

Dual-Level Evaluation Framework for Airport User Satisfaction

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ABSTRACT

Passenger's satisfaction evaluation is very complicated for transport infrastructure services that accommodate high demand, mainly due to international passenger's quality attitudes, expectations, and experiences. This paper focuses on the development of the methodological framework to assessing level of service quality at airports, adopting two evaluation layers: the level of service (efficiency to manage traffic demand) and the level of expectation (performance to accommodate traveler's needs). The conceptual framework develops a holistic approach to evaluate overall level of service quality of an airport. A modeling framework then is developed to test the reliability of the level of quality and the consistency of airport level of service and level of passengers expectation. The methodology is applied in a small sized airport the Democritus Airport in Alexandroupolis, in Northern Greece. The analysis explores the passenger's satisfaction level for Greek regional airports and highlights the consistency of level of airport service and passenger's level of expectations.

KEYWORDS

Dual Evaluation Modeling, Facilities Management, Operational Research, Passenger Satisfaction Indexing, Quality of Services

INTRODUCTION

International tourism performs strongly worldwide fueled by a positive economy and increased air capacity. Growth in arrivals outpaces the global rate of economic growth. In 2019, Europe the world's largest tourism region, reported growth (+4%), led by destinations in Southern and Mediterranean Europe and Central and Eastern Europe (both +5%). Especially Southern and Mediterranean Europe have undergone enormous growth in the tourist demand during the last decade, which in turn has significantly increased the demand for air travel (UNWTO, 2019). Among the larger destinations, Italy, Greece, Portugal and Croatia saw robust performance. Demand for air transport is projected to grow from 44 trillion in 2015 to 122 trillion in 2050 according to latest International Transport Forum (ITF) projections (ITF, 2019). International aviation will increase by 5.0% by 2030 and will continue to grow through 2050 with compound annual growth rate of 3.8%. The spectacular growth in the international air transport market and the accompanying development of new markets has greatly

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contributed to improved global connectivity (Dimitriou et al., 2018). According to UNWTO, 2019 the consumer travel in order to change, to pursue a healthy life, raise awareness on sustainability.

Efficient air transport networks and airport infrastructures not only provide direct benefit for travellers, enhancing connectivity and competitiveness but significantly contributes to sustainable development. Airport enterprises contribution to social and economic socioeconomic development is defined as a multidimensional topic affecting many aspects of people's lives, directly, linked with the business inside and outside the airports. Evidence on this is that most international organizations, provide dedicated activities to promote the goals of human development and well-being towards sustainable business development. The development of airport infrastructure to meet future demand needs is on the top of the agenda for governments, and stakeholders to stimulate new income generation and business growth (Dimitriou and Sartzetaki, 2018). Consequently, there is a risk that a significant share of the predicted growth in transport demand will be left unaddressed if existing air transport infrastructure are not expanded and new infrastructures are not built to meet this demand (Dimitriou et al., 2017).

Based on these trends significant competition between air transport industry enterprises is growing. In order to face this challenge, corporate management focus on measures and targets to optimize customer service (Dimitriou, 2017). Especially, for transportation enterprises such airports, efficient management target in terms of pricing and optimum resources allocation is to define the equilibrium between offered service quality and cost (Dimitriou, 2018a).

All transport enterprises are looking for measures and targets that will enable them to better serve their customers, while at the same time reducing costs (Oum et al., 2003). The objective of the service quality analysis is the not only the determination of service quality that affects the airport's efficient management, but also the analysis of the correlation between different service quality dimensions as compared to overall passenger service satisfaction as stated by Widarsyah (2013). Brady et al., 2002 defined that 'Satisfaction is an overall effective response to a perceived discrepancy between a prior expectation and a perceived performance after consumption'.

Airport service quality analysis key objectives are to: (a) identify the needs of the users of an airport; (b) quantify their satisfactions from the facilities and promoted services at airports; and (c) highlight recommendation and actions to meet their needs and level of satisfaction. The conceptual framework based on review airport user satisfaction, develop a holistic approach to evaluate overall satisfaction, implement methodology by choosing the appropriate airport and calibration results. The evaluation framework proposed is a tool for managers, operators and stakeholders, in order to define the level of airport service and thus further improve the customer level of service and enhance airport enterprise performance management.

