Enhancing Global Competitiveness: Benchmarking Airline Operational Performance in Highly Regulated Environments

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ABSTRACT

Enhancing competitiveness in the global airline industry is at the forefront of attention with airlines, government, and the flying public. The seemingly unchecked growth of major airline alliances is heralded as an enhancement to global competition. However, like many mega-conglomerates, mega-airlines will face complications driven by size regardless of the many recitations of enhanced efficiency. Outlined herein is a conceptual model to serve as a decision tool for policy-makers, managers, and consumers of airline services. This model is developed using public data for the United States (U.S.) major airline industry available from the U.S. Department of Transportation, Federal Aviation Administration, the National Aeronautics and Space Administration, the National Transportation Safety Board, and other public and private sector sources. Looking at historical patterns of Airline Quality Rating results provides the basis for establishment of an industry benchmark for the purpose of enhancing airline operational performance. Applications from this example can be applied to the many competitive environments of the global industry and assist policy-makers faced with rapidly changing regulatory challenges.

INTRODUCTION

Looking at historical patterns of the Airline Quality Rating (AQR) may provide the basis for establishment of an industry benchmark for the purpose of enhancing airline operational performance. Benchmarking is a process that helps companies to find high performance levels in other organizations and to learn enough about how they are achieving those levels so the practice producing the high performance can be applied to one's own company (Keehley, Medlin, MacBride & Longmire, 1997). Enhancing competitiveness in the global airline industry is at the forefront of attention with airlines, government, and the flying public. The seemingly unchecked growth of major airline alliances is heralded as an enhancement to global competition. However, like many mega-conglomerates, mega-airlines will face complications driven

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by size regardless of the many recitations of enhanced efficiency.

Outlined herein is a conceptual model to serve as a decision-tool for policy makers, managers, and consumers of airline services. The AQR can serve as a model for other organizations on how to use data as a benchmark to help an organization or industry improve its performance. The AQR is a summary of month-by-month quality ratings for the major U.S. airlines during a one-year period. The AQR uses 19 data points such as pilot deviations, load factors and the number of accidents. (See Table 1). The AQR model uses publicly available data from the Department of Transportation, Federal Aviation Administration, National Aeronautics and Space Administration, National Transportation Safety Board, as well as other sources. Applications from the AQR can be applied to the many competitive environments of our global industry and assist policy-makers faced with rapidly changing regulatory challenges.

The AQR serves as an annually reported benchmark in the aviation industry. The ultimate benefit of benchmarking is enhanced competitiveness. An airline striving to improve its service identifies industry leaders and seeks to understand how the leaders achieve successful performance levels. The airline then adapts these strategies to their own organization.

Benchmarking can best be described as "the continuous process of measuring products, services, and practices against the company's toughest competitors or those companies renowned as industry leaders" (Camp, 1992, p. 3).

Benchmarking can also be described as the "Consumer Reports" of the public and private sectors. It provides consumers with accurate and reliable information with which they can set standards, make comparisons, judge performances, and consequently make a purchasing decision. The AQR is an innovative example of a benchmark in the airline industry and can serve as a framework for organizations in other competitive environments. Using the Airline Quality Rating system and monthly performance data for each airline for the calendar year, individual and comparative ratings are reported. The AQR uses data points from key public sources and provides a starting point for monitoring the quality of an individual airline. With all of the competitive forces at play in the global airline industry, a basic quality assessment tool would be useful to various governments, competitors, and international airline travelers. The AQR applied to major U.S. carriers can also be applied to international airlines provided that comparable data are available. Consumers can use this ranking system to make comparisons and judge the various performances of the airlines.

