Proceedings of the International Conference on Industrial Engineering and Operations Management
Bandung, Indonesia, March 6-8, 2018

Analysis of Key Factors for Airport Service Quality: A Case Study of Three Regional Airports in Thailand

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Abstract

Airports open their doors to visitors and investors from around the world, crucially boosting the economy, trade, investment, and tourism of countries throughout the world. This paper aimed to categorize service quality factors used in the service evaluation of three regional airports in Thailand were used on case study. The factors of airport service quality were accumulated through literature review survey of service satisfaction from 300 passengers. Exploratory Factor Analysis (EFA) was then deployed and in a used to analyze the data from the survey to categorize into sub-factors. Analytic Hierarchy Process (AHP) was also used to evaluate the weight factors via pairwise comparison. Findings of this research provide the key factors of service quality for aviation authorities and airport administrators to raise service level in their respective airports.

Keywords: Airport Service Quality, Service Evaluation, AHP, Airport, EFA

1. Introduction

By 2035, it is expected that number of aviation passengers will reach 7.2 billion globally (The International Air Transport Association, 2016). With rising demand from passengers, the market competition will continue to be highly aggressive in the aviation industry. Not only airlines but also airports have to strive to be more competitive in term of service quality to survive in the market. To deliver superior service quality in accordance with customer expectations, understanding about the service is the key to success and survival (Gilbert and Wong, 2003). It is generally believed that higher service quality can contribute to the higher overall customer satisfaction and provide a long-term competitive advantage (Chen, 2008). Thus, airports must be able to meet the passenger demand for air transport.

In Thailand, between 2015 and 2016, the tourism industry contributed to the growth in the passenger traffic. According to the Airports of Thailand (AOT), AOT-managed airports handled over 121.7 million passengers in 2016, increasing from 109.8 million in 2015. There were 790,194 aircraft movements (takeoffs and landings) in 2016 versus 727,750 movements in 2015.

The objective of this study is to categorize service quality factors for the evaluation of airport service quality of the three selected airports operated under AOT in different regions of Thailand namely Chiang Mai (CNX), Don Mueang (DMK), and Phuket (HKT). Service quality factors will be accumulated from literature review and used in the satisfaction survey of 300 passengers at these airports in terms of service quality. The Exploratory Factor Analysis (EFA), which is a statistical method widely used for group categorization, will be employed to analyze the data from the survey to categorize the factors into sub-factors. In addition, the Analytic Hierarchy Process (AHP) will be used to evaluate the weight factors via pairwise comparison.

2. Literature review

2.1. Airport Service Quality

Following the globalization trend in modern economies, air transports are experiencing an ever-increasing level of demand, which is expected to grow in double digits in the next 20 years and the main flow is expected to move toward Asia-Pacific region (Pin et al., 2013). Sopadand and Suwanwong (2016) discussed the competition between airports is an issue that has been discussed recently. With the number of airlines' aircraft increasing and the aviation transport market opening, the airports start to pay attention on their performances. The list of airports has been ranked by Skytrax, ICAO, or IATA in every year, to show the competitive position of each airport worldwide by category with awards given to best airports in terms of region and size of airport. There are several factors used to evaluate the airport service quality, which are several indicators used to evaluate the airport performance, airport service quality is one of them to passenger satfication. Considering the rapidly changing nature of the airport industry, airports should place a strong emphasis on improving the service quality, or in other words the perceived level of service delivered to their passengers (Pantouvakis and Renzi, 2016).

In today's airports, awareness raising service quality has become an important corporate strategy to improve competitive advantage (Lin and Hong, 2006). Airport service quality can have an indirect impact on tourism business and related business activities, because travelers are more likely to use an airport again if they remain satisfied service with its service quality and they are more likely to recommend the airport to other potential travelers (Park and Jung, 2011). Also found that ignoring the expectations of passengers in the measurement of service quality can result in misguided attempts by the airport management to improve and develop services in ways that are not important to passengers (Eboli and Mazzulla, 2009). As the perceived level of quality is an antecedent of customer satisfaction, hence the measuring of airport service quality may guide the organization's effort to specific needs of customer (Cronin et al., 2000; Falk et al., 2010; Alan et al., 2012). Lin et al., (2009) discussed service quality improvement strategies can be effective if based on an appropriate identification and selection of quality attributes to be improved, which there evaluating service quality in the airport services has become an important issue for airport management. Hence, airport performance measures for service quality focus on passenger perception of airport service quality.

In this regard, airport service quality literature has attempted to importance airport service quality in the aviation industry has been intensely competitive and there are the swelling number and growing diversity of passengers that lead to the increase of competitiveness among airlines and airports. Therefore, the airlines and related companies re focusing on providing satisfied and excellent services to customers in order to enhance effective services among intensely competitive situation in international level.

