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Brent D. Bowen  
bowenb6@erau.edu

Dean E. Headley

Jacqueline R. Luedtke  
jackie.luedtke@erau.edu

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## A QUANTITATIVE METHODOLOGY FOR MEASURING AIRLINE QUALITY

Brent D. Bowen, Dean E. Headley, Jacqueline R. Luedtke

### ABSTRACT

*In today's competitive airline industry, it is crucial that an airline do all it can to attract and retain customers. One of the best ways to do this is by offering a quality service to consumers. Perceptions of service quality vary from person to person, but an enduring element of service quality is the consistent achievement of customer satisfaction. Satisfying customer service needs keeps present customers loyal and helps establish a base for new ones.*

*An Airline Quality Rating scale is proposed that assesses the quality of the U.S. major airlines using comparable, objective, quantifiable, periodically published data that addresses customer satisfaction concerns. This data is not consumer opinion based, but has distinct performance characteristics that are specifically attuned to the consumer's point of view. The AQR outlined here focuses on quantitative factors to provide a more reliable and objective result in assessing service quality levels across all major domestic airlines. Combining quantifiable and readily available data provides an objective starting point for monitoring the quality of service an individual airline might be providing.*

*This unique method of measuring quality, without the burdensome task of surveying thousands of consumers, resulted in findings synonymous with findings of a major consumer survey of 4,400 frequent flyers (Zagat 1991).*

### INTRODUCTION

The airline industry, like any service industry in today's competitive market, must be concerned with the quality of its service if it wants to survive. Achieving quality service is necessary in order to attract new customers and, even more important, to retain current customers. For customers to perceive an airline as a valued quality service, they must be satisfied, and that usually means receiving service that is equal to or greater than expected.

There are many possible aspects that could influence the consumer's perception of quality/satisfaction at different times in the consumption process. Fortunately, the consumer of airline services has information available regarding service performance that other industries do not currently provide. Unfortunately, the average consumer is probably unaware of or uninterested in this detail of performance, so it goes unused

in consumer decision making. Our objective in developing the AQR is to better organize the readily available data for the consumer and offer it in a useful and understandable form.

### WHAT IS QUALITY IN THE AIRLINE INDUSTRY?

In its simplest form, airline service quality can be defined as passenger satisfaction. Put another way, quality is "continually satisfying customer requirements" (Smith, 1987). In the airline industry, passenger satisfaction is reflected in airline and government statistical reports by on-time performance, mishandled baggage, oversales, and consumer complaints. Performance data for these factors are easily obtained from the U.S. Department of Transportation. Other factors that address quality and passenger satisfaction that are available from other sources include such considerations as accidents/safety, financial stability of the airline, frequent flyer award programs,

ability of the airline to perform as promised, comfort of the aircraft, price, quality of food, and hassle-free service. These factors contribute to a consumer's perspectives of quality. All of these factors make up service quality/satisfaction. There are certainly other, more qualitative factors such as comfort, pleasure, taste of food, and employee attitude. These subjective aspects are only assessable by direct inquiry of the consumer. This does not make them less important, just less accessible. Elaborate surveying efforts are necessary to monitor this type of consumer opinion. Most of the major airlines already do this type of quality assessment and use the results to improve the service they offer the consumer. However, this information is proprietary and not available to the public for its use in making better choices involving airline quality. As stated before, the intent is to identify a group of factors that can be

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monitored on a regular basis to address pertinent consumer concerns but not necessarily all consumer quality concerns. The results from this data gathering/monitoring technique can consequently be compared to consumer data such as the Zagat Rating of Airlines to ascertain potential correlation.

**SERVICE QUALITY  
DIMENSIONS FOR THE  
AIRLINE INDUSTRY**

To help organize the search for factors, the work of Parasuraman, Zeithaml, and Berry (1985, 1988) in conceptualizing and defining service quality was used. The five dimensions of the SERVQUAL model, a multiple-item scale for measuring consumer perceptions of service quality, is a useful way to categorize factors relevant to airline service quality. Listed below are the major dimensions that these authors propose as useful in defining the quality of any service and our suggestions about how these relate to airline services.