Benchmark Purposes and Rationale

Many reasons exist to benchmark the performance of an organization or industry. First of all, it simply works. To the surprise of many organizations, benchmarking reveals sizable performance gaps. Alaska Airlines had a high rate of mishandled baggage in 1997, which placed it well below the industry average. This performance gap is now identified and can be improved. In fact, the 1998 AQR results showed a slight improvement in Alaska Airlines' mishandled baggage rate. The airline moved from being ranked tenth worst to ninth worst in baggage handling (Bowen & Headley, 1999). Secondly, recognition is likely to follow. Besides the internal benefits, external benefits such as publicity are likely to occur. The AQR is nationally broadcast to more than 50 million consumers on the major news networks and in major newspapers. As competition for

this achievement increases, the airlines will undoubtedly seek to be the best and implement innovative and successful practices. Finally, airlines cannot afford not to benchmark. Airline consumer complaints rose 20 percent from 1996 to 1997 (Bowen & Headley, 1998). Consumers are demanding a high-quality return for their money.

Benchmarking works because it illustrates improvements in quality and performance. A perfect example is Continental Airlines. Continental was the most improved airline from 1996 to 1997 as they moved from fifth to third position. They improved their mishandled baggage rate and denied boardings, and had consistently good performance in all areas rated. The AQR scores over the years show that Continental Airlines is clearly the most improved of the major carriers. Their consistent improvement since 1994 has moved them from last to third on the quality scale.

Benchmarking can be defined by the following criteria; it must be successful over time, have quantifiable results, be innovative, be repeatable, and must not be linked to unique demographics (Keehley et al., 1997). The AQR qualifies as a benchmark by meeting all of these criteria. The AQR has a comprehensive database of success dating to 1991. Seven consecutive years of data have been collected and analyzed. The AQR has quantitative results derived from a weighted average of 19 factors with relevance to consumers when judging the quality of airline services. "The Airline Quality Rating approach focuses on quantitative factors rather than qualitative factors in order to provide a more objective result in assessing service quality levels across all major domestic airlines. The use of quantifiable, readily available data provides an objective starting point for monitoring the quality of service an

individual airline might be providing and allows it to be directly compared with other competitors" (Bowen & Headley, 1997, p. 58). The AQR uses an innovative approach by combining basic ideas and raw material with a specific purpose in mind. "The objective in developing the AQR was to better organize readily available data for the consumer and offer it in a more useful, understandable, and objective form" (Bowen & Headley, 1997, p. 57). Another criteria of a benchmark is that it should be repeatable with some modifications. The AQR has been successfully repeated from 1991 to 1998. Minor modifications were made when the number of carriers changed from year to year. Finally, a good benchmark is not linked to unique demographics. "The results of a benchmark study are just a snapshot, or a moment in time. But when you add data from your industry and your organization to your benchmark subject's database, trends invariably start to emerge and become clear" (Finnigan, 1996, p. 144).

Defining Performance Measurement: The Airline Quality Rating

The majority of quality ratings available rely on subjective surveys of consumer opinion which are completed infrequently. This subjective approach yields a quality rating that is essentially non-comparable from survey to survey for any specific airline. Timeliness of survey based results can be problematic as well in the fast changing airline industry. Before the Airline Quality Rating, there was effectively no consistent method for monitoring the quality of airlines on a timely, objective, and comparable basis. With the introduction of the AQR, a multi-factor, weighted average approach became available. This approach had not been used before in the airline industry. The method relies on taking published, publicly available data that characterizes airline performance on critical

quality factors important to consumers and combines them into a rating system. The final result is a rating for individual airlines with ratio scale properties comparable across airlines and across time.

The Airline Quality Rating is a weighted average of 19 factors that have important to consumers when judging the quality of airline services. Factors included in the rating scale were taken from an initial list of over 80 potential factors. Factors were screened to meet two basic criteria; 1) a factor must be obtainable from published data sources for each airline; and 2) a factor must have relevance to consumer concerns regarding airline quality. Data used in calculating ratings represent performance aspects (i.e. safety, on-time performance, financial stability, lost baggage, denied boardings) of airlines that are important to consumers. Many of the factors used are part of the Air Travel Consumer Report prepared by the U.S. Department of Transportation.

