/CFA	[16]
Regression models	[25, 28, 35, 37, 40]
SEM	[22, 23, 26, 27, 31, 33, 36]
MCDM	[32, 38, 44, 45]
Fuzzy theory	[29, 32, 44, 45]
Sentiment Analysis	[41, 42, 43]
IPA	[30, 32, 37, 39]
Kano model	[20]
Decision rules	[13]
Rasch model	[18]

When the data are represented by web reviews [41–43], the technique generally adopted is the sentiment analysis. As an example, the findings of Gitto & Mancuso [41] suggest that passengers concentrate their valuations on a restricted set of services concerning food and beverage and the shopping area for the non-aviation services, while the evaluations for the aviation services mostly concern check-in, baggage claim, and security control procedures.

There is a large number of SEM-oriented studies, an advanced regression modelling approach where latent constructs can be considered. This approach is very suitable for analysing customer satisfaction data. It permits to account for latent constructs affecting overall air service quality and to explore observed indicators for measuring the introduced latent constructs themselves. Also, several studies aiming at investigating the behavioural intentions adopted the SEM approach, because it permits to model well the relationship among different constructs, such as satisfaction, expectation, and behavioural intentions.

In Park & Jung [22] the SEM approach was adopted to test the relationships between airport service quality, value, satisfaction, airport image, and passenger behaviour. The main findings suggest that airport service quality positively affect value, satisfaction, and airport image. Moreover, they concluded that the airport service quality influences reuse intentions of transfer passengers. The results of the study carried out by Nesset & Helgesen [31] presented airport service quality as the most important driver for loyalty attitude, passenger satisfaction creation and airport image building. The study of Prentice & Kadan [33] examines through SEM the relationship between airport service quality, passenger satisfaction, and behavioural intentions including airport reuse and destination revisit. Bezerra & Gomes [27] used the SEM for analysing the relationships between passenger expectations, airport service quality, switching costs for changing airports, and passenger loyalty towards the airport. Finally, Allen et al. [23] proposed a SEM-MIMIC ordinal Probit model for capturing the heterogeneity in perceptions of air transport passengers and identifying groups of passengers with similar assessments of the services.

A specific technique that represents also a very practical instrument for identifying the service aspects requiring a prompt action for improvement is surely the Importance-Performance Analysis (IPA), proposed initially by Martilla & James [46]. Performance and importance can represent the ratings provided directly by the passengers, but importance has been frequently derived by applying various techniques. In the work of Pandey [32], a fuzzy analysis was performed for deriving both performance and importance ratings. A modified version of the traditional IPA was proposed by Tseng [39] to classify and diagnose the service attributes of an airport: the IPA-Kano model. Both Jiang & Zhang [37] and Tseng [39] added to their study also a GAP analysis.

Finally, as reported in Lupo [45], in the field of airport service quality evaluation, unlike the studies investigating service quality of other public transport modes, several studies focused on the deterministic nature of the multi-criteria decision process. In all the revised studies, the MCDM approach was chosen to make a comparative analysis among airports belonging to the same region and for this reason they are in reciprocal competitiveness.

4. STUDIES EVALUATING AIRLINES SERVICE QUALITY

4.1 Airlines services

As for the airport services, the attributes taken into consideration by the various authors to assess the airline service quality are numerous and variegated. Furthermore, the researchers also have to include often in their studies service attributes that do not compete with the airlines directly. This occurrence probably happens because the survey for collecting data are addressed to customers who do not always know for whom certain services are competing. The airlines provide a range of services to customers including ticket reservation, purchase, airport ground service, on-board service, and the service at the destination [47] According to this, the airlines service attributes could be divided in aspects relating to the following phases: before the flight (e.g. flight booking and check-in procedure), during the flight (e.g. cabin cleanliness and seat comfort), and after the flight (e.g. luggage delivery and landing procedures) [48].