2.2. Exploratory Factor Analysis (EFA)

A review of the airport service quality factors was collected and defined via s cumulative frequency from literature review shows that the tool most researchers used the is EFA statistical technique to categorize the factors. Bezerra and Gomes, (2015) and Pakdil and aydin, (2007) used EFA to extract service quality factors from the factors of typical attributes within the airport industry. The idea of EFA instrument is to analyze several variables or reduce several variables from the variables that are highly correlated and combine into one.

2.3. Analytic Hierarchy Process (AHP)

In general, the airport industry has been progressively motivated in evaluating service quality, and adopting a different approach regarding airport service quality. Decision process of evaluating airport service quality is one in which multiple requirements with uncertain conditions should be taken into consideration simultaneously.

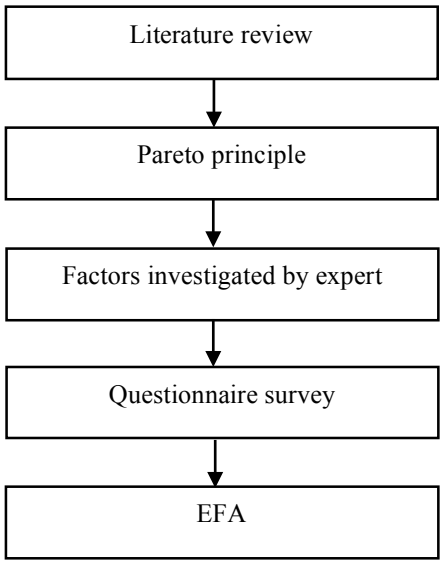
The Multi-Criteria Decision Making (MCDM) was employed to assess service quality the attitude of a customer towards a given service is based on the assessment of service criteria weighted by importance assigned to these criteria. It resulted in utilization of varied MCDM methods AHP method is a systematic procedure used to represent the elements of a problem hierarchically, developed by Saaty in 1971 (Saaty, 1980), AHP will be used to evaluate service quality in the aviation industry. It will be applied to calculate the relative weights of the criteria/sub-criteria selected that affect services quality. Previous reviews used Multi Criteria Decision Analysis (MCDA)

instrument to evaluate service quality (Chang, 2012; Kuo and Liang, 2011; Lupo, 2015; Tsai et al., 2011; Yeh and Kuo, 2003). Other used on AHP to evaluate service quality (Correia et al., 2008)

3. Methodology

In this work, a two-stage process was used to analyze the data from the satisfaction survey of 300 passengers at Thailand's (CNX), (DMK), and (HKT) reginal airports which concerned service quality factors. These factors were their categorized categorize those factors into sub-factors. The first stage of the study was about literature review to provide the background of the study and to questionnaire for the survey of passenger satisfaction using the service quality factors. The EFA was employed in the first stage as a means to categorize the factors into sub-factors. Meanwhile, the AHP was used in the second stage of the study to evaluate the weight factors by using pairwise comparison.

In the first stage; review of the airport service quality factors was undertaken by cumulative frequency resulting in over 40 interested attributes. Pareto diagram was to screen those factors, that 20% of the invested input is responsible for 80% of the results obtained. There were 18 important attributes identified. Appropriate factors were selected by the experts who had experienced in airport service quality. Moreover, the designed questionnaire was pilot-checked by preliminary sampling of 30 passengers in term of appropriateness and data collection possibility to categorize the factors into sub-factors using EFA (see figure 1)



(Figure 1. The process to analyze the data)

In the second stage; these 18 factors were input to design the questionnaire to evaluate Thai airport service quality. Which calculated weight factors by experts who had been involved in the airport industry through pair-wise comparisons. All attributes were raked through 9 point Likert's scale (1= equally important, 3=moderately more important, 5=strongly more important, 7=very strongly more important, 9=extremely more important) (see table 1). Their weights and importance were obtained using the AHP to analyze the factors and sub-factors by experts.

(Table 1. Scale of AHP)

Verbal judgment	Numerical values
Equally important	1
Moderately more important	3
Strongly more important	5
Very strongly more important	7
Extremely more important	9

3.1. Sample and data collection

Data was obtained from the domestic passengers' surveys who visited at least two airports or only one airport. (In this case, the respondents should have the travel experience on that airport at least three times within six month). Data collection was conducted during august, 2017 and 300 sets of the questionnaires were received from the passengers.

3.2. Models, factors and data analysis

The collected data was analyzed by EFA which provided categorized factors. This method has been widely used among airport quality researchers (Bezerra and Gomes, 2015). EFA was used to extract service quality factors from the factors of typical attributes within the airport industry to extract service quality factors from 300 respondents. The analysis involved with the use of scores which attained from 18 airport service quality attributes to conduct group classification. This study used principal component analysis for factor extraction through SPSS ver.23.

