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

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Introduction

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 …

- o It refers to the perspective of the consumers.
- o 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.
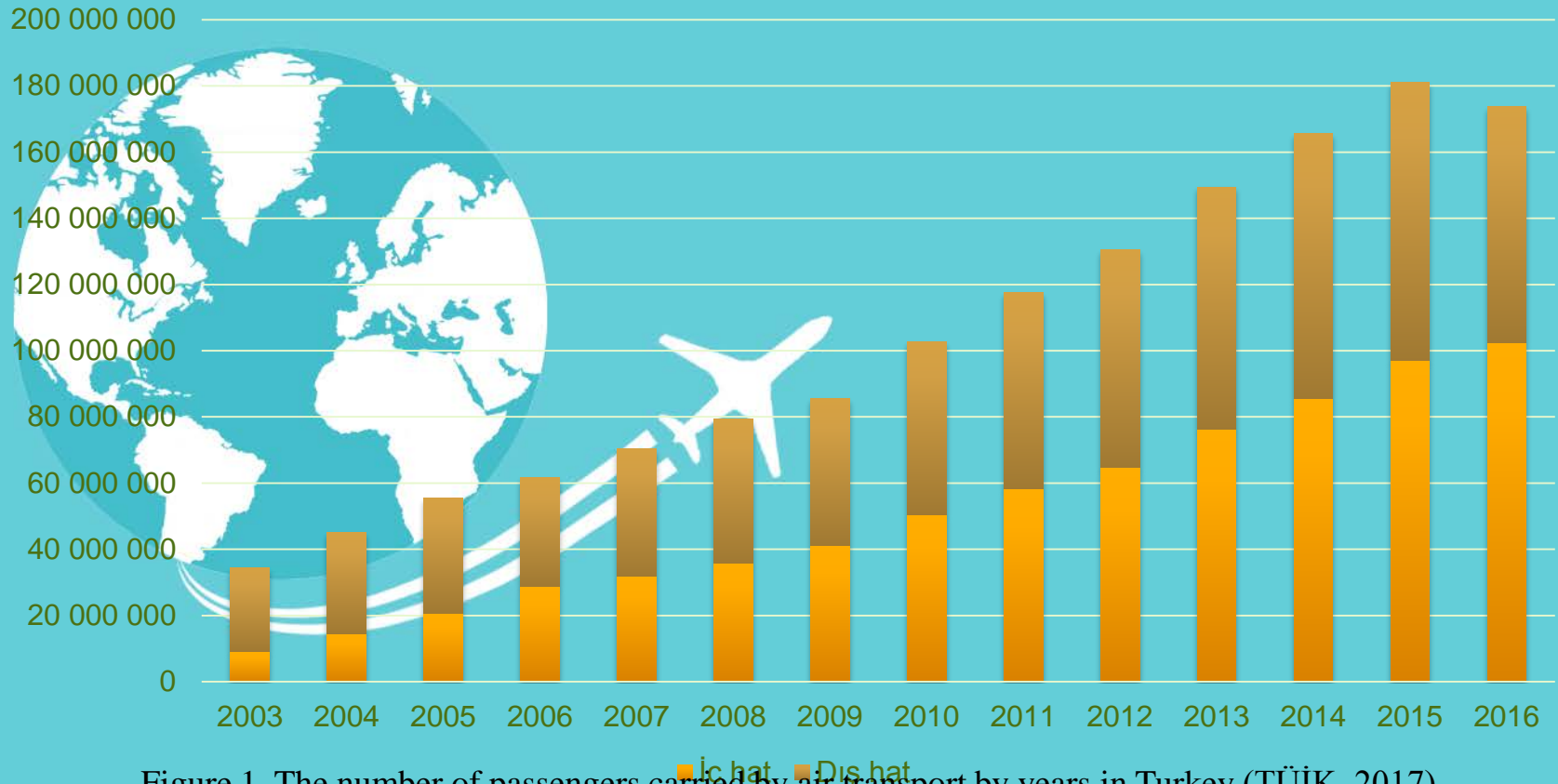- In 2003, Civil Aviation Liberation Movement started.