From the literature, in the questionnaires the service attributes are often divided into categories or dimensions. The number of these categories or dimensions is different among the authors. In Suki [49] there are only two airlines service quality dimension: tangibles (including cleanliness of airplane interior and toilets, quality of catering, and comfort level of the plane seats) and empathy (including attributes regarding how the company cares for and provides individualised attention to their customers). Hu & Hsiao [50] represented the airlines service quality by three dimensions: interaction quality (regarding airlines staff in general), physical environmental quality (related to cleanliness on board and other in-flight services), and outcome quality (related to flight information, flight punctuality but also to the check-in service). For Wu & Cheng [1], service quality is the overall dimension consisting of four primary dimensions: interaction quality (regarding, for example, expertise and problem solving), physical environment quality (e.g. cleanliness and comfort), outcome quality (focusing on the outcome of the service), and access quality (concerning information and convenience). Other authors [51, 52] by adopting the SERVQUAL model [53], represented the airlines service quality with five dimensions, i.e., tangibility (representing the physical service

presentation such as on-board equipment, quality of the food, and so on), reliability (standing for how credible the airline is in terms of safety and pilot navigating skills), responsiveness (relating to the interaction of the crew with customers), assurance (relating to the certitude provided by the airlines to customers) and empathy (representing how the airline deals with customer complaints and provides thoughtful services). Shah et al. [54] added other two dimensions to the SERVQUAL: passenger satisfaction and behavioural intentions.

A larger number of airlines service quality dimension can be found also in Liou et al. [55] and Liou et al. [56] Specifically, in these studies service attributes were divided into eight dimension, namely: booking service, ticketing service, check-in, baggage handling, boarding process, cabin service, baggage claim, and responsiveness.

Beyond the different ways to consider the dimensions of the airlines service quality, the airlines service attributes found in the selected studies are summarised in *Table 5*.

4.2 Data collection

As for airport-related studies, some differences also emerge in airlines literature in terms of type of survey, type of collected data, and evaluation scale. In this case, it is even more complex to organise the data collection and choose the time and place for

Table 5 – Selected studies for airlines services by service aspects

Service aspect	Studies analysing the service
Flight booking	[1, 34, 50, 54, 55, 56, 57, 61, 63, 65, 66, 67, 69, 70, 71, 72]
Seat choosing	[37, 54, 57, 63, 69, 70, 72]
Airlines web site	[48, 71]
Check-in	[1, 34, 50, 54, 55, 56, 59, 61, 63, 67, 70, 72, 74, 75, 77]
Frequency and scheduling	[1, 34, 51, 52, 54, 57, 61, 62, 63, 65, 67, 69, 71, 72, 73, 74, 75]
Waiting lounges	[62, 63, 67, 69, 72, 77]
Boarding operations	[6, 34, 55, 56, 61]
Punctuality	[1, 49, 50, 51, 52, 54, 57, 59, 61, 62, 63, 64, 65, 66, 67, 69, 70, 71, 72, 74, 75, 77]
Airline staff/Cabin crew	[1, 34, 48, 50, 51, 52, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 77]
Cabin announcements	[55, 59, 64, 65, 67]
Seat comfort/Space available	[1, 34, 48, 50, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 77]
Acoustic comfort inside the cabin	[1, 64, 70]
Thermal comfort inside the cabin	[57, 64, 70]
Air quality inside the cabin	[64]
Cleanliness inside the cabin	[1, 34, 48, 49, 50, 51, 55, 56, 59, 62, 63, 64, 66, 69, 70, 71]
Toilets	[1, 34, 49, 57, 58, 63, 69, 70]
Safety and security	[1, 48, 51, 52, 54, 55, 56, 59, 61, 62, 63, 64, 66, 67, 69, 70, 72, 77]
Food and drinks	[34, 48, 49, 50, 52, 54, 57, 58, 59, 61, 62, 63, 64, 65, 67, 70, 71, 72, 73, 74, 75, 77]
Entertainment	[34, 48, 50, 52, 54, 55, 56, 58, 59, 61, 62, 63, 64, 67, 68, 69, 70, 71, 72, 77]
In-flight internet/phone services	[58, 59, 62, 64, 70]
Baggage delivery	[34, 51, 52, 54, 55, 56, 61, 65, 66, 67, 70, 71, 72]
Handling services	[48, 49, 50, 51, 52, 54, 55, 56, 59, 62, 65, 66, 67, 69, 70, 73]
Frequent flyer program	[48, 51, 54, 65, 71, 72, 73]
Pricing	[34, 54, 57, 61, 68, 73, 74, 75, 77]

collecting data, because the interviews for investigating airport services are generally realised at the departure gates of the airport, where passengers are waiting for the flight and have a perception of the airport services that they have already received or experienced. On the other hand, airlines services cannot be judged before flying and particular attention has to be dedicated to this issue.

