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A voice in the skies: Listening to airline passenger preferences

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ABSTRACT

This study aims to identify the impact levels and priorities in the service expectations that passengers have when identifying a preferred airline. The results are based on probabilities and impacts, and can help airlines to accurately understand the preference criteria of their passengers. The priorities of the passengers may differ according to the airline chosen; therefore, the probabilities shown in this study can inform senior airline managers about the passenger perspective. This study uses the Stochastic Multicriteria Acceptability Analysis-2 (SMAA-2) method. SMAA-2 identifies the priorities and impact levels of passengers' expectations on airline selection, and the ranking of alternative firms according to the probability. According to the obtained results, Airline 3 (AF_3) is the most preferred airline with the highest confidence rate. This airline operates based on a low-cost model that allows passengers to choose additional services for additional charges. The passenger expectations that have the highest impact on the preference when selecting an airline are 1) ticket prices, 2) punctuality, and 3) booking convenience. Free in-flight food and beverages, the variety and quality of the food and beverages, and voyager miles programs for loyal customers are found to have no impact on the ranking of airlines. The expectations identified by the passengers in this study are related to the outcome quality dimension, with services dominated by flexible features. The findings of this study define the passenger as a rational decision maker who is price sensitive.

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1. Introduction

In any service company, high-quality service results in the company achieving a core competitive advantage for sustainable improvement and for profitability (Chen, 2008). To achieve a core competitive advantage over their rivals, service managers should listen to their customers' feedback early in the transaction process, and should effectively and accurately respond to their identified needs (Zeithaml et al., 1996). Customers are generally very aware of service quality, rising costs and competition; this customer so-phistication forces company managers to provide distinct and differentiated services from their rivals (Aksoy et al., 2003; Ukpere et al., 2012).

Frequently, airlines measure their customers' perception of the services provided, without having sufficient knowledge about their customers' expectations (Chen and Chang, 2005). Gilbert and Wong

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(2003) emphasize the importance of airlines understanding their customers' expectations of service quality. Hence, how airlines prioritize the expectations that their customers have when determining a preferred airline is very important (Kim and Lee, 2011). Misreading or misevaluating customer expectations may create serious problems in airlines' resource allocation decisions (Chen and Chang, 2005). This study aims to identify the impact levels and the priority

This study aims to identify the impact levels and the priority ranks of the service expectations that passengers have when determining a preferred airline. The study results can help airlines to understand the preference criteria of passengers based on different probabilities and impacts. The passengers' priorities may differ according to the airline that they choose; therefore, the probabilities shown in this study can inform the senior management of such airlines about the passengers' viewpoint.

The study uses the Stochastic Multicriteria Acceptability Analysis-2 (SMAA-2) method, a multicriteria decision-making (MCDM) tool developed by Lahdelma and Salminen (2001). SMAA-2 shows the priorities that passengers assign to their selection criteria when choosing an airline, and further shows the impact levels of the





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passengers' expectations. SMAA-2 also ranks the firms using the probability information. Kaliszewski (2000) noted the gap in knowledge about the decision-making methods used when selecting an airline. Liou et al. (2011) identified the expectations that passengers have of airline service quality, using conventional statistical and MCDM methods. More studies on airline selection use conventional statistical methods compared with those that use MCDM methods (e.g., Kuo, 2011; Tsaur et al., 2002). To the best of the authors' knowledge, this study is the first to identify the priorities and the impact levels of the expectations that determine the preferred airline firm based upon the probability.

The second section of this paper introduces the study material and the research methodology. The third section focuses on the survey instrument and the data. The fourth section uses SMAA-2 to identify the impact levels and the priorities of the service expectations of the most preferred airline for the passengers. The fifth section includes the results and discussions, and section six concludes the paper.

2. Material and research methodology

SMAA-2 uses reverse weighting space analysis to define the criteria effects as to 1) the probability of an alternative being in any rank, and 2) the preference of an alternative. This analysis uses weighting information to find the most preferred alternative. SMAA-2 uses three parameters to rank the alternatives: the rank acceptability (RankAcc) index, the central weight vector (CWV), and the confidence factor (CF). The RankAcc index determines the occurrence probability of an alternative in any order. The alternatives with the highest acceptability for the best ranks are the best alternatives (Tervonen and Figueira, 2006). The CWVs are the impact levels of the criteria that affect the rankings of the alternatives, and the CFs are the reliability scores of the rankings (Lahdelma and Salminen, 2001).