The paper is structured in the following manner: after this introduction, the background and key literature review is presented in next section, while following section provides the methodological approach. Then the numerical application is given, and the results are highlighted and discussed in following section. Some concluding remarks are presented in next section and the references are given.

BACKGROUND

Stakeholders, Airport managers, Airport Operators and Consultants indicate that the factors affecting satisfaction could identify, improve or maintain to the desired level the passengers (Dimitriou, 2018b). This approach was based on the stakeholders' perspective and not on the passengers. Such an assumption has been carried out by Rhoades et al. (2000), who studied the existing literature, in order to identify more specifically all the factors that affect the quality of airport's services.

The quality of airport's services depends on many different functions, according to Chen, Yeh & Kuo, 2002. Yeh & Kuo (2002), defined 'comfort', 'processing time', 'convenience', 'courtesy of personnel', 'information visibility' and 'security' as six (6) key essential airport customer services categories. Continuously, Chen (2002) determined the factors that constitute the overall airport quality

by using the quality-benchmarking development from the passengers' perspective. This survey was carried out by collecting individual data from specific operators and then used them on the Multi-Attribute Decision Making Analysis (MADMA) program, from which produced an efficient model customized on the airport's services (Bohenblit 2002).

Customer service at airports is a complex process, which is influenced by many parameters. In literature, three different methods of service quality analysis are analyzed extensively. One of the most frequently applied method for service quality analysis is the 'SERVQUAL' method.

The 'SERVQUAL' method introduced by Zeithaml et al., (1985) used to identify both possible and impossible factors affecting the airport's services. The 'SERVQUAL' method based on a multi scale evaluation, by means of which it is possible to measure the service quality from the point of view of passenger, to get valuable feedback points associated with the directions of the quality improvement. It is based on the concept of quality as the difference between passengers' expectations and actual perceptions of the service (Garcia et al., 2010).

This method has been used by many researchers to identify passengers' satisfaction. Han et al., 2012 defined the five dimensions of service quality that mainly affect the level of satisfaction. These five dimensions of service quality are defined as 'Tangibles', 'Reliability', 'Responsiveness', 'Assurance' and 'Empathy'. Based on these five dimensions, many researches developed further criteria in order to evaluate passenger satisfaction. In 2011, Erdil et al., evaluated airport's service quality based on twenty-two (22) criteria, while, Chou et al., 2011 developed a methodology framework depended on 28 criteria. Finally, Liou et al., 2011, developed a 'dominance-based rough set approach' (DSRA), expanding the classical theory, introducing quality criteria that are not ranked by priority. Tseng et al., 2008, Perelman et al., 2010 and Zhang et al., 2012 developed various methodology frameworks to evaluate the service quality based on airport operational efficiency different parameters such as the number of runways, platforms, airport size, number of employees, flight & passengers, cargo volume, etc.). Finally, the factors of human capital, efficient management and corporate planning are also assumed to affect the overall performance of an airport enterprise in many researches (Sutia et al., 2013).

The initial conceptual model of airport service quality, named 'SERVQUAL', consisted of three (3) categories, 'Servicescape', 'Service Personnel' and 'Services' (Brady et al., 2002). Bitner (2004), focused on the 'Servicescape' category as a significant influence on the overall passenger satisfaction and defined the subcategories as 'Spatial Layout', 'Ambient Conditions' and 'Signs & Symbols'. The second dimension, 'Service Personnel' defines the interaction of service providers with airport quality expectations. Bitner, 2004 defined the three (3) sub-categories of the category 'Service Personnel', which are 'Attributes', 'Behavior' and 'Expertise of the staff'. Finally, as regards the dimension 'Services', Csikszentmihalyi & Graef, 1980; defined the main activities, on which passengers prefer to spend their free time. Therefore, the sub-categories from the 'Services' were transformed to 'Productivity', 'Maintenance' and 'Leisure'.

The original 'SERVQUAL' model has been used widely in evaluating overall airport enterprise service quality. The original modeling framework, based on surveys conducted by Fodness et al., 2007, oriented to passengers' expectations about the multidimensional airport services. Therefore, the sub-dimensions from the initial model were modified to 'Interaction', 'Function' and 'Diversion'.