The major part of the studies focuses on data collected by surveys addressed to departing passengers. Some authors referred to departing passengers at the boarding gates or anywhere in the departure area [34, 48, 54, 57–62]. In this case, the collected opinions have to necessarily refer to a previous flight, given that in the departure area passengers are waiting for the flight and therefore have not travelled yet. For this reason, the questionnaires can be addressed only to people who either purchased a flight ticket or used the analysed airline in the past; as an example, Wu & Cheng [1] considered only the passengers who had used the airline services during the past 12 months, because passengers could have difficulties with expressing opinions on a trip made more than one year before the interview. Only a few studies analysed data collected during the flight [63, 64]. In the studies by Liou et al. [55] and Liou et al. [56], the questionnaire was distributed at the boarding gate of several airports and collected at the exit doors after the baggage claim. In these cases, passengers could express their opinion about the current flight. Generally, when the survey takes place at the airport or during the flight, the interviews are conducted face-to-face [34, 48, 54, 60, 65, 66] or by using a self-administered questionnaire [1, 50, 52, 55–59, 61–63, 67] (*Table 6*).

Other studies analysed data collected from self-administered questionnaires compiled neither at the airport nor during flight. As an example, the study by Suki [49] analysed data from residents who had flown regularly with a certain company in the preceding six months. Basfirinci & Mitra [51] published the survey online, and in order to attract many participants, links to the survey were sent by email to people (colleagues and the staff of national airline companies) requesting their participation. Furthermore, in the work by Kos Koklic et al. [68] an online survey was used where people reported the opinions about a specific airline for the most recent travel within the past 12 months. On the other hand, Keshavarz Ghorabaee et al. [69] sent an email to tour leaders and asked for cooperation in the evaluation process if they have had some experience with the considered airlines. Finally, Bellizzi et al. [70] used an online survey by contacting university students and staff via institutional email; they considered questionnaire submissions made only by respondents who travelled in the last 6 months.

Moreover, for the airline services the studies differ in terms of types of opinions collected through the questionnaire: (1) satisfaction/perceptions data; (2) importance/expectations data; (3) behavioural intentions.

Specifically, there are studies investigating only perceptions or satisfaction with the service [1, 34, 52, 57, 64, 67, 70]. In a respectable number of studies, in addition to the perceptions about service aspects, passengers are requested to express what they expect from each analysed service aspect (importance rate)

Table 6 – Selected studies for airlines services by data collection methods

Type of passengers	Departing	On board	Arriving
	[34, 48, 54, 57, 58, 59, 60, 61, 62, 73, 74, 75]	[63, 64]	[55, 56]
Type of survey	Face-to-face	Self-administered	Online
	[34, 48, 54, 60, 65, 66]	[1, 50, 52, 55, 56, 57, 58, 59, 61, 62, 63, 67]	[51, 68, 69, 70, 76, 77, 78]
Type of opinion	Only satisfaction/perceptions	Satisfaction/perceptions Importance/expectations	Behavioural intentions
	[1, 34, 52, 57, 64, 67, 70]	[50, 51, 55, 59, 62, 63, 65, 66, 69]	[48, 54, 58, 60, 68]
Type of scale	5-point	7-point	Other
	[34, 48, 54, 50, 51, 55, 56, 58, 59, 63, 64, 65, 67, 68]	[1, 52, 57, 61, 66, 71]	[62, 69, 70]

[50, 51, 55, 59, 62, 63, 65, 66, 69]. On the other hand, some studies investigated only the expectations/importance [61, 71, 72].

A restricted number of studies investigated satisfaction and/or expectations together with the behavioural intentions of passengers [48, 54, 58, 60, 68] (*Table 6*).