SMAA-2 uses a five-step process to turn the customer's voice into a competitive advantage (Hokkanen et al., 2000). 1) Identify the decision alternatives (DAs) and the decision criteria (DC) to be used in the comparison. 2) Select the decision makers (DMs) who compare the alternatives, and determine the criteria that the DMs use to evaluate the alternatives. 3) Determine the preference information for each criteria weight according to the DMs. 4) Determine the RankAcc indices of the alternatives. 5) Determine the CWV and the CF for each alternative's ranking.

3. Survey instrument and data

The airline service evaluation survey has four sections. The first section consists of seven questions on demographic characteristics, and on flight services use. In the second section of the survey, the passengers score each of the DC between 0 and 100. A 0 score means that the criterion has no importance for the passenger in terms of flight service expectation. A 100 indicates the highest importance for the passenger in terms of flight service expectation. In the third section, the passengers select the most important DC for flight service according to their expectations. They select as many DCs as they like in this section. The weighted average score for each DC is calculated from the expectation scores given to the DC in the second section, and from the chosen criteria in the third section. The scores are then normalized to obtain the criteria importance weights. The fourth section considers three specific airlines. This section determines the satisfaction scores of the passengers for each airline on the 24 listed DC. The passengers' satisfaction is measured using a 1-5 Likert scale, where 1 represents very dissatisfied and 5 represents very satisfied. The results are shown in Table 2.

This study uses Goss and Leinbach's (1996) suggestion to use a focus group study as a tool to generate questions to be tested in research. Accordingly, three focus groups were formed. Each group was composed of four passengers who flew at least once with each of the three airlines in the last year. Previous studies on airline service expectations were used to prepare a set of questions for the focus groups (see Table A1 in the Appendix for a summary of these studies). During the focus group study, the researchers, in conjunction with a trained moderator, asked the passengers to define their expectations relating to an airline and the preferred airline features in their own words. The focus group sessions lasted 60-90 min, and were recorded to be transcribed later. An observer was present to take additional notes on the sessions. The participants also completed a demographic questionnaire. Out of the 12 respondents, seven were female, and the average age was 30 years. Seven of the respondents were aged 27–45 years, two were aged 46-54 years, and three were aged 55 years or older. The focus groups' comments were then analyzed by the researchers, and a consensus reached on the final DC.

The questionnaire was evaluated by managers from each of the airline firms participating in the study. Next, a pilot study was performed on 25 participants who had flown at least once with each of the airlines, to establish if the formulated questionnaire was correct and understandable. Eleven of the participants were female, and 14 were male. Twelve of the participants were aged 35–50, and 13 were aged 51–65. Following the pilot survey, some minor changes were made to the survey form, and the content validity of the survey was deemed adequate.

To assure a level of homogeneity in the sample, as mentioned in Mikulić and Prebežac (2011), the respondents were taken from only Turkish economy class passengers who fly from the largest airport in Turkey (Atatürk International Airport) to various domestic destinations. The survey was administered over one weekday and one weekend. The questionnaires that were distributed to the passengers were accompanied by a covering letter explaining the objective of the survey, and assuring the confidentiality of all of the respondents. The questionnaires were distributed at each boarding gate and were collected at the exit doors after the baggage claim point. The probability of the phenomena occurring was calculated as 0.8 and the probability of it not occurring was taken as 0.2. The sample error was 0.05 and the significance level was $\alpha = 0.05$, meaning that the sample was appropriate as cited in Arya et al. (2012). The sample size was computed as 245, considering that the population size was unknown. The sample size was found to be sufficient at the 95% confidence level. Participation was voluntary. A total of 450 questionnaires were distributed, and the response rate was 77.3% (348 valid responses). The demographic and flight service use data are summarized in Table 1.

To evaluate the homogeneity of the survey, the reliability is calculated using Cronbach's α coefficient. The result is $\alpha = 0.846$, showing that the survey is highly reliable.