Final factors and weights were established by surveying airline industry experts, consumers, and public agency personnel regarding their opinion as to what consumers would rate as important in judging airline quality. Also, each weight and factor were assigned a plus or minus sign to reflect the nature of impact for that factor on a consumer's perception of quality. For instance, the factor that includes on-time performance is included as a positive factor because it is reported in terms of on-time successes, suggesting that a higher number is favorable to consumers. The weight for this factor is high due to the importance most consumers place on this aspect of airline service. Conversely, the factor that includes accidents is included as a negative factor because it is reported in terms of accidents relative to the industry experience, suggesting that a higher number is unfavorable to consumers. Because safety

is important to most consumers the weight for this factor is also high. Weights and positive/negative signs are independent of each other. Weights reflect importance of the factor in consumer decision making, while signs reflect the direction of impact that the factor should have on the consumer's rating of airline quality. When all factors, weights, and impacts are combined for an airline and averaged, a single continuously scaled value is obtained. This value is comparable across airlines and across time periods.

Table 1
Airline Quality Rating Factors, Weights and Impact

	FACTOR	WEIGHT	IMPACT (+/-)
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[a]	8.05	-
9	Denied Boardings[a]	8.03	-
10	Mishandled Baggage[a]	7.92	-
11	Fares[a]	7.60	-
12	Customer Service[a]	7.20	-
13	Refunds[a]	7.32	-
14	Ticketing/Boarding[a]	7.08	-
15	Advertising[a]	6.82	-
16	Credit[a]	5.94	-
17	Other[a]	7.34	-
18	Financial Stability	6.52	+
19	Average Seat-Mile Cost	4.49	-

Note: [a]Data for these factors are drawn from the Department of Transportation's monthly Air Travel Consumer Report.

The Airline Quality Rating methodology allows comparison of major airline domestic operations on a regular basis (as often as monthly) using a standard set of quality factors. Unlike other consumer opinion approaches, which rely on consumer surveys and subjective opinion, the AQR uses a mathematical formula that takes multiple weighted objective factors into account in arriving at a single rating for an airline. The rating scale is useful because it provides consumers and industry watchers a means for looking at comparative quality for each airline on a timely basis using objective, performance-based data.

The equation, known as the national Airline Quality Rating (AQR), where Q is quality, C is weight, and V is the value of the variables, is stated $Q = W[i1-19] \times F[i1-19]$. Figure 1 presents the formula as a weighted average, which results in ratio scale numbers.

Figure 1
Weighted Average Formula for the AQR

$$AQR = \frac{- w_1F1 + w_2F2 + w_3F3 +/- \ldots w_{19}F19}{w_1 + w_2 + w_3 + \ldots w_{19}}$$

Note. From "Airline Quality Report," by B. Bowen and D. Headley, 1991, NIAR Report 91-11. Wichita State University.

Framing a Benchmark Procedure

Benchmarking asks two fundamental questions: how well is the agency doing and is the agency's performance improving or deteriorating? Only then should a third question be asked: is another company doing something better than this agency? The AQR can be used as a benchmark by the major airlines to answer these very questions. Northwest Airlines can look at the results and ask itself how their company is doing and if their performance is improving or deteriorating. Then they can look to see who is doing something better than they are. Northwest Airlines could look at the success of Southwest Airlines, the top ranked airline, to gain insight as to how they are successful. "Sharing experiences and learning from the experience of other organizations is the cheapest and most efficient, effective and compelling means for improving performance" (Keehley et al., 1997, p. 207).

Industry Week named the Xerox company best-in-class in benchmarking. Robert Camp from Xerox wrote a book on benchmarking in 1992, Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance. Camp says the first step in benchmarking is to decide what to focus on. Select areas that are important to customers, critical success factors, areas for greatest improvement, competitive pressure points and problem areas (Richardson, 1992, p. 33). The air carriers realize that customer satisfaction is a key point to consumers and that consumers have a choice when selecting an air carrier. Using Northwest Airlines as an example, the company should seek out areas that are important to customers such as customer service, mishandled bags, fares, and denied boardings. They should choose problem areas such as on-time performance and focus on these areas for improvement.