Regarding the adopted scales, the major part of the studies in this case refers to 5-level scale evaluation, from "very poor" (or "very bad") to "very good" (or "excellent"), or from "strongly dissatisfied" (or "very unsatisfied") to "strongly satisfied" (or "very satisfied") [34, 48, 50, 51, 54–56, 58, 59, 63–65, 67, 68]. Tsafarakis et al. [34] asked the passengers to express a level of satisfaction with the total trip experience on an ordinal qualitative scale with five levels (very satisfied, somewhat satisfied, neutral, somewhat unsatisfied, very unsatisfied). Li et al. [64] asked passengers to evaluate each item of in-flight services expressing a rate on a five-point scale anchored from 1 (very low) to 5 (very high). Regarding the importance scale, the proposed levels generally range from "least important" (or "not important at all") to "most important" (or "very important"). Finally, in a respectable number of studies the adopted evaluation scales include 7 levels [1, 52, 57, 61, 66, 71]. A small number of studies adopted scales on a number of points other than 5 or 7: Keshavarz Ghorabaee et al. [69] used a 9-point Likert scale; Tahanisaz & Shokuhyar [62] adopted a numerical scale ranging from 0 to 10, as well as Bellizzi et al. [70], but in addition to an evaluation according to a five-point scale anchored from 1 (not at all satisfied) to 5 (extremely satisfied); the results revealed that the use of both evaluation scales is convenient and useful for discovering the different perceptions of users and specifically their satisfaction level in relation to their judgments on each service aspect (*Table 6*).

Finally, a few studies address the investigation of service quality by analysing data collected through Stated Preferences (SP) surveys. Specifically, in Martín et al. [73] the individuals were asked to choose between two hypothetical airlines that differed in terms of services provided, by considering the Gran Canaria-Madrid route as a specific case study. Wen et al. [74] and Wen & Lai [75] asked air travellers to choose one of the airlines serving their most recent international trips. Also in these cases, the data were collected at the airport.

Only in recent years, traditional surveys seem to have been accompanied by more modern data collection. In fact, the most recent studies use the opinions of users left through reviews on online platforms such as social networks [76–78].

4.3 Data analysis

The main focus of the literature concerning airlines services is often to help airlines to better understand how the customer views their services compared to their competitors. The quality of airlines service is difficult to describe and measure due to its heterogeneity, intangibility, and inseparability [79]. In fact, as shown above, airlines service quality consists not only of tangible attributes, but also intangible and subjective attributes such as safety and comfort, which are difficult to measure and analyse accurately [63]. There is a large variety of methodologies proposed and adopted for analysing the services, and these can be more or less complex. From the studies selected for the proposed literature review, the most common data analysis techniques and models are: regression models [48, 58, 67] EFA and/or CFA [54, 61, 71, 72,]; SEM [49, 52, 57, 59, 60, 68]; and Kano model [50, 51, 62] (*Table 7*).

Table 7 – Selected studies for airlines services by data analysis methods

Data analysis method	Studies adopting the method
EFA/CFA	[54, 61, 71, 72,]
Regression models	[48, 58, 67]
SEM	[49, 52, 57, 59, 60, 68]
MCDM	[34, 55, 56, 64, 66, 69]
Fuzzy theory	[66, 64]
Kano model	[50, 51, 62]
Discrete choice models	[73, 74, 75]
Sentiment Analysis	[76, 77]

As an example, Han et al. [58] focused their study on passengers' perceptions of airline lounges, and according to a multiple regression analysis, they found that food and beverage service was the strongest predictor of overall satisfaction and revisit intentions. Jiang & Zhang [67], through a probit model, found that ticket pricing had a positive and significant effect on the overall satisfaction of passengers and in turn strengthened customer loyalty among leisure travellers, and not among business travellers. According to this, they conclude that

different marketing strategies may be used. Namukasa [48] also came to the same conclusion, and the author's findings indicated that pre-flight, in-flight, and post-flight services had a significant effect on passenger satisfaction. Regarding the EFA, this analysis is generally conducted in order to determine the service dimensions and eventually the relationships among them. Specifically, De Jager et al. [71] show that a very similar ranking structure of service dimensions emerges between the South African and Italian passengers. In both cases, timeliness of flights was rated as most important, while the second most important are in-flight service elements; the third most important dimensions are convenience of booking and the offering of booking facilities via the internet, and the least important is the country origin of the airline. The results obtained by Medina-Muñoz et al. [61] revealed the existence of eight categories of attributes that are important for airline passengers. They found "safety and punctuality", "ticket price", and "attention and service during the customer journey" as the most relevant categories.

Same as for the airport related literature, there is also a large number of studies oriented toward SEM for airlines. Specifically, in the selected studies, the principal aim is the analysis of the relationships between airlines service quality, passenger satisfaction, and other latent constructs.

