E-SERVICE QUALITY PERFORMANCE MEASUREMENT IN AIRLINES: AN APPLICATION ON SCHEDULED AIRLINES IN TURKEY

Res. Asst. Mahmut BAKIR
Anadolu University
Faculty of Aeronautics and Astronautics

Assoc. Prof. Dr. Özlem ATALIK
Anadolu University
Faculty of Aeronautics and Astronautics
• Introduction
• Service and Service Quality Concepts
• Development of Air Transport Industry in Turkey
• Research Object
• Literature Review
• Aim, Limitations and Sampling Method
• Methodology
• Findings
• Conclusion and Evaluation
• Genuine Value
As a result of the liberalization and commercialization process, the air transport sector has entered an important stage of development.

• It is estimated that passenger demand for air transport will grow by an annual average of 4% (Boeing, 2016).

• The airline industry is an industry where services are used extensively.

• E-service quality measurement is also very important in the airline industry where innovations such as e-commerce and e-service is also widely used.
Service and Service Quality Concepts

- **Service:**
  It is an abstract structure which is the result of the interaction between the customer and the service employee, and it is an activity to restrict ownership and meet customer requests and needs.

- **Quality:**
  The suitability of a goods and service to the consumers' purposes and expectations...
- **Service Quality:**
  A general evaluation of the superiority or perfection of services …
  - It refers to the perspective of the consumers.
  - At this point, the concept of perceived service quality comes to the forefront.

Service Quality =

- Avoiding price competition
- Effect customer satisfaction and loyalty positively
- Improving customer relationships
- Reduced costs and increased business performance
• **E-commerce**
It is a form of trade in which payments are made on electronic channels, which allow for the purchase and sale of products through electronic communication channels.

• **E-service**
It is a self-service experience that customers interact through online channels without the need for service staff (Çelik ve Başaran, 2008)…

• **E-service Quality**
It is general assessment or judgment on the quality that consumers receive about service offerings in the virtual environment (Santos, 2003)…
Measurement of Service Quality

So far, many models on service quality have been proposed;

- **Nordic Model**  
  • Grönroos (1984)
- **SERVQUAL**  
  • Parasuraman, Zeithaml & Berry (1988)
- **SERVPERF**  
  • Cronin & Taylor (1992)
- **Retail Service Quality Model**  
  • Dabholkar, Thorpe & Rentz, 1996
- **Hierarchical Approach Model**  
  • Brady & Cronin, 2001

Apart from these, many different proposals have been made, including Multi-Criteria Decision Making (MCDM) methods.
E-service Quality Measurement Models

• E-QUAL (Kaynama ve Black, 2000)
• SITEQUAL (Yoo ve Donthu, 2001)
• WebQual™ (Loaicono, Watson ve Goodhue, 2002)
• eTailQ (Wolfinbarger ve Gilly, 2003)
• E-S-QUAL ve E-RecS-Qual (Parasuraman, Zeithaml ve Malhotra, 2005)
Development of Air Transport Industry in Turkey