Step two is to understand your company's own processes by clarifying, identifying, and prioritizing your own best practices. Benchmarking is best utilized where there is the opportunity for major payback and it is not advised to benchmark an organization's strengths. Because of the expense involved, a company should not necessarily benchmark a process in which they know they are successful. Instead, focus on performance areas that could provide the most significant return. For the

airline industry, these areas could include improving on-time performance and reducing consumer complaints. Next, use people with knowledge and experience in the function. Benchmarking should be conducted by teams with the appropriate skills such as a team facilitator, analytical skills, and information search capability. A company should train the teams in the essentials of benchmarking. The fourth step is to make sure the teams are focused on best practices. Often times results or returns on assets are the focus of a company. The numbers however, do not tell anything about the process. In benchmarking, the numbers are only 10% of the activity whole processes are 90%. The next step is to find a company that does it the best. Benchmarking with more than one company gives validation that you are finding the best practice. US Airways, for example, can use Southwest, Alaska, Continental, or another airline they feel is doing something superior. The final step is to update. As processes and competition change over time, industry best practices should change accordingly (Camp, 1992).

Benchmark Procedural Validity and Reliability

The AQR has accomplished numerous objectives accepted as key ingredients of benchmarking. It is based on objective criteria, thereby eliminating perception and opinion. (Velocci, 1997). While based primarily on public sector data, realization and inclusion of private sector information provides substantial benefit. The AQR has spanned seven years, therefore encountering a changing business environment, public policy, and economic conditions. Metrics derived from publically available data sources insure accountability and validity through constant replication and constituent observation. As a methodology,

AQR annual results have been subjected to peer review on numerous occasions. Widespread citation in academic literature, media reports, and airline reports continuously validate the mechanisms used to establish this industry benchmark. The details of this methodological approach and validation have been addressed in annual publication of results. A key test for data reliability is computation of Cronbach's Alpha. Reliability of the rating scale (See Table 2) was measured as extremely high (Bowen, Headley, & Lutte, 1993).

The reliability, as defined as the freedom from the random error and its ability to yield consistent results, is established by Cronbach's Alpha. (Bowen, Headley, & Luedtke, 1992). Cronbach's Alpha estimates the internal consistency reliability of a scale made up of a number of equally weighted items with values between zero and one. Coefficients above 0.6 are desirable and many would argue that values above 0.8 are needed for a developed scale. A reliability coefficient sets an upper limit for the (criterion) validity of a scale (Cronbach, 1951).

Table 2
Reliability Coefficient

Measure	Score	Scale	Result
Cronbach's Alpha	0.87	0-1.0	Extremely high validity

Controlling for Variability

Testing the AQR model involved basic concepts such as control limitation and standard deviation range comparisons to performance data and to model variability in the baseline year. A statistical process control charting established the upper control limitations and the lower control limitations. These limits represent a targeted range of variability based on one year of experience and are projected outward across the next year. Statistical process control testing for the AQR was calculated over 24 measurement periods to provide maximum representation of variability. This tool can be used with the AQR scores to set benchmark standards for individual airlines and for the airline industry. As a model, the AQR meets the prerequisites of accurate numerical data and chronologically recorded data (Bowen, Headley, & Lutte, 1993).

Common cause variability occurs when points are randomly distributed about the center line within the upper and lower control limits. Common cause variability involves more complicated factors that cannot be easily altered in the short-term. In the AQR these factors are areas such as financial stability, age of the fleet, and number of accidents. Common cause variability represents the level of quality that the organization or industry is capable of producing. It is entirely possible that an organization may be within control limits and still be performing at an inadequate level of quality to compete. The second type of variability is called local faults. Local faults are factors that are easily identifiable and can generally be controlled by employees. In the AQR these factors would be such things as mishandled baggage or customer complaints about service. A local fault is indicative of a situation that is temporarily out-of-control. Local faults are typically short-term and are often corrected by employees actually responsible for performance (Fellers, 1992).

The AQR Benchmark: Results in Action

The Airline Quality Rating was developed and first announced in early 1991 as an objective method of comparing airline performance on combined multiple factors important to consumers. Over a span of seven years the Airline Quality Rating has provided a summary of month-by-month quality ratings for the ten major U.S. airlines operating during this period. Using the AQR system and monthly performance data for each airline for the multi-year period provides comparative data for a longer term view of quality in the industry.