4. Results and Discussion

4.1. Sample size

The minimum of sample divided the observations at least five times over the factors to analysis. The study, the number of sample is 300 and the factor is 18 to appropriated this sample. The result to analysis KMO value found that the sample was adequate for the analysis (KMO = 0.933). Bartlett's test of sphericity the result was Chi-Square = 8801.048, df = 171 and p = 0.000. Hence, reject the null hypothesis and accept the alternate hypothesis, there are factors statistically significant interrelationship between variables. It also implies that the correlation coefficients among all the variables are suitable to EFA. (see table 2)

(Table 2. Result of KMO and Bartlett's test)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.933
Bartlett's Test of Sphericity	Chi-Square	8801.048
	df	171
	Sig.	0.000

4.2. Demographic Information

There were 300 respondents to the questionnaire, 40% was male and 60% female passengers. Almost 60% of the respondents age between 21-30 years old. Most passengers were mainly students (37.40%). Moreover, the salary range of most passengers was less than 600 USD per month. In terms of annual travel frequency, for less than or equal to five times per six month the percentage was 65.33%. The demographics of the 300 respondents as see in table 3.

Table 3. Demographic Information of Thai airport passengers

		Frequency	Percentage
Gender	Male	120	40%
	Female	180	60%
Age (year)	< 20	10	3.33%
	21-30	178	59.33%
	31-40	55	18.33%
	41-50	30	10%
	51-60	15	5%
	>61	12	4%
Occupation	Student	110	36.67%
	Business owner	49	16.33%
	Employee/office worker	90	30%
	Government officer	15	5%
	State Enterprises	20	6.67%
	Other	16	5.33%
Salary(USD/month)	<600	125	41.67%
	601-900	80	26.67%
	901-1,200	39	12%
	1,201-1,500	20	6.67%
	1,501-1,800	19	6.33%
	>1,801	17	5.67%
Annual travel frequency	≤5	196	65.33%
	6-10	76	25.33%
	11-15	20	6.67%
	>15	8	2.67%

4.3. Results of EFA

EFA condensed 17 variables into five factors. All factor loadings were greater than 0.50, considered as practically significant. these are five factors had eigenvalues higher than 1, explaining 67.98 % of the variance together. whereas the results of EFA were exposed as see in table 5.

Table 5. Results of Exploratory Factor Analysis

	Title	Variables included	Factor loading
Factor 1	Check-in	Check-in process efficiency	0.530
		Courtesy and helpfulness of check-in	0.796
		Wait time at check-in	0.79
Factor 2	Security	Thoroughness of security screening	0.673
		Feeling of begin safe and secure	0.541
		Wait-time at security checkpoint	0.769
		Courtesy and helpfulness of security staff	0.819
Factor 3	Convenience	Courtesy and helpfulness of airport staff	0.711
		Availability and quality of stores	0.826
		Availability of Bank/ATM/Exchange	0.642
		Availability and quality of food facilities	0.552
Factor 4	Facilities of the airport	Cleanliness of washroom/toilets	0.782
		Availability of washroom/toilets	0.645
		Enough available seats in waiting area	0.523
Factor 5	Mobility	Walking distance in airport	0.826
		Clarity of airport signs	0.684
		Flight information display	0.765

4.4. Reliability of output factor

The factor of reliability was established to estimating Cronbach's lph for each factor, with values of 0.687 and 0.626 deemed the lower limit of acceptability (see table 4) The results showed alpha value for all the factors were above 0.626, indicators of the reliable output.

Table 4. Reliability and validity of EFA results

	Title	Cronbach's lph
Factor 1	Check-in	0.897
Factor 2	Security	0.810
Factor 3	Convenience	0.709
Factor 4	Facilities of the airport	0.687
Factor 5	Mobility	0.626