Figure 1. The number of passengers carried by air transport by years in Turkey (TÜİK, 2017)

Research Object

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.
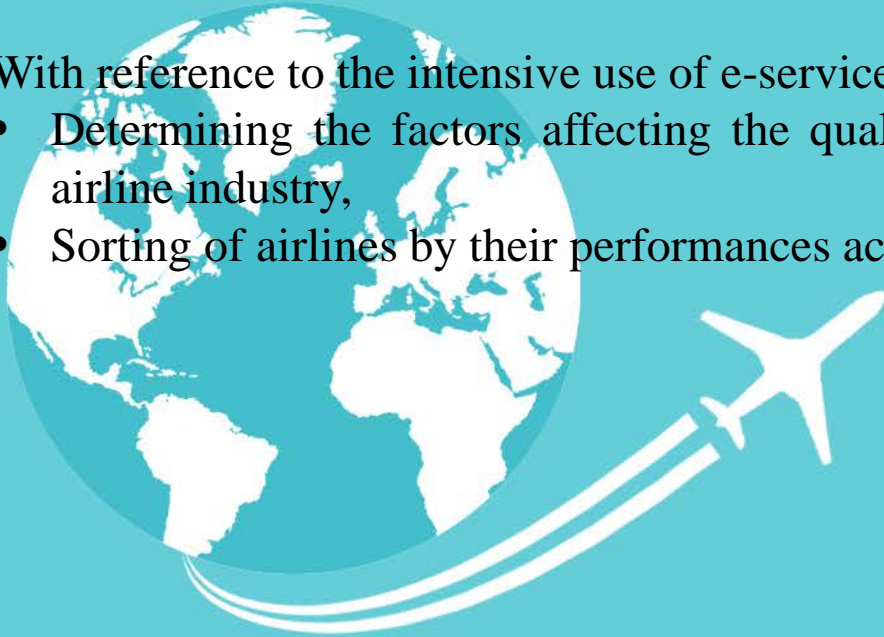
Literature Review

Table 1. Studies of e-service quality using MCDM (Multi-Criteria Decision Making) methods

Study	Field	Methods	Criteria	Findings
Lee ve Kozar (2006)	Online travel agencies and online retail businesses	AHP	4 main criteria + 14 sub-criteria + 4 alternatives	Response time, currency
Lin (2010)	Online education institutions	Fuzzy AHP	4 main criteria + 16 sub-criteria	Information quality
Tsai, Chou ve Lai (2010)	National park websites	Dematel + ANP + VIKOR	7 main criteria + 7 alternatives	Richness, navigability, attractiveness
Yu (2010)	Virtual book stores	AHP	3 main criteria + 9 sub-criteria	Website design; security
Hsu , Hung ve Tang (2012)	Online travel agencies	Fuzzy ANP	4 main criteria + 14 sub-criteria	Security
Nilashi ve diğerleri (2012)	Online shopping stores	Entropy + TOPSIS + Fuzzy TOPSIS	3 main criteria + 14 sub-criteria	Trust, response time, reliability
Chou ve Cheng (2012)	Accounting firms	Fuzzy ANP ve Fuzzy VIKOR	3 main criteria + 12 sub-criteria+ 4 alternatives	Information quality; relevancy, understandability, trust
Ustasüleyman (2013)	Online banking services	AHP	4 main criteria + 17 sub-criteria	Service quality; reliability, trust
Ecer (2014)	Online banking services	AHP ve G-COPRAS	3 main criteria + 10 sub-criteria	Information quality; relevancy, richness, understandability
Vatansever ve Akgül (2014)	Online shopping stores	Fuzzy AHP	4 main criteria + 22 sub-criteria + 4 alternatives	Vendor specific quality; price saving
Çelik (2015)	Online banking services	AHP	4 main criteria + 17 sub-criteria + 5 alternatives	Service quality; reliability, security
Özdağoğlu ve Güler (2016)	Online banking services	Fuzzy AHP + Fuzzy TOPSIS	5 main criteria + 19 sub-criteria + 7 alternatives	Privacy; customer authentication, security
Yaghoubi ve Rigi (2017)	E-government applications	Delphi Method + AHP	6 main criteria + 25 sub-criteria	Delivery
Pathania ve Rasool (2017)	E-retail businesses	AHP	3 main criteria + 3 alternatives	Ease of use