**1. TANGIBLES**

Physical facilities, equipment, and appearance of personnel

- Appearance/cleanliness of aircraft/airport facilities
- Age of aircraft
- Number of aircraft (size of fleet)
- Types of aircraft used
- Number of employees
- Appearance of employees
- Revenue Management System (RMS) - "Yield Management"
- Reservation network
- Safety record
- On-aircraft storage for carry-on baggage

**2. RELIABILITY**

Ability to perform the promised

service consistently, dependably, and accurately

- On-time flights
- Oversales
- Mishandled Baggage
- Load Factor
- Frequent Flier Awards
- Low Cost Air Fares
- "Fair" Premiums at One-Carrier Dominated Hubs
- Efficiency
- Financial Viability of Airline - Net Earnings, Return on Investment, Return on Equity, Current Assets Current Liabilities Ratio, RPMs (revenue per mile or the number of passengers carried one mile), ASMs (available seat miles)
- Convenience-routes, flight times, number of possible connections, easy access terminals, gate assignments
- Congestion of air traffic
- Layoffs of employees
- Maintenance capability/record
- Creativeness
- Differentiation
- Articulation agreements with commuter airlines

**3. RESPONSIVENESS**

Willingness to help customers and provide prompt service.

- Consumer complaints (12 categories)
- Competitive fares
- Service to other connections

**4. ASSURANCE**

Knowledge and courtesy of employees and their ability to inspire trust and confidence in the passenger

- Ability/leadership of management
- Awards for excellence/performance
- Promptness of complaint handling
- Competence of employees

**5. EMPATHY**

Caring, individualized attention the firm provides its customers (e.g., "knowing the customer"), communication

- Percentage of passengers flying first class
- Catering to women
- In-flight services
- Handling of children and the elderly
- Smoking policy

As shown, many of the factors outlined are qualitative and impossible to monitor from regularly published data sources. Many airlines have quality assurance/marketing research divisions dedicated to researching and tracking customer satisfaction factors; however, their findings are proprietary and not available for use by the general public. In an effort to address this problem the AQR scale was developed, relying on more objective, quantitative, regularly published factors.

**AIRLINE QUALITY RATING  
(AQR) DEVELOPMENTAL  
PROCEDURES**

The AQR is proposed as a method for comparing major domestic airlines using a standard set of quality factors. In addition, the AQR helps identify which airline has the most favorable quality rating at any particular time. A major airline, as defined by the Department of Transportation, is an airline whose operating revenues for a 12-month period are one billion dollars or more. At the present time, there are ten U.S. based airlines meeting this qualification. They are American, America West, Continental, Delta, Northwest, Pan Am, Southwest, Trans World, United, and USAir.

The AQR scale is essentially a

weighted average of 19 factors that have relevance to consumers when judging the quality of airline services. These factors represent a select group of concerns identified through a combination of research and opinion polling. Originally, over 80 factors were identified as potentially relevant for the AQR. This initial list was pared using two criteria: (a) the factor had to be readily obtainable from published data for each airline, and (b) the factor had to have relevance to consumer concerns regarding quality. Methods used to achieve a reduction in the number of factors included records searches to determine the availability of data, discussions with experts in the airline industry regarding relevance to consumers, and personal judgement of the research team. In arriving at the final 19 items, a specific inquiry was made to a group of 65 experts in the field. These experts included representatives of most major airlines, air travel experts, FAA representatives, academic researchers, airline manufacturing and support firms, and individual consumers. The result of this inquiry allowed a final list of critical factors to be identified. This survey of opinion process was also used to establish the weights for each factor.

#### 19 FACTORS INCLUDED IN THE AIRLINE QUALITY RATING (AQR)

1. Average Age of Fleet
2. Number of Aircraft
3. On-Time Performance
4. Load Factor
5. Pilot Deviations
6. Number of Accidents
7. Frequent Flyer Awards

- \* 8. Flight Problems
- \* 9. Oversales
- \* 10. Mishandled Baggage
- \* 11. Fares
- \* 12. Customer Service
- \* 13. Refunds
- \* 14. Ticketing/Boarding
- \* 15. Advertising
- \* 16. Credit
- \* 17. Other consumer complaints
18. Financial Stability
19. Average Seat-Mile

#### Cost (Average Yield)

(\* These data are from consumer complaints)

During the gathering of opinion from this diverse group, each expert was asked to rate the importance that each individual factor might have to a consumer of airline services using a scale of 0 (no importance) to 10 (great importance). As a result of these discussions and ratings, some factors were excluded from further consideration. The average importance ratings for each factor were also used as the weights for that factor in the AQR. Due to the continuous nature of the rating scale, the reliability (freedom from random error and its ability to yield consistent results) of the scale can be established. The 19 item rating scale has a reliability coefficient (Cronbach's Alpha) of 0.87 (with 1.00 being perfect) for the sample of 65 experts surveyed. This suggests that the 19 factor AQR is very reliable and that the ratings given by this sample of experts would be similar for other comparable sample groups as well.