The 'SERVPERF' (Service Performance) method developed to evaluate the overall service quality performance, satisfaction and purchase intention (Widarsyah R., 2013). The effectiveness of customer satisfaction measures has been also modified to 'performance only', 'performance weighted by importance', 'importance minus performance', 'direct confirmation-disconfirmation', 'confirmation disconfirmation weighted by importance' 'performance minus predictive expectation' factors. (Widarsyah R., 2013).

The third model, Importance-Performance Analysis (IPA) was first proposed and introduced by Marilla and James (1977) (Abalo et al., 2007), as a means by which to measure client satisfaction with a product or service. The IPA methodology based on the concept of satisfaction as the function

of two components: the importance of a service to a client and the performance of a business in providing that service or product.

In this way, IPA examines not only the performance of a subject, but as well as, the importance of that subject, as a determining factor in satisfaction to the respondent (Silva & Fernandes, 2010). The combined client ratings for those two components then provide an overall view of satisfaction with clear directives for management and where to focus agency resources. This method has proven to be a generally applicable tool which is relatively easy to administer and interpret resulting in extensive use among researchers and managers in various fields and is a way to promote the development of effective marketing programs, promoting strategic decisions (Redman et al., 2013; Henser et al., 2010).

Many researches have investigated the differences in management implications and the validity of the three different models. Brady et al. 2002 have reexamined the model and added elements to produce a more efficient framework analysis. Carrillat, et al., 2007, Hudson et al., 2004 analyzed the differences between 'SERVQUAL', 'SERVPERF' and 'Importance-Performance Analysis (IPA)' and considered the 'SERVQUAL' model as the most appropriate tool for measuring passenger satisfaction. Widarsyah, 2013 indicated that there were no statistically significant differences between the three models for measuring passenger satisfaction.

Differences between service quality models are influenced by factors that affect customer satisfaction (Chu et al., 2011). 'Perceived Quality', 'Perceived Value' and finally 'Customer Expectations' are determined as the main factors that affect the applicability and validity of each model. The factor "Perceived Quality" refers to the level of quality that the customer receives from the airport services, and answers if customer's expectations of quality are met. "Perceived Value" refers to the value for money services, therefore the perceived quality of the services offered to passengers in relation to monetary value. Finally, the factor 'Customer expectations', refers to the overall level of customer expectations for the services they will receive (Angelova et al., 2011).

For the purpose of this paper in order to develop a conceptual framework based on a holistic approach to evaluate overall level of service quality of an airport, the modeling framework developed combined the three different factors 'Perceived Quality', 'Perceived Value' and finally 'Customer Expectations' to assessing Level of Service Quality at airports, adopting two evaluation layers: the level of service (efficiency to manage traffic demand); and the level of expectation (performance to accommodate traveler's needs), testing the reliability of the Level of Quality and the consistency of airport level of service and level of passengers expectation.

METHODOLOGY FRAMEWORK

Level of Service (LoS) and Level of Quality (LoQ) Conceptual Analysis

Service quality assessment is a complex functional analysis, and there is complex to determine which criteria should be employed to evaluate and measure service quality. The methodology adopted for assessing the service quality of airport enterprises services is based on the Level of Service (LoS) and Level of Expectation (LoE) dimensions. This methodology based on assessing airport service qualitative and quantitative factors from passengers' perspective.

The overall Level of Quality (LoQ) considered to be influenced both by the airport Level of Service (LoS) and the passengers Level of Expectation (LoE). The LoQ based on quantitative and qualitative variables, and they are differentiated based on their score. Weighted scored methodology for service management is of greater importance and efficiency as claimed by Andreatta et al., 2007.

More analytically, LoQ parameters are rated into two different kind of ratings, the Level of Service (LoS) and the Level of Expectations (LoE). In LoS rating a representative sample of airport quantitative data such as waiting time and space available are included, while in LoE all the qualitative passenger's 'expectations.