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 $n = \frac{Nt^2pq}{d^2(N-1)+t^2pq}$

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.
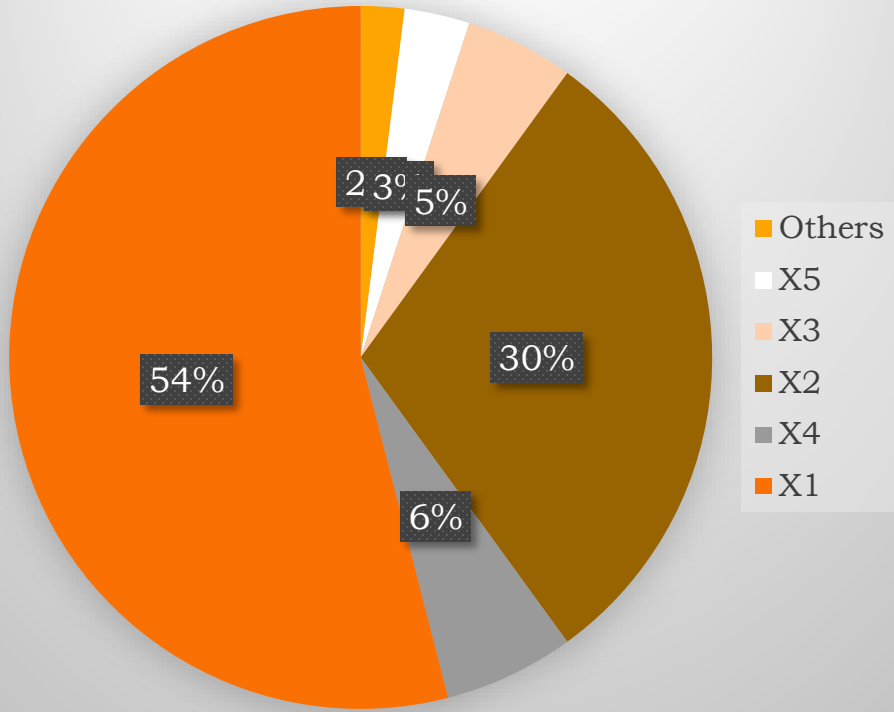
Figure 2. Domestic passenger traffic by airlines in 2016 in Turkey

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.

Methodology

Methods Used in Research

- <u>AHP (Analytical Hierarchy Process) Method (Saaty, 1980)</u>
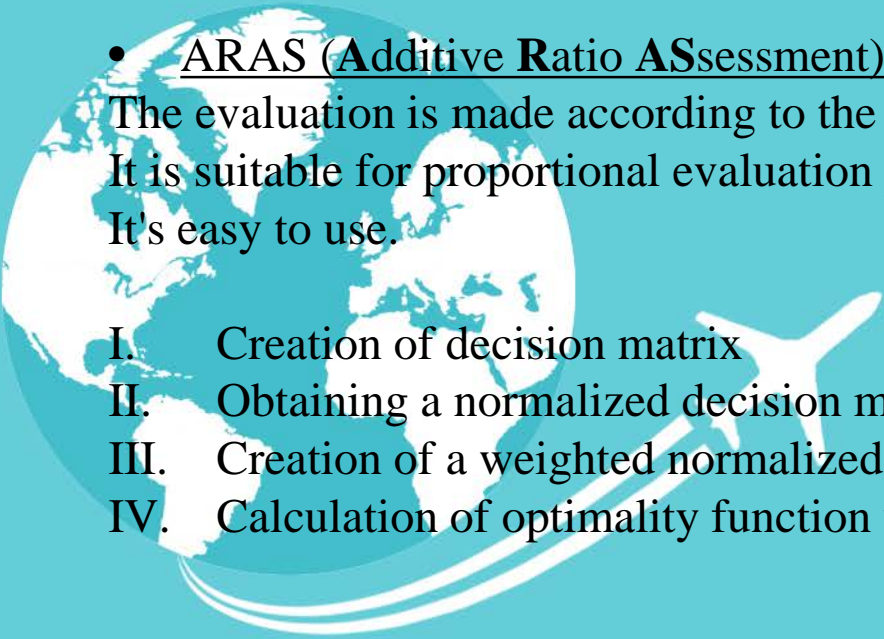
Quantitative and qualitative criteria are comparable
Suitable for both individual and group decisions
The problem can be explained in detail
Application and calculation is easy