Since the Airline Quality Rating is comparable across airlines and across time, monthly rating results can be examined both individually and collectively. A composite industry average that combines the ten major airlines which are monitored each month on 19 criteria over the seven year span is represented in Table 3. Table 4 provides a summary of data.

Table 3
Benchmark Indicators 1991- 1997

AQR Result

1997	1996	1995	1994
0.0001	-0.0762	-0.0948	-0.1103
1993	1992	1991	
-0.0706	-0.0309	-0.0167	

Note. From "Airline Quality Report," by B. Bowen and D. Headley, 1991-1998, Aviation Monograph Reports. Wichita State University and University of Nebraska at Omaha.

Table 4
Summary of Data

Mean	-0.05629
Standard Deviation	0.04072
Standard Error	0.01539
Minimum	-0.1100
Maximum	0.000
Median	-0.07000
Lower 95% CI	-0.09395
Upper 95% CI	-0.09395

Note. t= 3.675 with 6 degrees of freedom
The two-tailed P value is 0.0106, considered significant

Continuing a trend started in 1994, the AQR industry average scores show an industry that is improving in quality. 1997 shows the largest change for industry average AQR scores of any of the past seven years. For 1997 the overall industry average AQR score was the highest of any of the seven years rated. The AQR score improvement was the most of any year-to-year score changes since 1991. While factors of on-time performance, involuntary denied boardings, and mishandled baggage are better, a 20% increase in the number of complaints filed with the Department of Transportation runs counter to a recovered industry. Financial performance has certainly improved along with some indicators of quality performance. Increased consumer dissatisfaction expressed by an increased volume of complaints seems to indicate that how things are done is just as important as what gets done.

The AQR was originally developed for the eventual purpose of benchmarking the U.S. major airline industry, which is highly competitive and highly regulated. The airlines clearly compete for the AQR rating. American Airlines launched a large marketing campaign when they were rated the number one in airline quality in 1991, 1992, and 1994. Regulatory officials, consumers, financial analysts, and others are interested in monitoring overall industry performance and the resulting effects of situational environment changes. Airlines must monitor operational performance to maintain competitiveness. Each airline must monitor performance to industry standard and previous case history for that air carrier. Thus each airline will have to know the effect of each operational performance indicator and act to effect change. Table 5 portrays each airlines' results for the seven year span. The order is from high to low score for the calendar year of 1997.

Table 5
Industry Average AQR Scores for U.S. Major Airlines

	1997	1996	1995	1994	1993	1992	1991
Southwest	0.346	0.306	0.221	0.211	0.252	0.251	0.220
Alaska	0.112						
Continental	0.069	-0.095	-0.340	-0.574	-0.540	-0.274	-0.266
American	0.050	0.033	0.164	0.225	0.231	0.290	0.323
United	0.041	0.031	0.058	0.123	0.176	0.214	0.168
Delta	0.000	-0.017	-0.024	-0.031	0.076	0.123	0.193
Northwest	-0.069	-0.100	-0.222	-0.210	-0.247	-0.193	-0.143
America West	-0.116	-0.275	-0.145	-0.282	-0.294	-0.267	-0.325
Trans World	-0.199	-0.302	-0.303	-0.307	-0.286	-0.398	-0.435
US Airways	-0.233	-0.267	-0.262	-0.148	-0.003	-0.024	0.115

	Mean	SD	SE	Min	Max
1997	0.0001	0.1678	0.0531	-0.2330	0.3460
1996	-0.0762	0.1939	0.0646	-0.3020	0.3060
1995	-0.0948	0.2077	0.0692	-0.3400	0.2210
1994	-0.1103	0.2671	0.0890	-0.5740	0.2250
1993	-0.0706	0.2805	0.0935	-0.5400	0.2520
1992	-0.0309	0.2603	0.0868	-0.3980	0.2900
1991	-0.0167	0.2773	0.0924	-0.4350	0.3230

Note. From "The 1998 Airline Quality Rating," by B. Bowen and D. Headley, 1998, Aviation Monograph Report 98-1. Wichita State University and University of Nebraska at Omaha.