As an example, the results of the study conducted by Suki [49] revealed that the relationship between customer satisfaction with airline service quality and 'word-of-mouth' recommendations is a consistent one. Moreover, customer satisfaction is widely influenced by empathy. Consistent results have been obtained by Farooq et al. [57], Hussain et al. [59], and Kos Koklic et al. [68] According to them, service quality, perceived value, and brand image have a positive significant impact on customer satisfaction, which can in turn lead to brand loyalty.

When the objective is to help airlines better understand how the customer views their services relative to their competitors, the most adopted methodology is the MCDM analysis. In other words, through this technique authors were not only able to compare with several airlines and determine a ranking of the alternatives, but they were also able to identify the most influential aspects that emerge from the comparison. Some of these studies [64, 66] combined the fuzzy theory with the most common MCDM techniques (e.g. AHP and TOPSIS). Other modified versions of the classical MCDM analysis are proposed also by Keshavarz Ghorabaee et al. [69], Liou et al. [55], and Liou et al. [56]. Finally, Tsafarakis et al. [34] employed MUSA, an approach that combines MCDM analysis for assessing customer satisfaction and IPA for suggesting the critical service that needs improvement.

Otherwise, when the data were collected through SP survey, the most common proposed models are discrete choice models [73, 74]. For example, Martín et al. [73] analysed user preferences by estimating MNL and ML models, while Wen et al. [74] and Wen & Lai [75] proposed a generalised logit model and a LC model, respectively.

A different kind of methodology was proposed by the study concerning reviews taken from web. As an example, Kumar & Zymbler [76] and Lucini et al. [77] proposed the sentiment analysis, applied for determining the sentiment strengths of adjectives that are normally used by airlines customers in their online reviews (*Table 7*).

5. FINDINGS

Air transport system is very complex, given the wide range of provided services and facilities. Just for this reason, airport services are usually investigated separately from services managed by the airlines. Following this orientation, we decided to differentiate our review between studies analysing airport service quality and studies analysing airlines service quality. The proposed literature review provides, first of all, a picture of the service quality attributes investigated both for airport services and airlines services. It was found that if in an airport there are many different activities dealing with several operations such as aviation, security controls, shopping, from the analysis of the literature review concerning the airlines service quality, there is a great variety of services provided in all the phases characterising a trip by air (before, during, and after the flight), which makes it difficult to summarise the phenomenon in a few dimensions. *Tables 2 and 3* want to provide an exhaustive as possible picture of the several service aspects investigated from the passengers' point-of-view, which obviously cannot consider the entirety of the aspects characterising air transport. As an example, air transport produces significant environmental consequences, such as an exceptional volume of carbon dioxide [80]. It would seem that this point has been completely disregarded by the literature and does not belong to the

passenger perception at all. A reason why air quality emissions have been generally not considered in the list of service aspects to be evaluated by the passengers is that this aspect is not perceived by a passenger travelling on an aircraft, because of the altitude at which the emissions are generated. On the other hand, another kind of impact such as aircraft noise is really perceived and experienced by the passengers both during the flight and on the ground, and for this reason it has been generally investigated by the researchers as a service quality aspect.

Regarding the collection of data, interesting differences emerged between the two groups of studies analysed. Concerning airport services, we can conclude that passenger opinions are generally obtained through surveys that took place inside the airports where the interviewers can ask passengers their opinions about the service before departing, because they already used or are using the services when the interviewers contact them. In these cases, the traditional face-to-face interview or self-administer questionnaire are generally adopted. The studies analysing airport services differ from those analysing airlines services mainly concerning data collection methods. Although in both cases most of the studies refer to data collected at the airport, in the case of airlines, if passengers are interviewed while waiting to depart, they have not experienced the services offered by the airlines during the flight yet. Therefore, in this case the major part of studies analyse data collected before the flight departure, but necessarily refer to a previous flight or data about a recent flight collected online. Concerning the previous flight, it would be convenient to consider a flight experienced within six or twelve months before the survey; in fact, a larger time period could be too long for having a vivid memory of the flight and consequently providing reliable opinions.

It can be observed that there are more authors who analysed air service quality on the basis of satisfaction or perceptions only. There are several reasons for this evidence, the most obvious one being easier collection of only one type of opinions reducing fatigue to the respondents. In fact, asking passengers about importance rates would extend the questionnaire and consequently weaken the survey accuracy [81].