Table 1. LoS quantitative criteria of assessment of airport service quality

	Category	Measure	Specifications	
LS1	Waiting time	Min.	Public Departure Hall	-
LS2	Waiting time	Min.	Bag Drop Desk	(queue width 1.4 - 1.6m)
LS3	Waiting time	Min.	Check-in Desk	(queue width: 1.4 - 1.6m)
LS4	Waiting time	Min.	Security Control	(queue width: 1.2m)
LS5	Space available	sqm/pax	Self-service kiosk	-
LS6	Space available	sqm/pax	Bag Drop Desk	(queue width 1.4 - 1.6m)
LS7	Space available	sqm/pax	Check-in Desk	(queue width: 1.4 - 1.6m)
LS8	Space available	sqm/pax	Security Control	(queue width: 1.2m)

Assessment Criteria Determination

Assessing the quality of specific services involves the development of the criteria reflect the peculiarities of the services for LoS and LoE dimension. After a comprehensive analysis on factors affect airport efficiency and performance the assessment criteria are selected, to determine the correspondence between the airport level of service quality dimension and the passenger's level of expectations quality dimension. The selected criteria have been grouped in the two dimensions.

The quantitative aspect, is based on factors that allow airports' performance evaluation and benchmarking, based on variables such as walking distance and number of passengers per square meter. in three distinguished areas:

1. Public departure hall
2. Check in area
3. Bag drop area
4. Security control area

The Quantitive variables (LS1 to LS8) selected for modelling framework application as analytically depicted in Table 1 divided in two categories: the space variables measured in sqm/pax and the maximum waiting time variables measured in time (minutes).

The qualitative aspect based on passengers' perceptions and subjective variables such as quality of passenger orientation, airport staff helpfulness and comfort of airport facilities. LoE qualititave variables refer to the process of assessing quality services related to the hidden expectations that passengers have. Passengers' hidden expectations are defined based on targeted surveys in the form of questionnaires. The variables introduced for LoE factor evaluation divided in variables in the check in area and variables in the boarding area and security and are analytically depicted in Table 2.

This analysis has resulted in development of a system of criteria for assessment of the service quality of an airport enterprise according to the two LoS and LoE dimensions. The LoS dimension is described by eight criteria and the LoE dimension is reflected by 16 criteria.

Assessment Rating and Survey Key Features

There are two kind of surveys according to the type of information: the 'Qualitative Satisfaction Survey' and the 'Quantitative Satisfaction Survey'. In qualitative research, the key objective is to determine the views and opinions of airport users against the airport service quality, while quantitative research based on information and statistical data. For the qualititave variables estimation structured questionnaire conducted with the close-ended questions to passengers. The qualitative variables rated

Table 2. LoE qualitative criteria of assessment of airport service quality

Boarding area and security	LB1	Staff Helpfulness	Check in area	LC1	Cleanness
	LB2	Security check facility		LC2	Toilet
	LB3	Cleanness		LC3	Internet & wi-fi
	LB4	Toilets		LC4	Waiting area comfortness
	LB5	Waiting area comfortness		LC5	Helpfulness of airport staff
	LB6	Flight information display		LC6	Food & beverage
	LB7	Wi-Fi & Internet		LC7	Ancillary facilities
	LB8	Food and beverage/Duty free		LC8	Ticketing

in the scale A - F. For example, the LoS = A indicates the optimal response to the desired quality levels, while LoS = F is defined as 'Unqualified' (Andreatta et al., 2007). The scale is based on a 5-point Likert scale A=5 (excellent), B=4 (good), C=3 (average), D=2 (below average), E=1 (poor).

In the context of this paper, for the questionnaire development, the sampling method 1: 5 (sampling theory 1: 5) is applied, thus a passenger is asked to answer the structured interview questionnaire, then four passengers are not asked. The process is repeated in this way until the required number of questionnaires is completed. This method makes it possible to obtain more objective responses. For example, if a family travels by air, and all of its members were successively involved in the survey, they might have been affected by each other.

Hair et al., 2009 suggested that the sample size for performing factor analysis should be greater than 100 observations and at least five times greater than the number of variables analyzed.

In order to determine the appropriate sample size to enhance results validity, the sample size determination theory, based on choosing the number of observations or replicates to include in a statistical sample is applied, according to following assumptions:

- Population is defined as the passengers arriving and departing from the Airport. The sample size of the population calculated according to equation 1.
- The margin of error, as a percentage that highlights how much you the survey results reflect the views of the overall population is defined as 5%.
- The sampling confidence level, as a percentage that reveals how confident is the passengers' sample is defined as 90%.

$$Sample\ Size = (Z - score)^2 * \frac{StdDev * (1 - StdDev)}{(margin\ of\ error)_2} \quad (1)$$

Evaluation Modeling

The dual- level evaluation framework based on investigating the overall airport enterprise service quality both affected by LoS and LoE criteria evaluation. The LoQ factor defined as:

$$LoQ = \frac{LoS + LoE}{2} \quad (2)$$

LoQ factor based on the above equation and the score is determined from the range of values where '1 < x ≤ 5' is the worst case, where 'x = 5' target to be the best result. Therefore, the targeted

best score for an efficient service management should be as close as possible to '5', with '5' to be the best scenario.