4. Using SMAA-2 in the airline industry

This section follows the SMAA-2 steps outlined in Section 2, to analyze the customers' decision-making process when choosing to fly on one of Turkey's three largest airlines that service the domestic market. The section identifies the impact levels and priorities of the service expectations that passengers have on the most preferred airline.

4.1. Identify the decision alternatives (DAs) and the decision criteria (DC)

Turkey has a highly competitive oligopolistic domestic airline

Table 1

Demographic characteristics of survey sample.

Variables	Alternatives	Frequency (n)
Gender	Female	134
	Male	214
Age	<25	8
	25-34	40
	35-44	172
	45-54	124
	>55	4
Highest education level	Primary school	2
	High School	18
	University	254
	Postgraduate	74
Financial earnings (monthly)	0-3000 TL	102
	3001-6000 TL	184
	Over 6001 TL	62
Frequency of flying	Over once a week	26
	Once a week	63
	Once a month	180
	Once a year	20
	Less than once a year	59
Have you used each of the three airlines mentioned?	Yes	280
•	No	68
The most used transport vehicle	Airline	234
•	Bus	10
	Train	10
	Private car	94

Table 2

Importance weights and rankings of the DC.

No	Decision criteria	Rank	Importance weights
1	The convenience of the flight schedule	10	0.0392
2	In-flight food and beverages	26	0.0080
3	Ticket price	1	0.0950
4	In-flight entertainment	22	0.0142
5	In-flight seat space	8	0.0480
6	Sufficient air conditioning	5	0.0624
7	Cleanliness of the plane	6	0.0608
8	Punctuality	2	0.0834
9	On-time performance	4	0.0797
10	The variety and quality of food and beverages	27	0.0070
11	Ease of booking	7	0.0509
12	Customized needs of customers	24	0.0088
13	Online booking	3	0.0829
14	Safe and careful baggage handling	13	0.0321
15	Customer complaint handling	19	0.0209
16	Voyager miles	25	0.0085
17	The reward campaigns for loyal customers	17	0.0237
18	Facilities for disabled passengers and for pregnant and elderly passengers	14	0.0309
19	Courtesy and responsiveness	12	0.0332
20	Genuine interest in solving problems	16	0.0296
21	Caring and friendly crews	20	0.0206
22	Cabin crew service	21	0.0190
23	Professional appearance of flight crew	18	0.0214
24	Flight safety	23	0.0109
25	User friendly and comprehensive website	9	0.0421
26	Promptness and accuracy of customer services	15	0.0301
27	Flight frequency	11	0.0365

market, and has many direct flight routes to both national and international destinations. The airlines selected in this study are the three largest in Turkey's domestic market, and are key players in Turkey's airline sector. The study focuses on the main airlines that service the domestic routes, rather than on those that service international routes. Airlines that service domestic routes are selected in this study to compare similar services to the greatest extent possible, and to minimize any variations in service quality that might arise when comparing airline services for international routes with airline services for domestic routes. The three airline alternatives (the DAs) included in this study are called AF_1 , AF_2 and AF_3 .

The first airline (AF_1) positions itself relative to its rivals by differentiating its services as a full service provider airline. The other airlines $(AF_2 \text{ and } AF_3)$ use low cost strategies to differentiate their services, and offer low prices to passengers who are price sensitive. AF_1 has operated for a long time, and is a member of the *Star Alliance* global airline alliance. AF_1 offers in-flight entertainment, in-flight catering services, high quality and comfortable seats, and ample legroom on their flights. This airline advertises and runs promotional campaigns on a global scale. AF_2 was originally established as a charter airline, but has developed into the second largest airline in the market. AF_2 does not offer in-flight catering, to shortening the ground time and to reduce its costs. This airline uses a dynamic pricing system, offering a variety of price levels for each flight. It does not offer services such as advanced seat reservation or frequent traveler lounges. AF_2 invests the most heavily of the three airlines in its brand, and is an aggressive and marketing-oriented firm. AF_3 also follows a low-cost model that offers its passengers additional services (such as advanced seat reservation and in-flight catering) for an additional charge. When a passenger books a ticket, AF_3 offers a low ticket price for a future flight. However, it will not accept a cancellation or refund for that ticket. This policy enables the airline to over-book such flights. AF_3 focuses on internet sales to attract passengers.