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
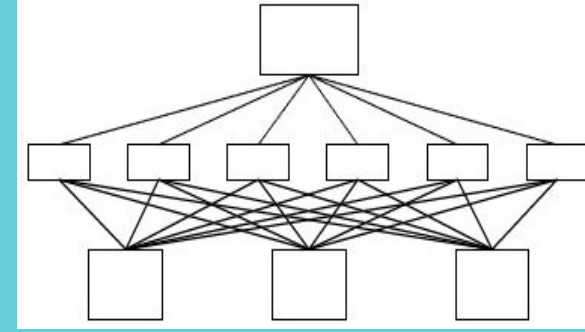
- ARAS (**A**dditive **R**atio **AS**sessment) Method (Zavadskas& Turskis, 2010)

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
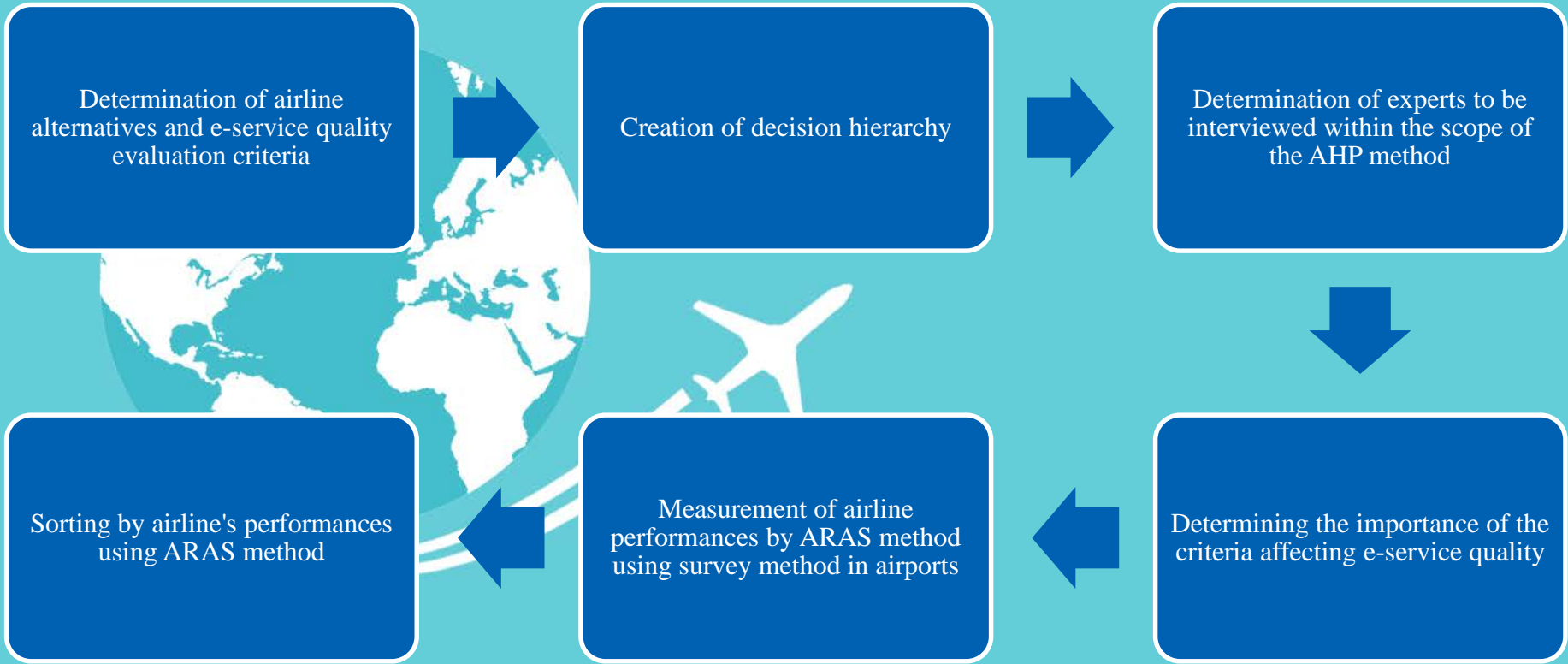
IV. Calculation of optimality function values