In order to evaluate the internal consistency of LoS and LoE and add validity and accuracy to the interpretation of the LoQ factor the Cronbach's Alpha is adopted.

Cronbach's Alpha provides a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and therefore is interrelated with the items within the test. If the items in a test are correlated to each other, the value of alpha is increased (Cho, 2016).

Alpha, therefore, does not simply measure the unidimensionality of a set of items, but can be used to confirm whether a sample of items is actually unidimensional (Wieland et al., 2017).

The Cronbach's Alpha is applied in this paper in order to validate the internal reliability of LoS variables and LoE variables both in expectation variables and quantitative variables of LoQ. A reliability Alpha coefficient of 0.70 or higher is considered acceptable. The formula for LoQ Cronbach's alpha is modified as:

$$LoQa = \frac{N \times \overline{CV}}{\overline{V} + (N - 1) \overline{CV}} \quad (3)$$

where:

N = the number of variables of the sample

\overline{CV} = average covariance between Los and LoE variables

\overline{V} = average variance.

The Variance (V) and Covariance (CV) of the LoS and LoE values are calculated as;

$$V = \sum_{I=1}^N (\mu)^2 \quad (4)$$

$$\mu = x_i - \bar{x} \quad (5)$$

$$COV = \sqrt{\frac{1}{N-1} \sum_{I=1}^N (x_i - \bar{x})^2 + \frac{1}{N-1} \sum_{I=1}^N (z_i - \bar{z})^2} \quad (6)$$

where:

$x_i = x_i$ the observed LoS values

$z_i = z_i$ the observed LoE Values

\bar{x} = the mean value of the LoS values observations

\bar{z} = the mean value of the LoE values observations

Figure 1. Case study airport location (Google maps)



N = the number of LoS and LoE values in the sample

NUMERICAL APPLICATION

Case Study Key Features

Catchment Area and Airport Traffic Features

Mediterranean region is one of the most attractive tourism destinations in world, accounting for approximately more than a third of ITA (ACI, 2017). For decades, the Mediterranean destinations have provided, along with other attractions, the traditional sun, sand and sea product, essentially for the North European markets. The northern part of Mediterranean tourism market is much more mature, although, recently a widespread development in the south part is occurred (Dimitriou et., 2018). Greece located in Southern and Southeast Europe, at the crossroads of Europe, Asia, and Africa. Thrace region is split among Bulgaria, Greece and Turkey as depicted in Figure 1.

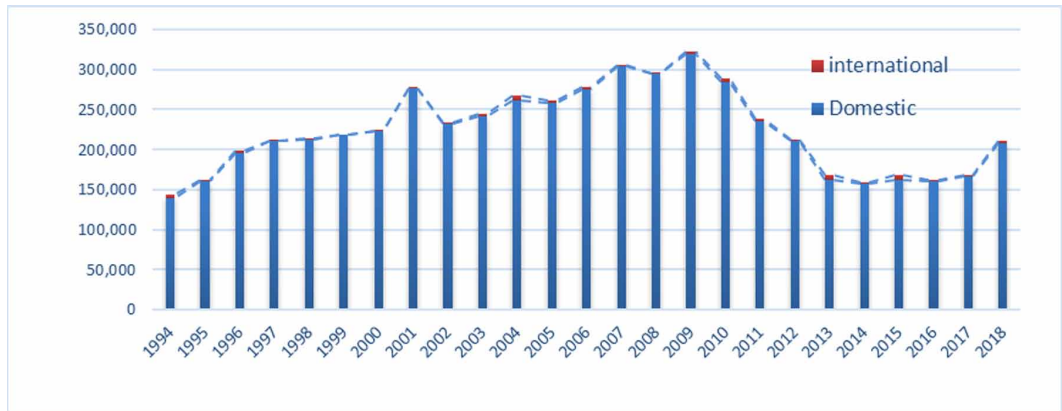
The numerical application addressed a small-sized Greek airport in North Greece. The airport of Alexandroupolis “Democritus” is the main airport of the Thrace region located in North-Eastern Greece, in the Prefecture of Evros in Alexandroupolis. The airport terminal building covers a surface of more than 8.500m². Passenger traffic in 2018 amounted to 208,056 domestic passengers and 2,327 international passengers. Figure 2 analytically depicts the traffic trends since 1994.