Table 2 shows the DC—derived from the focus groups—that are analyzed in the study.

4.2. Select the decision makers (DMs) and determine the criteria values

The DM group is composed of 26 passengers. The selection criteria for the group is passengers who fly with each of the airlines, who fly more than once in a month, and who mostly use air transport. These criteria are based on previous research findings on the characteristic of loyal passengers, and were decided by the team of researchers and airline managers. The DC values are determined by the mean value of the answers given by the DMs for the 24 identified preference criteria, scored from 1 to 5 scores for each airline. These points are obtained as an ordinal. The airlines provided three further real data criteria: the ticket price, the inflight catering, and flight frequency.

4.3. Determine the preference information of the DMs

Table 2 lists the criteria importance weights and ranks, using weighting average scores. The DMs attach the highest importance to the ticket price (0.0950), and the lowest to the variety and quality of the food and beverages (0.0070).

4.4. Determine the RankAcc index of the alternatives

Table 3 lists the RankAcc index for the DAs according to the weight and order of importance. When the criteria importance weights are considered, the RankAccs index shows that AF_1 has the highest probability (61%) of being ranked first of the three airlines, followed by AF_3 (39%) and AF_2 (0%). Hence, using the criteria importance weights gives an airline ranking of $AF_1 > AF_3 > AF_2$.

When the criteria importance orders are considered, the RankAccs index shows that AF_3 has the highest probability (79%) of being ranked first of the three airline firms, followed by AF_1 (12%)

Table 3 RankAcc indices for the airlines by criteria importance weight and by criteria importance order.

Airline firms	Rank 1	Rank 2	Rank 3			
Criteria importance weights						
AF ₁	0.61 ^a	0.39	0.00			
AF ₂	0.00	0.01	0.99 ^a			
AF ₃	0.39	0.60 ^a	0.01			
Criteria importance orders						
AF ₁	0.12	0.37	0.50 ^a			
AF ₂	0.09	0.44 ^a	0.47			
AF ₃	0.79 ^a	0.18	0.03			

^a Airline rankings that are most likely to be preferred by passengers.

and AF_2 (9%). Hence, using the criteria importance orders gives an airline ranking of $AF_3 > AF_1 > AF_2$.

4.5. Determine the central weight vector (CWV) and the confidence factor (CF) for each alternative

Table 4 shows the CWV and CF values found according to the importance weights and the importance orders. The CF values according to the airline rankings using the importance weights $(AF_1 > AF_3 > AF_2)$ are 0.61, 0.00 and 0.39, respectively. According to this measure, the confidence level of preferring AF_1 in the first rank with a 61% probability is 61%. Additionally, AF_2 will be ranked in first position with a 0% confidence level, meaning that customers never prefer AF_2 in the first rank.

The CF values according to the airline rankings using the importance orders ($AF_3 > AF_1 > AF_2$) are 0.13, 0.17 and 0.84, respectively. According to this measure, the confidence level of preferring AF_3 in the first rank with a 79% probability is 84%. This result shows that AF_3 is the most preferred firm with the highest confidence rate. The expectations that have the highest impact on the preference of AF_3 are 1) ticket prices, 2) punctuality, 3) online booking, and 4) online performance. Free in-flight food and beverages, the variety and quality of the food and beverages), and the voyager miles have no impact on the ranking of airline firms.

5. Analysis and discussion

This paper finds that ticket prices are the most important expectation for passengers. This finding is in line with other studies showing that ticket prices are a major determining factor in airline service quality (see Table A1). Gursoy et al. (2005) point out the high frequency of the complaints related to ticket prices, and Hsu et al. (2007) include the ticket price in "must be need" category in their study. This result implies that passengers are very price sensitive.