Table 6
Monthly AQR Scores: Southwest Airlines

	1997	1996	1995	1994	1993	1992	1991
January	0.348	0.274	0.222	0.233	0.280	0.291	0.244
February	0.351	0.284	0.229	0.233	0.300	0.287	0.254
March	0.355	0.288	0.255	0.239	0.295	0.274	0.241
April	0.309	0.268	0.265	0.202	0.238	0.266	0.245
May	0.305	0.241	0.256	0.210	0.245	0.263	0.250
June	0.323	0.250	0.230	0.206	0.241	0.261	0.254
July	0.350	0.351	0.204	0.221	0.174	0.265	0.203
August	0.349	0.351	0.203	0.221	0.170	0.270	0.183
September	0.353	0.400	0.232	0.236	0.169	0.256	0.202
October	0.394	0.319	0.197	0.191	0.308	0.266	0.196
November	0.337	0.330	0.187	0.187	0.304	0.159	0.190
December	0.384	0.316	0.175	0.151	0.306	0.149	0.179
Average	0.346	0.306	0.221	0.211	0.252	0.251	0.220

	Mean	SD	SE	Min	Max
January	0.2703	0.0428	0.0162	0.2220	0.3480
February	0.2769	0.0427	0.0161	0.2290	0.3510
March	0.2781	0.0403	0.0152	0.2390	0.3550
April	0.2561	0.0329	0.0124	0.2020	0.3090
May	0.2529	0.0285	0.0108	0.2100	0.3050
June	0.2521	0.0362	0.0137	0.2060	0.3230
July	0.2526	0.0723	0.0273	0.1740	0.3510
August	0.2496	0.0757	0.0286	0.1700	0.3510
September	0.2640	0.0828	0.0313	0.1690	0.4000
October	0.2673	0.0777	0.0294	0.1910	0.3940
November	0.2420	0.0777	0.0294	0.1590	0.3370
December	0.2371	0.0957	0.0362	0.1490	0.3840

Note. From "The 1998 Airline Quality Rating," by B. Bowen and D. Headley, 1998, Aviation Monograph Report 98-1. Wichita State University and University of Nebraska at Omaha.

As an example, Table 6 conveys the performance of 1997's leader, Southwest Airlines. This chart visually presents 1997's performance and provides the historical trend data for one year. Additionally, Table 6 shows performance over the seven year span which could set a higher benchmark for this individual carrier than use of the industry average as a benchmark. Identification of key benchmarks are available for any targeted point. Each airline will be able to analyze performance relative to the overall industry and past individual case.

Applications for the Benchmark Standard

In order for benchmarking to be successful, lasting performance improvements must be made. Sustaining the momentum is crucial to overcoming old practices and implementing new ones. New processes in organizations require constant attention and continual practice. Old practices must be unlearned. Three types of issues arise: ensuring the successful implementation and operation of best practice in organization, institutionalizing benchmarking as the way to search for best practices throughout the agency, and clearly defining the future of benchmarking for best practices as a means for bringing better service to customers (Keehley et al., 1997).

The major airlines are realizing that it is important to attract and retain 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 services (i.e. passenger satisfaction), it will lose its customers to its competitors" (Bowen & Headley, 1997, p. 61). "It is essential for all business organizations to retain existing customers and attract new ones. Since the signs from the service provider (emitter) are

interpreted by the customer they can either strengthen or weaken the persuasive influence of the company and thereby affect its image and the customer response. It would be interesting to research what these signs are in the area of service provision and their impact on the loss or gain of trade" (Malver, 1988, p. 223). Studies may indicate signs, whether they are positive or negative, and the impact on the customer. These impacts determine whether the customer will remain or leave. You can perform research to detect signs that have "a common international interpretation and the same impact irrespective of the nationality of the passenger" (Malver, 1988, p. 223). Findings from this study may help the "company to improve the delivery of service and to contribute the development of the discipline itself" (Malver, 1988, p. 224). The results from the AQR could most certainly help the major airlines to improve their delivery of service. Alaska Airlines could improve the number of mishandled bags and involuntary denied boardings and American could improve its on-time performance. All of the major airlines can use the results to see how they compare against the competition and improve their respective services.