Passengers Sampling and Data Collection

Qualitative data were collected through questionnaires. The questionnaire was divided into two parts; the first one addressed the demographic characteristics of the sample and the second one level of service of each variable of the proposed conceptual model in the check in and boarding area.

The rating of the questions of the second part of the questionnaire selected according to the linguistic terms used by Yeh and Kuo (2002): very poor, poor, fair, good and very good. These terms responded to rates 1, 2, 3, 4 and 5 respectively. In addition to these terms, if passengers have not used or have not noticed the response “did not notice/use” was also added. Passengers were asked during peak and non-peak periods of the day in order to increase the representativeness of the sample.

Figure 2. Traffic in terms of pax for the case study airport (1994-2018) (HCAA, 2019)



Based on sample size determination theory, the chosen number of observations to include in the statistical sample applied, according following assumptions:

- The Number of passengers arriving and departing from the Airport (latest data, 2018)
- A margin of error equal with 5%.
- A sampling confidence level 90%

based on equation (1), is calculated as 250 surveys.

As regards key highlights of the sample characteristics, the profile of the sample respondents highlighted that most of the respondents were male (52.7%) and 40% had an undergraduate degree or higher. Regarding trip purpose, 48.7% of the respondents are on leisure trip and 19% on business trip. Most respondents use air travel once per month (18.9%) while 10.8% travel more than 5 times a year and 10.8% 2 to 4 times per month. Regarding whether passengers have visited Alexandroupolis Airport before, 80.4% had visited the airport before, while 19.6% didn't. Except than the questions addressed to each of the 24 criteria for the evaluation, four questions for the overall cleanness of the airport, the planning and design, the overall helpfulness of the staff and the first impression were addressed to the sample.

EVALUATION RESULTS

Based on the survey results, the LoE variables in the check area rating based on overall customer satisfaction, using the 5-point Likert scale are analytically depicted in Table 3. The higher score responds to ancillary facilities and then to helpfulness of airport staff. The worst scores for the check in area respond to cleanness and ticketing.

For the boarding area the highest scores respond to food and beverage, staff helpfulness and then security check facilities, while the lowest to cleanness and waiting area comfortless as analytically given in Table 4. The results indicate that the LoE variables in check in area have higher scores than those in boarding area. The average LoE variables rating in check in area is 4.16 while in boarding is 3.81.

The LoS variables rating based using the 5-point Likert scale quantitative specification based on actual data and measurement on site is analytically depicted in Table 6. The variables waiting time in public departure hall (LS1) shows the highest score, while the variables waiting time in bag drop desk (LS2), available space in self-service desk (LS5), in bag drop desk (LS6), check in desk (LS7),

Table 3. LoE variables in check in area rating results

	LC1	LC2	LC3	LC4	LC5	LC6	LC7	LC8
A (5)	145	125	135	135	170	175	185	110
B (4)	200	260	228	220	224	200	225	235
C (3)	45	21	33	36	30	45	60	40
D (2)	8	4	10	12	0	0	0	13
E (1)	2	1	0	0	0	0	0	1
WA	4.0	4.11	4.06	4.03	4.24	4.2	4.7	3.99

Table 4. LoE variables in boarding area rating results

	LB1	LB2	LB3	LB4	LB5	LB6	LB7	LB8
A (5)	160	150	40	120	100	125	110	205
B (4)	204	220	64	232	128	156	192	120
C (3)	45	30	135	30	114	75	60	87
D (2)	4	8	60	16	18	22	20	0
E (1)	0	1	1	0	1	0	0	0
WA	4.13	4.09	3.0	3.98	3.61	3.78	3.82	4.12

security control (LS8) respond to a score equal with 4. The lowest scores for LS3 and LS4 are equal with 3, a moderate performance. The average score for the LoS variables is 3.87.