4.5. Factor of weight

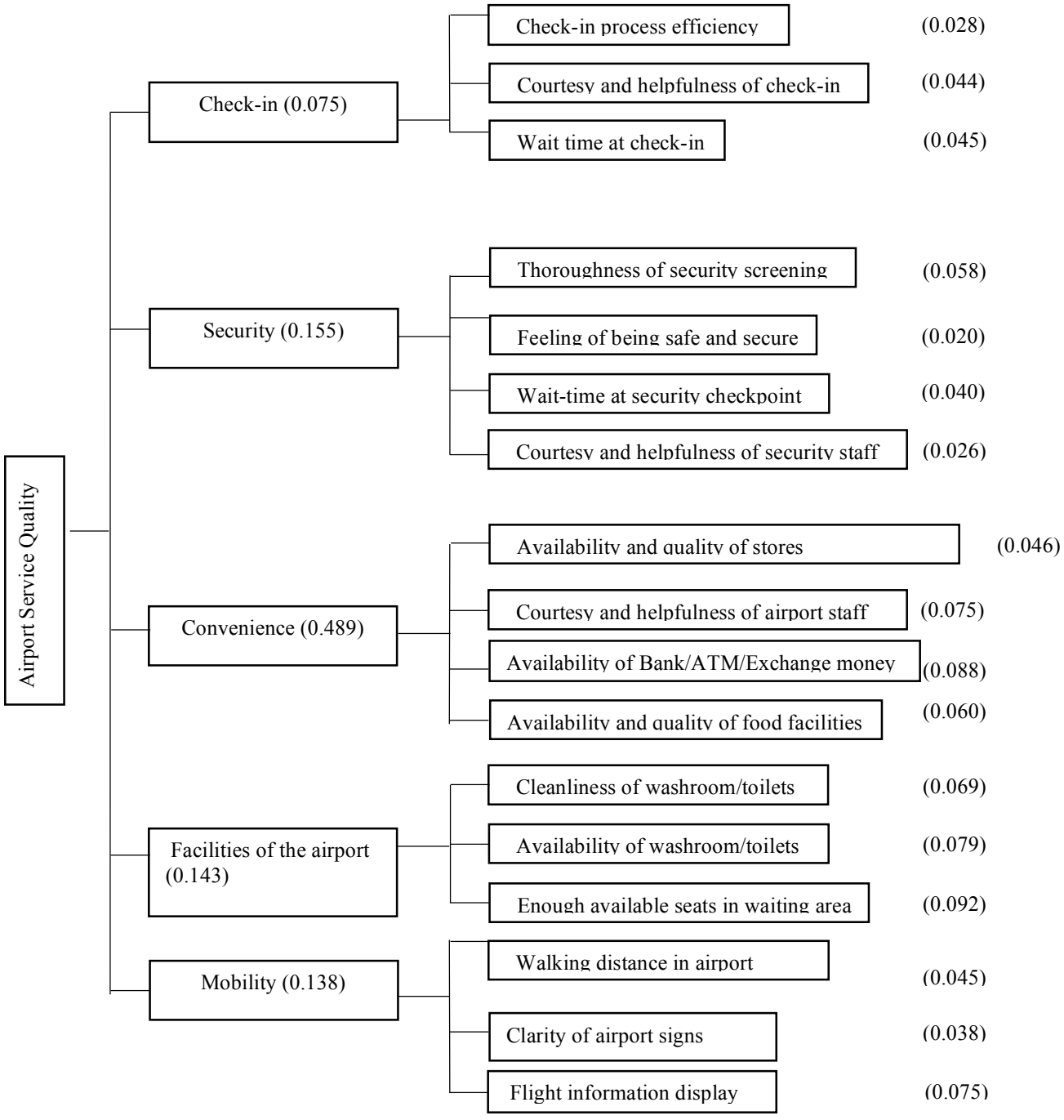
Figure 2 shows the relative weight of all service quality obtained AHP. The weights for each of factor were check-in (0.075), security (0.155), convenience to airport passenger (0.489), Facilities of the airport (0.078) and mobility (0.138), respectively. Convenience was found to have the highest relative weight. It was the most important factor when airport service quality 's performance measurement was conducted. The weight factors also described that convenience was the most important concern towards by experts. Ranked by the weight, the top five sub-factors or attributes were the enough available seats in waiting area (0.092), availability of bank/ATM/exchange (0.088), availability of washroom/toilets (0.079), availability and quality of stores (0.075) and flight information display (0.075). These results were from the preliminary stage. More interviews with airline industry experts were required. All collected data will be analyzed in order to increase validity and reliability in the future.

5. Conclusion and Discussion

In this study, service quality factors for performance measurements of Thai airport industry were categorized. Three regional airports in Thailand were selected. EFA was used in order to categorize the factors into five groups with sub-factor 18 attributes divided Check-in (Factor 1), Security (Factor 2), Convenience (Factor 3), Facilities of the airport (Factor 4), Mobility (Factor 5). All of factors loading scores were found to be relatively high (>0.5), indicator that the variables had strong potential for airport service quality in Thailand. The weight factors from AHP through pair-wise comparison showed that the primary experts identified convenience as the most important factor and the least one as check-in among the 17 sub-factors. The result of this research provides the key factors of service quality for aviation authorities and airport administrators to raise service level in their respective airports. In future study, the factor outputs from EFA will be examined the validity value. Moreover, more interview more experts who involved with airport industry will be conducted in order to increase additional data validity and reliability of factor weighting in AHP. Moreover, in the future study will be using SEM and Smart Pls to detect importance each factor and comparison with AHP will be explain the result are using difference of methods.

Acknowledgement

The authors would like to gratefully acknowledge the Excellence Center in Logistics and Supply Chain Management (E-LSCM), Chiang Mai University for the supporting of this research work.



(Figure 2. Weight of the factors)

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