- The beginning of civil aviation in Turkey is based on 1912.
- In 1933, the “Türk Hava Postaları İşletmesi” was established and domestic commercial flights started.
- Nuri Demirağ and Turkish Aeronautical Association produced aircraft in various types.
- In 1983, Turkish Civil Aviation Law entered into force.
- In 2003, Civil Aviation Liberation Movement started.
Figure 1. The number of passengers carried by air transport by years in Turkey (TÜİK, 2017)
With reference to the intensive use of e-services in the airline industry;
• Determining the factors affecting the quality of the e-services offered in the airline industry,
• Sorting of airlines by their performances according to relevant factors.
<table>
<thead>
<tr>
<th>Study</th>
<th>Field</th>
<th>Methods</th>
<th>Criteria</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee ve Kozar (2006)</td>
<td>Online travel agencies and online retail businesses</td>
<td>AHP</td>
<td>4 main criteria + 14 sub-criteria + 4 alternatives</td>
<td>Response time, currency</td>
</tr>
<tr>
<td>Lin (2010)</td>
<td>Online education institutions</td>
<td>Fuzzy AHP</td>
<td>4 main criteria + 16 sub-criteria</td>
<td>Information quality</td>
</tr>
<tr>
<td>Tsai, Chou ve Lai (2010)</td>
<td>National park websites</td>
<td>Dematel + ANP + VIKOR</td>
<td>7 main criteria + 7 alternatives</td>
<td>Richness, navigability, attractiveness</td>
</tr>
<tr>
<td>Yu (2010)</td>
<td>Virtual book stores</td>
<td>AHP</td>
<td>3 main criteria + 9 sub-criteria</td>
<td>Website design; security</td>
</tr>
<tr>
<td>Hsu, Hung ve Tang (2012)</td>
<td>Online travel agencies</td>
<td>Fuzzy ANP</td>
<td>4 main criteria + 14 sub-criteria</td>
<td>Security</td>
</tr>
<tr>
<td>Nilashi ve diğerleri (2012)</td>
<td>Online shopping stores</td>
<td>Entropy + TOPSIS + Fuzzy TOPSIS</td>
<td>3 main criteria + 14 sub-criteria</td>
<td>Trust, response time, reliability</td>
</tr>
<tr>
<td>Chou ve Cheng (2012)</td>
<td>Accounting firms</td>
<td>Fuzzy ANP ve Fuzzy VIKOR</td>
<td>3 main criteria + 12 sub-criteria + 4 alternatives</td>
<td>Information quality; relevancy, understandability, trust</td>
</tr>
<tr>
<td>Ustasüleyman (2013)</td>
<td>Online banking services</td>
<td>AHP</td>
<td>4 main criteria + 17 sub-criteria</td>
<td>Service quality; reliability, trust</td>
</tr>
<tr>
<td>Ecer (2014)</td>
<td>Online banking services</td>
<td>AHP ve G-COPRAS</td>
<td>3 main criteria + 10 sub-criteria</td>
<td>Information quality; relevancy, richness, understandability</td>
</tr>
<tr>
<td>Vatansever ve Akgül (2014)</td>
<td>Online shopping stores</td>
<td>Fuzzy AHP</td>
<td>4 main criteria + 22 sub-criteria + 4 alternatives</td>
<td>Vendor specific quality; price saving</td>
</tr>
<tr>
<td>Çelik (2015)</td>
<td>Online banking services</td>
<td>AHP</td>
<td>4 main criteria + 17 sub-criteria + 5 alternatives</td>
<td>Service quality; reliability, security</td>
</tr>
<tr>
<td>Özdağoğlu ve Güler (2016)</td>
<td>Online banking services</td>
<td>Fuzzy AHP + Fuzzy TOPSIS</td>
<td>5 main criteria + 19 sub-criteria + 7 alternatives</td>
<td>Privacy; customer authentication, security</td>
</tr>
<tr>
<td>Yaghoubi ve Rigi (2017)</td>
<td>E-government applications</td>
<td>Delphi Method + AHP</td>
<td>6 main criteria + 25 sub-criteria</td>
<td>Delivery</td>
</tr>
<tr>
<td>Pethania ve Bascel (2017)</td>
<td>E-retail businesses</td>
<td>AHP</td>
<td>3 main criteria + 3 sub-criteria</td>
<td>Ease of use</td>
</tr>
</tbody>
</table>
Aim, Limitations and Sampling Method

Aim

Evaluating the quality of service offered on the internet using MCDM methods on the basis of national airline operators

• Determining the importance levels of the factors affecting e-service quality in the airline sector,
• To present the current situation of airlines in this respect,
• Contributing to the literature because of the first use of the methods used in the measurement of e-service quality ...
Limitations

- Implementation of surveys at several airports
- Data obtained only from the domestic terminal of the airport
- Conducting research on a sample that can represent the universe
- The research involves a limited period
Sampling Method

Although no specific number has been specified in the literature, 11 experts have been interviewed in the implementation of the AHP method. Therefore, the specialists involved in the study as decision makers were selected from website designers, academics studying in the field of aviation and airline employees.