The basic formula for calculating the Airline Quality Rating is:

$$AQR = \frac{w_1F_1 + w_2F_2 + \dots + w_{19}F_{19}}{w_1 + w_2 + \dots + w_{19}}$$

Each factor (F) has a weight (w) ranging from 0 = no importance to 10 = great importance, that reflects the importance of that factor in the overall AQR. Also, each weight and factor has an associated plus or minus sign in the formula. The sign associated with the weight and factor reflects the nature of the impact that a factor should have on an airline's quality rating. For instance, the factor that included on-time performance is included as a positive because it is reported in terms of on-time success, suggesting that a higher number is favorable to consumers. The weight for this factor is high (8.63) due to the importance most consumers place on this aspect of airline service. Conversely, the factor that includes accidents is included as a negative because it is reported in terms of accidents per hours flown, suggesting that a higher number is unfavorable to customers. The weight of this factor is also high (8.38) since safety is important to most consumers. It is important to remember that weights and positive/negative signs are independent of each other. Weight reflects importance of the factor in consumer decision making, while sign reflects the direction of impact that the factor should have on the consumers' rating of airline quality.

Taken as a whole, the AQR seems to be reflective of the critical quality aspects that a consumer of airline services might consider and indicative of the fact that the signs and weights attached to each factor reflect consumer attitudes as well.

Table 1 displays the 19

## Measuring Airline Quality

**Table 1**  
**Chart of Factor Weight and +/- Sign**

Number of Factor	FACTOR	Weight	Sign (+/-)	
1	Average Age of Fleet	5.85	-	
2	Number of Aircraft	4.54	+	
3	On-Time	8.63	+	
4	Load Factor	6.98	-	
5	Pilot Deviations	8.03	-	
6	Number of Accidents	8.38	-	
7	Frequent Flier Awards	7.35	-	
*	8	Flight Problems	8.05	-
*	9	Oversales	8.03	-
*	10	Mishandled Baggage	7.92	-
*	11	Fares	7.60	-
*	12	Customer Service	7.20	-
*	13	Refunds	7.32	-
*	14	Ticketing/Boarding	7.08	-
*	15	Advertising	6.82	-
*	16	Credit	5.94	-
*	17	Other complaints	7.34	-
18	Financial Stability	6.52	+	
19	Average Seat-Mile (Average Yield)	4.49	-	

\* These data are from consumer complaints.

factors, the weights associated with each, and the positive/negative sign for each factor.

#### AQR FINDINGS

When all the factor values and their associated weights are combined for an airline as outlined in the AQR formula, a single value for each airline is obtained. Due to the construction of the AQR, this value is comparable among the airlines

for the designated reporting period. Table 2 shows the AQR values for the ten major airlines for the January 1991 reporting period. This table also displays the rank order of the airlines using the AQR values.

For comparison purposes, the rank ordering of the airlines given by a recent consumer survey is displayed in Table 3. It can be seen that ranking results

for airlines are very similar using either the AQR or the consumer survey. As a researcher, this basic convergent validity for the AQR is noteworthy. As an airline industry watcher, obtaining similar ranking to a large consumer survey using the AQR is exciting, since the AQR is regularly available and less cumbersome to achieve. Given that the ranking results are very

**Table 2**  
**Airline Quality Rating Results - January 1991**

AIRLINE	AQR RESULTS	RANK ORDER USING AQR
American	+ .295	1
Delta	+ .150	2
Southwest	+ .140	3
United	+ .116	4
USAir	+ .067	5
Pan Am	+ .010	6
Northwest	- .106	7
Continental	- .301	8
TWA	- .444	9
America West	- .445	10

**Table 3**  
**Airline Quality Rating Compared to Zagat Consumer Survey**

AIRLINE	RANK ORDER USING AQR	** RANK ORDER USING ZAGAT CONSUMER SURVEY
American	1	1
Delta	2	2
Southwest	3	Not Ranked
United	4	3
USAir	5	7
Pan Am	6	5
Northwest	7	6
Continental	8	8
TWA	9	4
America West	10	Not Ranked