Punctuality is the second most important expectation considered by the passengers when determining their preferred airline. This criterion is mentioned in various previous studies (see Table A1). Parasuraman et al. (1991) reveal that punctuality is regarded as the most important component of service reliability, and is taken as the core service by most customers. Similarly, service reliability is a powerful determinant of the evaluation of airline service quality (Berry and Parasuraman, 1991). Surovitskikh and Lubbe (2008) asserted that on-time performance is the most important factor for the consistency of service, supporting the current study's finding; however, the expectation of punctuality is not always satisfied by airlines. Generally, delays in services can be controlled by operations management or by perception management (Katz et al., 1991). In cases where the waiting time cannot be controlled, it is advisable to control the customer's perception. The customers develop an *interchangeable* perception against the firms when they face waiting times beyond their tolerance limits (Sauerwein et al., 1996). If customers change their airline, this affects the profitability of the airline. This situation causes a decrease in the airline's market share, and results in some hidden or soft costs such as delayed passenger costs, marginal maintenance and crew costs, and unnecessary fuel consumption (Cook et al., 2004, 2009; Cramer and Irrgang, 2007).

Online booking is the third most important expectation for passengers. Airlines use online booking to reach new markets, to minimize costs, and to increase customer satisfaction and value (Hanke and Teo, 2003). Online booking not only increases the efficiency and productivity of the company, but also creates new and convenient channels for the customers (Zeithaml and Gilly, 1987; Meuter et al., 2003; Bitner et al., 2002).

0.84

AF₃

0.01

Airline	By crite	By criteria importance weights													
	CF	CWV													
		<i>C</i> ₁	<i>C</i> ₂	<i>C</i> ₃	<i>C</i> ₄	<i>C</i> ₅	<i>C</i> ₆	C ₇	<i>C</i> ₈	C ₉	<i>C</i> ₁₀	<i>C</i> ₁₁	<i>C</i> ₁₂	C ₁₃	<i>C</i> ₁₄
AF1	0.61	0.10	0.01	0.04	0.01	0.05	0.06	0.06	0.08	0.08	0.01	0.05	0.01	0.08	0.03
AF ₂	0.00	0.10	0.01	0.04	0.01	0.05	0.06	0.06	0.08	0.08	0.01	0.05	0.01	0.08	0.03
AF ₃	0.39	0.10	0.01	0.04	0.01	0.05	0.06	0.06	0.08	0.08	0.01	0.05	0.01	0.08	0.03
	CF	C ₁₅	C ₁₆	C ₁₇	C ₁₈	C ₁₉	C ₂₀	C ₂₁	C ₂₂	C ₂₃	C ₂₄	C ₂₅	C_{26}	C ₂₇	
AF ₁	0.61	0.02	0.01	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.04	0.03	0.04	
AF ₂	0.00	0.02	0.01	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.04	0.03	0.04	
AF ₃	0.39	0.02	0.01	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.04	0.03	0.04	
By criteri	a importa	nce orders													
Airline	CF	CWV													
		<i>C</i> ₁	C ₂	С3	C4	C5	<i>C</i> ₆	C ₇	C ₈	C ₉	C ₁₀	C ₁₁	C ₁₂	C ₁₃	<i>C</i> ₁₄
AF ₁	0.13	0.04	0.00	0.14	0.01	0.05	0.07	0.06	0.11	0.08	0.00	0.05	0.01	0.09	0.03
AF ₂	0.17	0.04	0.00	0.17	0.01	0.04	0.06	0.06	0.12	0.08	0.00	0.05	0.01	0.09	0.03
AF ₃	0.84	0.04	0.00	0.14	0.01	0.05	0.07	0.06	0.11	0.08	0.00	0.05	0.01	0.09	0.03
	CF	C_{15}	C_{16}	C ₁₇	C_{18}	C_{19}	C_{20}	C_{21}	C_{22}	C_{23}	C ₂₄		C_{26}	C ₂₇	
AF ₁	0.13	0.02	0.00	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.04	0.02	0.04	
AFa	0.17	0.01	0.00	0.02	0.02	0.03	0.02	0.01	0.01	0.02	0.01	0.04	0.02	0.03	

0.02

0.01

0.01

0.02

Free in-flight food and beverages, and the variety and quality of the food and beverages offered, have no effect in this study, in contrast the findings of Hossain et al. (2011), Chou et al. (2011) and Park et al. (2006). When food is served on a flight, in-flight staff members have a high level of interaction with customers; hence, the catering services constitute an important dimension in the cost analysis (Mills and Clay, 2002). The catering service is an important opportunity for the firms having similar ticket prices, leg room, and seat quality to differentiate themselves from their rivals, to promote customer loyalty and thereby increase profitability (Yung, 2000). The Airline Quality Rating study-jointly conducted by Wichita State University and Embry-Riddle Aeronautical University in the United States-revealed that customers frequently complain about the decreasing quality of airline meals (Maxon, 1998). King (2001) found that some customers change to more expensive airlines solely for their higher quality food. Some airlines engage in an intelligent catering service for this purpose (Thorpe, 1998).