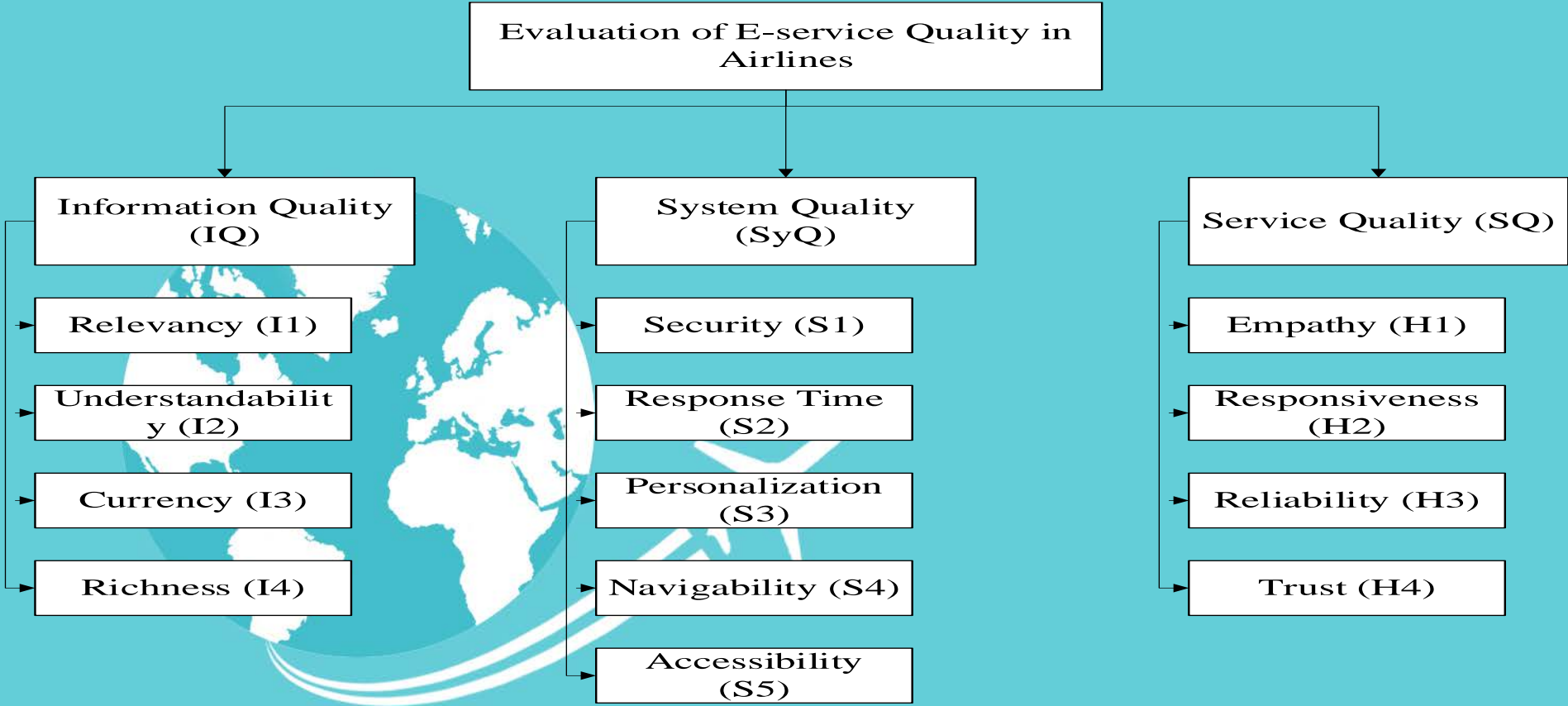Figure 3. Methodology adopted within the scope of the research