CONCLUSION

Benchmarking is not a solution to all of the problems an agency faces but "a powerful weapon in the performance improvement arsenal" (Keehley et al., 1997, p. 207). Benchmarking cannot solve all of the problems, but it allows an agency to look outward and provides the reason and methods that organizations need to seek out best practices and solve performance problems. The need for excellence will become even greater in the future as consumers become more demanding. "Budgets will shrink, the demand for accountability will increase, the need for

demonstrable results will grow" (Keehely et al., 1997, p. 206). The use of the AQR as an industry benchmark can enhance airline operational performance.

Prior to the AQR, a consistent method for monitoring airline quality on a timely, objective, and comparable basis did not exist. For the first time in the airline industry, a rating was developed that used a multi-factor weighted average approach that resulted in a starting point for monitoring airline quality. The end result is a rating for individual airlines with ratio scale properties that can be compared across airlines and across time. Additionally, the rating turns data into a more useful and understandable form for consumers.

Because most airline operations are similar throughout the world, this approach can also be used by many countries to enhance the quality of their airlines. A global airline performance benchmark would be in the best interests of all the airlines and consumers. Such a benchmark could identify some basic performance factors that could be tracked internationally. The AQR offers a readily available blueprint of a benchmark that is applicable to global airline benchmarking and to other organizations and industries. It is envisioned that the AQR benchmark will provide a baseline for future comparative research. Such comparative research could include correlational studies. These studies could attempt to show a cause and effect relationship between the AQR and airline financial performance or the AQR and airline safety.

References

Bowen, B. D., & Headley, D. E. (1999). <u>The airline quality rating 1999.</u> (UNO Aviation Monograph Report 99-3). Omaha, NE Aviation Institute.

Bowen, B. D., & Headley, D. E. (1998). <u>The airline quality rating 1998.</u> (UNO Aviation Monograph Report 98-1). Omaha, NE, Aviation Institute.

Bowen, B. D., & Headley, D. E. (1991). <u>The airline quality rating 1991</u>. (NIAR Report 91-11). Wichita, KS, Wichita State University.

Bowen, B. D., & Headley, D. E., & Luedtke, J. (1992, Winter). A quantitative methodology for measuring airline quality. <u>Journal of Aviation/Aerospace Education and Research, 2, (2)</u>, 27-33.

Bowen, B. D., Headley, D. E., & Lutte, R. (1993, Fall). The airline quality rating: Developing an industry standard. <u>Journal of Aviation/Aerospace Education and Research, 4, (1)</u>, 33-39.

Camp, R. C. (1992). Learning from the best leads to superior performance. <u>Journal of Business Strategy, 11</u>, 55-65.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. <u>Psychometrika, 16</u>, 297-334.

Fellers, G. (1992). <u>The Deming vision: SPC/TQM for administrators</u>. Milwaukee, WI: ASQC Quality Press.

Finnigan, J.P. (1996). <u>The manager's guide to benchmarking</u>. San Francisco: Jossey-Bass.

Headley, D. E., & Bowen, B. D. (1997). International airline quality measurement. <u>Journal of Air Transportation World Wide, 2</u>, 55-63.

Keehley, P., Medlin, S., MacBride, S., & Longmire, L. (1997). <u>Benchmarking for best practices in the public sector</u>. San Francisco: Jossey-Bass.

Malver, H. (1988). <u>Service in the airlines: Customer or competition oriented?</u> Unpublished doctoral dissertation: Stockholm University, Sweden.

Richardson, H. L. (1992, October). Improve quality through benchmarking. <u>Transportation and Distribution, 33</u>, 32-37.

Velocci, A. L. (1997, June 9). Competitive index: Benchmarking tool retains basic focus. <u>Aviation Week and Space Technology</u>, 49.