Many differences were registered also in the evaluation scales adopted for collecting passenger opinions: Likert scale is one of the most adopted scale together with other verbal scales; some authors used a numerical scale. It can be noted that most of the studies adopted odd scales, particularly 5-point scales. However, some researchers consider that the 5-point scale is inappropriate for measuring customer satisfaction because they believe that the scales with few points as more susceptible to inflated results. Moreover, in the even scales there is no neutral point. We have to finally consider that for most of the studies analysed in this literature review data were probably provided by the companies managing the services, which may not consider the advantages of adopting a scale to the detriment of another one.

Concerning the review of the methodologies of analysing the data, some authors aim to use traditional methods such as regression models or more advanced ones such as SEM. These methods can be considered as particularly suitable for measuring customer satisfaction because the final objective of most of the works is to determine the service attributes mostly affecting overall service quality. A relevant number of studies is based on the application of MCDM methods that allow evaluating an integrated service level and making suggestions for improvement. In fact, when the objective is to help air transport companies to better understand how the customer views their services relative to their competitors, this is the most adopted methodology.

6. CONCLUSIONS

The aim of this review was to provide an exhaustive summary of the most relevant studies published in the last ten years in the field of the evaluation of air transport service quality on the basis of passengers' perceptions. We selected a series of papers published in the most important journals of the transportation sector, divided between studies investigating services managed by the airport companies and studies analysing services managed by airlines. The literature review was structured by three main criteria: the service attributes analysed in the various studies; the methods adopted for collecting the data; the methods used for analysing the data. The reason why we selected these criteria is linked to the aim to create a picture of the studies by providing the most important information for researchers and practitioners, which are just the analysed service aspects and the methodologies adopted for discovering the most relevant ones. From our literature review study, it can be concluded that there is a large variety of methods both for

collecting and analysing data, even if some of them were adopted by several researchers, whereas others were adopted only in few cases (e.g. SEM as data analysis method). Anyway, the suitability of each method depends on the objectives of the study, as well as other practical aspects, linked to the types of available data or the opportunity to collect certain data rather than others.

Definitively, we retain that it is important to investigate much more on the issue of air transport service quality, which is an emerging sector in the public transport service quality analysis. In fact, although in the last 20 years the research works in the field of air transport service quality have become increasingly numerous, this topic is still largely unexplored and requires a thorough investigation and further developments.

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RASSEGNA DELLA LETTERATURA DEGLI STUDI CHE ANALIZZANO LA QUALITÀ DEI SERVIZI DI TRASPORTO AEREO DAL PUNTO DI VISTA DEI PASSEGGERI

SOMMARIO

Valutare la qualità dei servizi di trasporto aereo è fondamentale per garantire agli utenti standard di qualità accettabili e migliorare i servizi offerti ai passeggeri e ai turisti. Nella letteratura relativa al settore dei trasporti è presente un'ampia gamma di studi sulla valutazione della qualità dei servizi di trasporto pubblico basata sulle percezioni dei passeggeri; tuttavia, più recentemente, la valutazione della qualità dei servizi di trasporto aereo sta diventando una questione rilevante. La valutazione della qualità dei servizi nel settore del trasporto aereo rappresenta una sfida più stimolante, data la complessità del sistema di trasporto aereo rispetto agli altri sistemi; infatti, il servizio di trasporto aereo è caratterizzato da una grande varietà di aspetti relativi ai servizi offerti dalle compagnie aeree e forniti dalle società di gestione degli aeroporti. La complessità di tale servizio richiede un approfondimento sulle modalità adottate per la raccolta e l'analisi dei dati relativi alle percezioni dei passeggeri. Il presente lavoro è proposto proprio per trattare questi interessanti aspetti, e per fornire un'esauriente rassegna bibliografica degli studi che analizzano la qualità del servizio dal punto di vista dei passeggeri, dove le opinioni dei passeggeri sono raccolte dalle ben note Customer Satisfaction Surveys (CSS). Abbiamo deciso di selezionare articoli pubblicati nell'ultimo decennio (2010-2020) su riviste indicizzate su importanti database come Scopus e WoS.

KEYWORDS

servizi aeroportuali; servizi di compagnie aeree; qualità del servizio; percezioni dei passeggeri; raccolta dati; analisi dei dati; rassegna della letteratura.

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