Figure 4. Hierarchical structure of e-service quality performance model
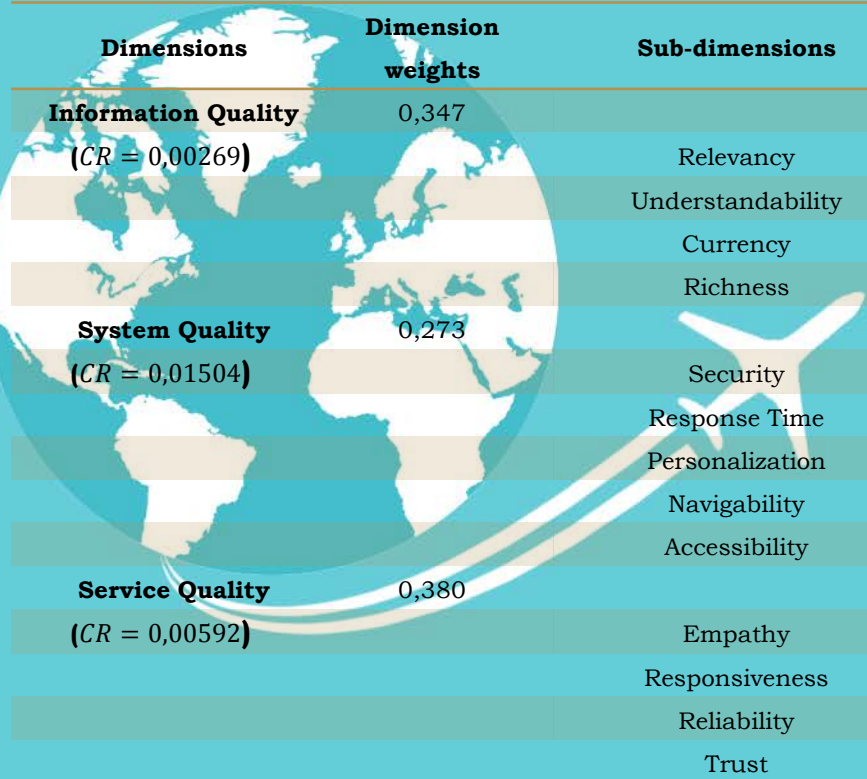
Obtaining the Importance Levels of Criteria by AHP Method