0.00

0.02

0.03

0.03

This study finds that voyager miles have no impact on the ranking of airlines. However, Campbell and Vigar-Ellis (2013) determined that voyager miles are important to service quality evaluation. An and Noh (2009) emphasized the effect of mileage programs on the loyalty of customers. They also found that the customers who are not completely satisfied with the service quality prefer not to change their airline company because of mileage programs.

The findings of this study correspond with the price segment in Teichert et al.'s (2008) study, which segmented the passengers according to airline service preferences. This price segment attaches importance to both price and punctuality. Passengers use a rational decision-making process when evaluating airline services, and do not give importance to personal benefits, such as catering services or voyager miles. The preferred airline features found in the current study also support the rational decision making claim. This study reveals that AF_3 follows a low-cost leadership strategy to maintain a competitive position in the market. However, the study also shows that competing on price alone does not always maintain the leader position in the market. Airlines should emphasize that *quality is worth paying for* to their passengers: this could lower the passengers' sensitivity to price.

The services provided by airlines have both flexible and fixed features (An and Noh, 2009). This study shows that the important

attributes for the customers are those with services dominated by flexible features. Brady and Cronin (2001) describe the *quality outcome* as one of three dimensions forming service quality, which encompasses the findings of the current study. In other words, the criteria used by the passengers who participated in this study are related to the quality outcome dimension.

0.04

0.02

0.04

0.01

Such analysis implies that the airlines that listen to their passengers effectively and efficiently, should provide reliable services to their passengers and should monitor and manage the service delivery system accurately. Some of the supporting services have a secondary impact on the passengers' evaluations. Interestingly, the passengers give a higher importance to the controllable flexible features than the fixed and uncontrollable factors, which may be advantageous for the small airlines with limited infrastructure. The criteria mentioned in this study can guide such airlines in resource allocation and cost-related issues.

Future studies may investigate the expectation of passengers according to the generality of the demographic, behavioral, and physiographic dimensions for other research settings as mentioned by (Payne and Williams, 2005). The self-selected sample imposes limits to the generality of the study; however, the possibility of comparison with other study findings could increase the generality (Sivadas et al., 1998). In the current study, the collection and analysis of data was completed by the researchers themselves to improve the capacity of generalization as mentioned by Polit and Beck (2010). Similarly, a mixed method research was chosen in this study to promote the generality as cited by Polit and Beck (2010).

6. Conclusion

The most important factor that affects a company's performance is the quality of its products or services as perceived by the market (Buzzell and Gale, 1987). Previous research reveals that companies are often oblivious to, or misunderstand, their customers' voices. It is impossible to meet all of the expectations and the needs of customers. However, companies must determine the most important expectations. This study discusses the impact levels and the ranks of the customer expectations for airline firms.

Appendix

Table A1 Previous airline service expectation studies: Findings and research methods