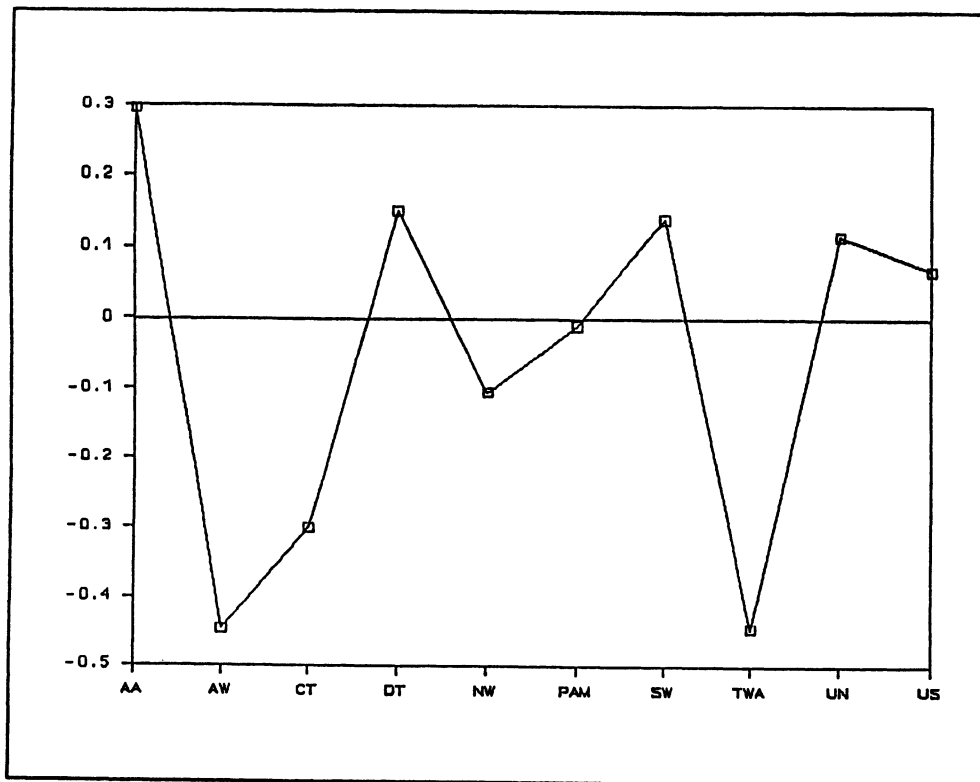
\*\* Source: Zagat Rates (January 1991). *Frequent Flyer*, pp 32-35

close, using the AQR to monitor airline quality ratings offers a simpler, more responsive

approach to monitoring the quality of airline performance on a regular and timely basis. Table

4 shows a graph of the AQR results.

**Table 4**  
**Graph of AQR Results**



### CONCLUSION

In today's competitive environment in the airline industry, it is imperative that a company does all it can to attract and keep customers. Companies are learning that it is important to monitor customers needs and wants and then strive to meet those needs and wants. If an airline fails to provide quality/satisfaction in its service (i.e., passenger satisfaction), it will lose customers to its competitors. If this continues long enough, the airline will go bankrupt or be taken over.

In order to assess quality in the airline industry, we have two types of measurement factors: qualitative and quantitative. The qualitative factors, which are difficult to measure, reveal, more or less, how customers "perceive" the airline's quality. These can be somewhat deter-

mined by surveys, focus groups, interviews, etc. and are difficult to monitor on a comparative basis. The Airline Quality Rating scale developed here offers a way to compare the quality of airlines by using strictly quantitative, comparable, regularly published factors. This does not take all aspects of quality into account, and it does not tell the whole story. It does provide a way to judge the impact on service quality for all airlines for some of the factors that passengers notice most. This is an acceptable, objective approach for an airline to use to compare its quality of service to that of its competitors on factors that are important to customers. Comparing the AQR results to those of a major consumer survey of 4,400 frequent fliers is notable.

Our basic intent is the development of an Airline Quality Rating (AQR) that can be used as a point of comparison by consumers and industry watchers alike in evaluating the comparative quality of the major domestic airlines in the United States. To achieve this, an array of consumer concerns is used to arrive at a multifactor rating scale that can be easily monitored on a periodic basis. Data supporting the factors contained in the scale are all available through regularly published public or proprietary sources. It is our conclusion that regular monitoring of this group of factors can bring a more common comparative base to the consumer decision process and help in making informed decisions.

[Note: This article has been excerpted from a technical research report prepared by the National Institute for Aviation Research at The Wichita State University.]

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**Brent D. Bowen** holds a Doctorate in Aviation Sciences from Oklahoma State University and a Master of Business Administration from Oklahoma City University. He is currently the Director of the Aviation Management Program, W. Frank Barton School of Business, and Director of the Center for Aviation Management Research at the National Institute for Aviation Research at Wichita State University. Dr. Bowen has in excess of 100 publications and presentations in his areas of expertise.

**Dean E. Headley** holds a Doctorate in Marketing from Oklahoma State University, a Master of business Administration from Wichita State University, and a Master of Public Health from the University of Oklahoma. Currently, Dr. Headley is Assistant Professor of Marketing, W. Frank Barton School of Business, and Faculty Associate of the National Institute for Aviation Research at Wichita State University.

**Jacqueline R. Luedtke** holds a Master of Business Administration from Wichita State University and is a doctoral candidate in Aviation Sciences at Oklahoma State University. Currently, Ms. Luedtke is Business Manager of the National Institute for Aviation Research and Instructor of Aviation Management, W. Frank Barton School of Business at Wichita State University.

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