Table 2 : Decision matrix of AHP method
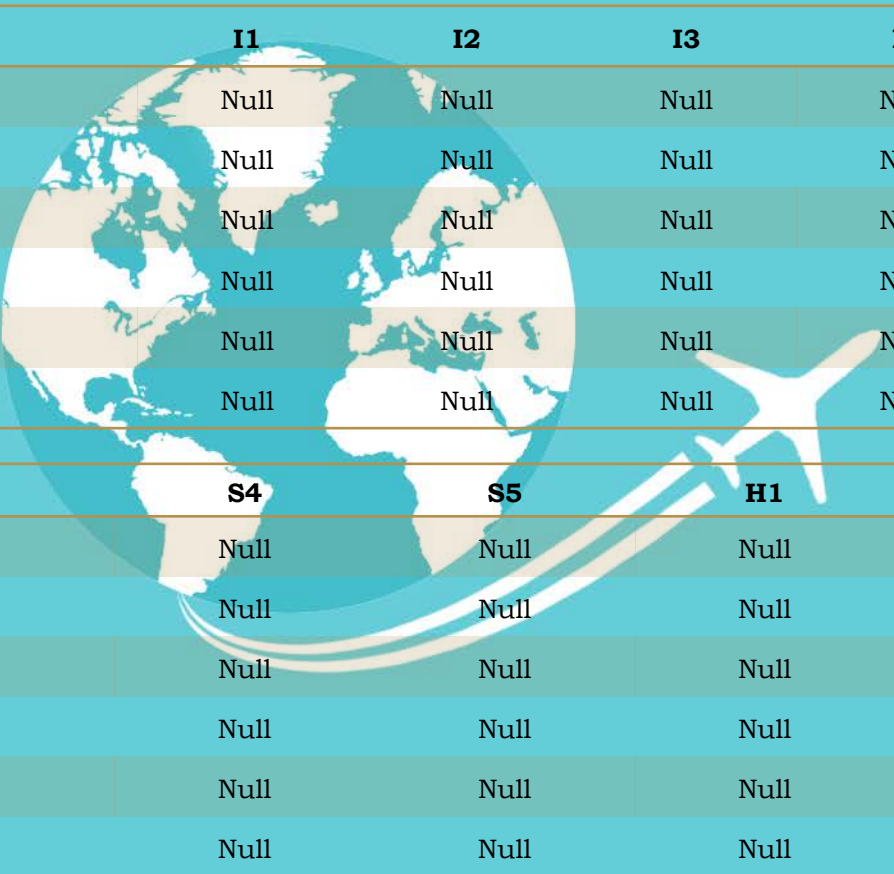
	IQ	SyQ	SQ
IQ	1,00	1,28	0,91
SyQ	0,78	1,00	0,72
SQ	1,10	1,39	1,00
Total	2,88	3,67	2,63

	IQ	SyQ	SQ	Eigenvalues
IQ	0,347	0,349	0,346	0,347
SyQ	0,271	0,273	0,274	0,273
SQ	0,382	0,379	0,380	0,380

$\lambda_{max} = 3,00001$ $CR = 0,00002 < 0,10$

Table 3: Importance levels of sub-criteria

Dimensions	Dimension weights	Sub-dimensions	Sub-Dim. Local weights	Final weights	Ranking
Information Quality	0,347				
$(CR = 0,00269)$		Relevancy	0,232	0,0805	9
		Understandability	0,352	0,1221	2
		Currency	0,286	0,0992	5
		Richness	0,129	0,0448	11
System Quality	0,273				
$(CR = 0,01504)$		Security	0,437	0,1193	3
		Response Time	0,148	0,0404	12
		Personalization	0,070	0,0191	13
		Navigability	0,127	0,0347	10
		Accessibility	0,218	0,0595	7
Service Quality	0,380				
$(CR = 0,00592)$		Empathy	0,155	0,0589	8
		Responsiveness	0,169	0,0642	6
		Reliability	0,392	0,1490	1
		Trust	0,284	0,1079	4

Sorting of Airlines by Performance by ARAS Method

	I1	I2	I3	I4	S1	S2	S3
A_0	Null	Null	Null	Null	Null	Null	Null
X1	Null	Null	Null	Null	Null	Null	Null
X2	Null	Null	Null	Null	Null	Null	Null
X3	Null	Null	Null	Null	Null	Null	Null
X4	Null	Null	Null	Null	Null	Null	Null
X5	Null	Null	Null	Null	Null	Null	Null

	S4	S5	H1	H2	H3	H4
A_0	Null	Null	Null	Null	Null	Null
X1	Null	Null	Null	Null	Null	Null
X2	Null	Null	Null	Null	Null	Null
X3	Null	Null	Null	Null	Null	Null
X4	Null	Null	Null	Null	Null	Null
X5	Null	Null	Null	Null	Null	Null

	S_i	K_i	**Sıralama**
A$_0$	Null	Null	optimal
X1	Null	Null	2
X2	Null	Null	4
X3	Null	Null	3
X4	Null	Null	5
X5	Null	Null	1

X2 > X4 >X3 > X1 > X5

Conclusion and Evaluation

- 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…

Criteria with the highest level of importance	
Reliability[*]	0,1490
Understandability[*]	0,1221
Security[*]	0,1193
Trust	0,1079
Currency	0,0992

- 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.

Genuine Value

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…