• In the application of ARAS method, the sample size will be determined by using formula \( n = \frac{N t^2 pq}{d^2(N-1)+t^2 pq} \)

During the second and last stage of the study, in which ARAS method is applied; passengers will be interviewed by stratified sampling method in a few of the country's busiest airports.
Domestic airlines in Turkey and their market shares can be seen in Figure 2\(^1\). In order not to advertise, operators were represented by codes X1, X2, X3, X4 and X5.

In this study, the number of passengers will be taken into consideration at various airports.

\(^1\)Relevant data have been obtained from the State Airports Authority of the Republic of Turkey under the right to information act.
Methods Used in Research

  - Quantitative and qualitative criteria are comparable
  - Suitable for both individual and group decisions
  - The problem can be explained in detail
  - Application and calculation is easy

I. Defining the decision problem and establishing the hierarchical structure
II. Creation of binary comparison matrices
III. Determination of importance ratings of criteria
IV. Calculation of matrix consistency ratio
V. Obtaining the final eigenvectors in a hierarchical structure
• ARAS (Additive Ratio ASsessment) Method (Zavadskas & Turskis, 2010)
  The evaluation is made according to the optimal alternative.
  It is suitable for proportional evaluation purposes.
  It's easy to use.

I. Creation of decision matrix
II. Obtaining a normalized decision matrix
III. Creation of a weighted normalized decision matrix
IV. Calculation of optimality function values
Determination of airline alternatives and e-service quality evaluation criteria

Creation of decision hierarchy

Determination of experts to be interviewed within the scope of the AHP method

Determining the importance of the criteria affecting e-service quality

Measurement of airline performances by ARAS method using survey method in airports

Sorting by airline's performances using ARAS method

Figure 3. Methodology adopted within the scope of the research
Evaluation of E-service Quality in Airlines

Information Quality (IQ)
- Relevancy (I1)
- Understandability (I2)
- Currency (I3)
- Richness (I4)

System Quality (SyQ)
- Security (S1)
- Response Time (S2)
- Personalization (S3)
- Navigability (S4)
- Accessibility (S5)

Service Quality (SQ)
- Empathy (H1)
- Responsiveness (H2)
- Reliability (H3)
- Trust (H4)

Figure 4. Hierarchical structure of e-service quality performance model
## Findings

### Obtaining the Importance Levels of Criteria by AHP Method

Table 2: Decision matrix of AHP method

<table>
<thead>
<tr>
<th></th>
<th>IQ</th>
<th>SyQ</th>
<th>SQ</th>
</tr>
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<tr>
<td>IQ</td>
<td>1,00</td>
<td>1,28</td>
<td>0,91</td>
</tr>
<tr>
<td>SyQ</td>
<td>0,78</td>
<td>1,00</td>
<td>0,72</td>
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<tr>
<td>SQ</td>
<td>1,10</td>
<td>1,39</td>
<td>1,00</td>
</tr>
<tr>
<td>Total</td>
<td>2,88</td>
<td>3,67</td>
<td>2,63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>IQ</th>
<th>SyQ</th>
<th>SQ</th>
<th>Eigenvalues</th>
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</thead>
<tbody>
<tr>
<td>IQ</td>
<td>0,347</td>
<td>0,349</td>
<td>0,346</td>
<td>0,347</td>
</tr>
<tr>
<td>SyQ</td>
<td>0,271</td>
<td>0,273</td>
<td>0,274</td>
<td>0,273</td>
</tr>
<tr>
<td>SQ</td>
<td>0,382</td>
<td>0,379</td>
<td>0,380</td>
<td>0,380</td>
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</table>