	Author	Dimension	Method
-	Ritchie et al. (1980) Ostrowski et al.	Price, service, choice and schedules Timeliness, food and beverage quality, and comfort of seat dimensions, schedule convenience	Group interviews Factor analysis
	Proussaloglou and Koppelman	Airline's market presence, schedule convenience, low fares, on time performance, reliability and the availability of frequent flier service reliability, service quality, flight schedules, fares, connections, frequent flyer programs, comfort	Multinomial logit approach
	Cao and Huang	Tangible emotional dimension, friendly service attitude and flight safety, extended services,	Fuzzy analytic hierarchy process (AHP)
	(1990) Alamdari (1999)	Passengers flying for leisure indicated the importance of price, seating comfort, reliability and	Frequency
	Sultan and Simpson	Servqual Dimension	Servqual scale
	Chang and Yeh (2001)	Cost, productivity, service quality, price, and management experience	Simple additive weighting; Technique for order of preference by similarity to ideal solution (TOPSIS)
	Oyewole (2001)	Distribution of printed materials, ticket sale, reservation service, check-in, luggage service, information service, communication of the flight's progress, demonstration of the life jacket, distribution of newspapers aboard, provision of music, movie shows, food service, non-alcoholic beverages, alcoholic beverages, off-tax sales, toilet facilities, bar service, gift giving, and communication of weather condition	Multivariate analysis of variance (MANOVA)
	Chang and Yeh (2002)	Flight safety, on-board comfort, airline employees, reliability of service, convenience of service, and handling of abnormal conditions	Fuzzy multicriteria analysis
	Gilbert and Wong (2003)	Reliability, assurance, facilities, employees, flight patterns, customization and responsiveness, timeliness, luggage transport, food and beverage service quality, seat	Analysis of variance (ANOVA)
	Tsaur et al. (2002)	Courtesy, comfort, cleanliness of seat, responsiveness, professional skills, convenient departure time, food, actively providing service, timeliness, convenient ticketing process, customer complaints handling, language skill, entertainment, and appearance of crew	AHP and TOPSIS
	Aksoy et al. (2003)	Cabin and personnel, country of origin and promotion, food and beverages, in-flight activities, internet services, punctuality and speed, free alcoholic drinks, and price	Factor analysis
	Gursoy et al. (2005)	Flight problem complaints, over-booking complaints, reservations, ticketing and boarding complaints, fares complaints, baggage complaints, customer service complaints, disability complaints, advartiging complaints, tour complaints, and animal complaints.	Canonical correspondence analysis
	Feng and Jeng	Seat reservation, ground service, cabin facilities, in-flight service, baggage delivery, complaint response safety, and nunctuality.	Importance performance analysis (IPA)
	O'Connell and Williams (2005)	Reliability, quality, flight schedules, connections, frequent flyer programs, comfort, fare, convenient schedule, online booking channel, brand reputation and attractiveness of advertising, prices, convenient booking channel, airline image, and attractive advertising	T-test
	Chen and Chang (2005)	Responsiveness and assurance, service attributes of ground service, and the service attributes of in-flight service	PZB gap model
	Hinninghofen and Enck (2006)	Seat pitch, seatback width, legroom, armrest quality, and seat recline angle	Frequency
	Park et al. (2006)	Up-to-date aircraft, in-flight facilities, meal service, seating comfort, entertainment services, convenience of reservation-ticketing, promptness and accuracy of reservation- ticketing, check-in service, promptness and accuracy of baggage delivery, seat allocation, reliability, on-time performance, interest in solving problems, safety, employee service, and flight availability	Structural equation modeling (SEM)
	Theis et al. (2006)	Aircraft type, arrival time, takeoff time, flight connecting time, punctuality, number of connecting flights, and price	Polynomial logit model
	Liou and Tzeng (2007)	Safety and reliability, employees' service, and safety records	Fuzzy model, Grey relation analysis
	Pakdil and Aydın (2007)	Employees, tangibles, responsiveness, reliability and assurance, flight patterns, availability, image, and empathy	Weighted servqual
	Prayag (2007)	Service efficiency and effect, service personalization, service dimension of reliability, and tangibility of service efficiency and effect	Regression
	Hsu et al. (2007) Chen (2008)	Check in, in-flight service, in-flight facilities, and group ticketing reservation Transaction, reliability, product, and employees/facilities	Kano model Factor analysis
	Chang and Yang (2008)	Setting, service, staff, and performance	Rasch measurements
	Anderson et al. (2008)	Interaction, aircraft, personal space, food, flight, and timeliness	SEM
	Teichert et al., 2008 Saha and Theingi (2009)	Efficiency/punctuality, comfort, price catch all/flexibility, and price/performance Tangibles, flight schedules, services offered by flight attendants and ground staff, word of mouth, convenient schedule, service efficiency of employees, available routes and destinations, on-time performance, neat appearance of employees, courtesy, customers complaints handling, and recommendations from friends and family	T-test and factor analysis SEM
	An and Noh (2009)	Responsiveness and empathy, food quality, alcoholic beverage, non-alcoholic beverage, and reliability	Regression and factor analysis
	Chau and Kao (2009)	Servqual dimensions	Disconfirmation model