For the quantitative criteria assessment, the LoS criteria values in terms of space and waiting time based on standard recommendations by IATA, for the purpose of this research placed in the Likert scale and as rated as analytically depicted in Table 5.

Applying equation (1) the LoQ factor value is calculated as 3.84. In order to add validity and accuracy to the interpretation of variables and the LoQ factor the Cronbach's Alpha according to equation 5 is applied. The Cronbach's Alpha compares the internal reliability of LoS variables and LoE variables both in expectation variables and quantitative variables of LoQ analysis. A reliability coefficient of .70 or higher is considered acceptable. The analytical results for Cronbach's alpha are depicted in Table 6.

According to Table 6 analytically results, Cronbach's Alpha calculated 0.89. thus, the consistency of the LoE and LoS variables is above the suggested threshold of 0.70. The results show high internal consistency between LoS and LoE.

The results of this empirical finding highlight for management that service offered by airport in terms of minimum waiting time as well as available space both in check in and boarding area highly affect the level of passenger's expectations.

As service quality satisfaction occurs when passengers' expectations are met or exceeded, enhancing passengers' expectations on airport service quantitative planning and operational efficiency criteria such as minimum waiting time and maximum available space may increase the level of passengers perceived service quality.

Therefore, airport management should offer services and try to enhance and reach optimum operational efficiency and performance levels. This strategy should enable management to improve airport benchmarking and competitiveness from the other airports in terms of service quality. Airlines should also seek to develop.

Table 5. LoS variables values specification and results

		Space values (sqm/pax)				Maximum waiting time (minutes)			
		LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8
A	5	>2.3	>1.8	>1.8	>1.2	< 1	< 2	< 5	< 3
B	4	2.2-2.3	1.6-1.8	1.6-1.8	1.15-1.2	1-2	2-3	5 - 10	3-5
C	3	10 - 15	1.4-1.6	1.4-1.6	1.10-1.15	2-3	3-5	10 - 15	5-7
D	2	15 - 20	1.3-1.4	1.3-1.4	1.0-1.10	3-5	5-7	15 - 20	7-10
E	1	<2.0	<1.3	<1.3	<1.0	>5	>7	>20	>10
		5	4	3	3	4	4	4	4

Table 6. LoQ Cronbach alpha results

	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	\bar{V} =27.72
μ (LoE)	0.165	0.2	-0.37	0.105	0.025	0.09	0.36	0.155	
	LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8	
μ (LoS)	1.1	0.1	-0.9	-0.9	0.1	0.1	0.1	0.1	
	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	LB1, LC1 mean	\overline{CV} =0.45
μ^2 (LoE)	0.03145	0.0401	0.4178	0.01165	0.09985	0.0522	0.3232	0.0242	
	LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8	
μ^2 (LoE)	1.21	0.01	0.81	0.81	0.01	0.01	0.01	0.01	
							LoQ Cronbach alpha		0.89

CONCLUSION

The purpose of the paper was to evaluate airport enterprise service quality based on airport Level of Service (LoS) and passengers' Level of Expectations (LoE), with 24 core criteria used to find out about the Overall Airport Level of Quality (LoQ). The numerical application was carried out using a qualitative method of collecting primary data, out of 250 questionnaires of departing passengers in a small size airport in North Greece.

The empirical findings from passenger's perspective variables highlighted that LoE in check in area demonstrates a higher score than on boarding area, with the higher score responds to ancillary facilities and then to helpfulness of airport staff, and the worst scores for the check in area to cleanness and ticketing. For the boarding area the highest scores respond to food and beverage, staff helpfulness and then security check facilities, while the lowest to cleanness and waiting area comfortless. For the LoS, the waiting time in public departure hall shows the highest score, while the variables waiting

time in bag drop desk, available space in self-service desk, in bag drop desk, check in desk, security control respond to a good score. Testing the consistency of LoQ factor, in order to add validity and accuracy to the interpretation of variables the LoQ Cronbach's Alpha coefficient of is very high equal with 0.89, highlighting the consistency of LoS and LoE.

The modeling framework is a tool for airport managers and stakeholders to measure overall airport service quality. Therefore, airport enterprise management can use the results in relevant case studies in business and strategic development, enhancing efficient performance management. This will support them to better allocate resources to provide better service to their passengers and improve affect overall service passenger satisfaction.

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