$\lambda_{max} = 3,00001 \quad CR = 0,00002 < 0,10$
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Dimension weights</th>
<th>Sub-dimensions: Sub-Dim. Local weights</th>
<th>Final weights</th>
<th>Ranking</th>
</tr>
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<tr>
<td>Information Quality</td>
<td>0.347</td>
<td>Relevancy 0.232</td>
<td>0.0805</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understandability 0.352</td>
<td>0.1221</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Currency 0.286</td>
<td>0.0992</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Richness 0.129</td>
<td>0.0448</td>
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</tr>
<tr>
<td>System Quality</td>
<td>0.273</td>
<td>Security 0.437</td>
<td>0.1193</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Response Time 0.148</td>
<td>0.0404</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Personalization 0.070</td>
<td>0.0191</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Navigability 0.127</td>
<td>0.0347</td>
<td>10</td>
</tr>
<tr>
<td>Service Quality</td>
<td>0.380</td>
<td>Accessibility 0.218</td>
<td>0.0595</td>
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<tr>
<td></td>
<td></td>
<td>Empathy 0.155</td>
<td>0.0589</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>Responsiveness 0.169</td>
<td>0.0642</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Reliability 0.392</td>
<td>0.1490</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>Trust 0.284</td>
<td>0.1079</td>
<td>4</td>
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</tbody>
</table>

Table 3: Importance levels of sub-criteria
## Sorting of Airlines by Performance by ARAS Method

<table>
<thead>
<tr>
<th></th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>I4</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ao</td>
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<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X1</td>
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<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X2</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X3</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X4</td>
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<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X5</td>
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<td>Null</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>S4</th>
<th>S5</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ao</td>
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<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X1</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X2</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X3</td>
<td>Null</td>
<td>Null</td>
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<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X4</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>X5</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
</tr>
<tr>
<td>( S_i )</td>
<td>( K_i )</td>
<td>( \text{Sıralama} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>---</td>
<td>---</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>( A_0 )</td>
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<td></td>
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<tr>
<td>( X_1 )</td>
<td>Null</td>
<td>Null</td>
<td>2</td>
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<td>( X_2 )</td>
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<td>( X_3 )</td>
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<td></td>
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<td>( X_4 )</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>( X_5 )</td>
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<td>Null</td>
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<td></td>
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</tr>
</tbody>
</table>

\( X_2 > X_4 > X_3 > X_1 > X_5 \)
As a result of the analysis, it was determined that the most important criterion affecting the e-service quality is service quality (Ustasüleyman, 2013; Alptekin vd ., 2015; Kartal, 2016).

As a result of the same analysis, the system quality has been determined to be the least important criterion (Chou and Cheng, 2012). It can be assumed that the service quality and the information quality are related to Hofstede's concept of avoidance of uncertainty in the theory of cultural dimensions.

Delivery of the services without any problems,
The smooth implementation of interaction,
The quality of information about the service to be purchased…
Reliability (Lee ve Lin, 2005; Vatansever ve Akgül, 2014; Cebi, 2013)

Understandability (Chou ve Cheng, 2012)

Security (Yu, 2010; Hsu, Hung ve Tang, 2012; Kartal, 2016)

Trust (Nilashi vd., 2012; Ustasüleyman, 2013)

Currency (Lee ve Kozar, 2006)
Recommendations for Future Researches

• A hierarchical model of e-service quality can be developed.

• Fuzzy logic or gray system can be integrated into the methods used.

• Because the studies in the literature are carried out on a large scale web-based e-services, researches can be included on mobile applications which are used extensively today.
This research,

• It is one of the few studies in which the AHP and ARAS methods are used in an integrated way, regardless of the field of application. In terms of method, it is one of the limited studies about e-service quality.

• When the literature on air transport is taken into account, the methods used have been used for the first time in terms of e-service quality.
Thank you for your time...