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Table A1 (continued)

Author	Dimension	Method
Balcombe et al. (2009)	Price, size of seats, legroom, flight frequency, and in-flight food and entertainment	Bayesian method
Chou (2009)	Check-in, immigration process, and customs inspection	Regression analysis
Huang (2009)	Servqual dimensions	SEM and independent practice association (IPA)
Hsu et al. (2009)	Flight safety, manners and service attitudes of flight attendants, and convenience of purchasing tickets	Fuzzy theory
Nejati et al. (2009)	Flight safety, good appearance of flight crew and offering quality services 24 h a day, and the possibility of checking flight schedule via telephone	Fuzzy TOPSIS
Wen and Lai (2010)	Price, time differences, frequency of flights, punctuality, check in services, legroom, and in- flight services.	Multinomial logit model and latent class model
Park (2010)	Inflight service, reservation-related service, airport service, reliability, employee service, flight availability, perceived price, passenger satisfaction, perceived value, airline image, and overall service quality	SEM and Path analysis
Kuo (2011)	Tangibility, safety and reliability, responsiveness, assurance, and empathy	VIKOR method, grey relational analysis (GRA), and fuzzy sets
Hossain et al. (2011)) Caring and friendly crews, luggage handling, in-flight meals, in-flight entertainment, skills of flight attendants, capacity to communicate and respond, in-flight facilities and services, safety performance and frequent flier program	Latent semantic analysis
Chou et al. (2011)	Comfort and cleanliness of seats, quality of food and beverages, customer complaint handling, safety, crew's approach to unexpected situations, size of airplane, convenience of flight schedules, handling of delays, on-time departure and arrival, and in-flight	Fuzzy weighted Servqual
Wang et al. (2011)	Truly providing committed services, professional training of flight attendants, accuracy of various operations, flight attendants are able to initiatively take care of passenger needs, active and rapid response to passenger needs, handling passenger complaints, seat	Fuzzy decision making trial and evaluation laboratory (DEMATEL)
Liou et al. (2011)	(designation) and easy booking processes, and service attitude of check-in attendant Cabin service criteria, variety of newspapers and magazines, experience at baggage claim area, the reservation, ticketing, check-in and boarding processes complaint mechanisms, and handling of delays	Modified grey relation method
Kim and Lee (2011)	Servgual dimensions	SEM, Factor analysis
Campbell and Vigar-Ellis (2013	Safety, punctual flights, safety of baggage, friendliness customer service, efficiency of employees, online booking, space on board, legroom, and voyager miles	Positioning map
Shanka (2012)	Servqual dimensions	Servqual and regression
Yang et al. (2012)	Schedule, booking, image, service efficiency, on-time performance, appearance of employees, courtesy, complains handling, and safety	SEM
Archana and Subha (2012)	In-flight service, in-flight digital service, and back-office operations	Factor analysis
Liao (2013)	Cost, price, productivity management, experience, service quality, and brand image delivery performance	Integrated AHP-TOPSIS
Jiang (2013)	Servqual dimensions	Robust schedule design model
Chang and Hung (2013)	Ticket prices, convenient booking channel, airline image, on-time performance, comfort and cleanliness of seats, and flight safety	Cox proportional hazard model
Nagar (2013)	Tangible factors, flight schedule factors, flight attendants, and ground staff	T-test
Greghi et al. (2013)	Delay and cancellations, loss of luggage, and overbooking	Multiple correspondence analysis
Başfirıncı and Mitra (2015)	Modern and clean facilities, on time performances, responsive ground and cabin crews, good reputation and image, competent service staff in answering customer questions and in	Kano model
	meeting customer demands, and frequent flight schedule	CD 4
Wang et al. (2015) Milioti et al. (2015)	Airport, passenger, and airline and hre services Fare, safety, reliability, friendly-helpful staff, in-flight entertainment, frequent flyer program,	GKA Multivariate probit models
Hussain et al. (2015	Reliability, responsiveness, assurance, tangibles, security and safety, and communications	SEM

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