CHAPTER 3

METHODOLOGY

This chapter outlines the various research methods used to capture the data in this research. A substantial part of the chapter is dedicated to an overview of the procedures and outcomes of the study. The research study was designed to explore airport service quality related to passenger and staff satisfaction of Suvarnabhumi International Airport in Bangkok, Thailand. This chapter provides a discussion of the research methodology used to accomplish the study. It includes research design, respondents and sampling procedure, sampling and sample size, and research method and data analysis through statistical treatment of data.

Research Design

The quantitative approach was used as the research design in this investigation. The questionnaire survey was employed as a research instrument, including both close-ended questions and open-ended questions.

Population and Sample

The population of the research is divided into 2 groups; (1) passengers at Suvarnabhumi airport and (2) staff at Suvarnabhumi airport.

Firstly, the sample population is both male and female international passengers over 18 years old using the services and facilities at Suvarnabhumi airport. The sample population is separated into two sources.

1. International passengers using Suvarnabhumi airport at the international departure area in the fourth floor passenger terminal.

2. Non-Thai passengers using airport services at Suvarnabhumi airport.

According to Monthly Air Transportation Statistics of Suvarnabhumi Airport (January-November, 2006), the total number of passengers who used the airport was 28,274,022. Therefore, the amount of the sampling group was set using Yamane's formula which permits for errors at 0.05 (Yamane, 1973, p. 583) resulting in 400 samples.

$$n = \frac{n}{1 + N(\mathrm{e})^2}$$

n = number of sampling group

N = number of population

e = errors allowed to happen in sampling group which has been set in this research at 0.05

According to the formula, the amount would be

$$n = \frac{28{,}274{,}022}{1 + 28{,}274{,}022\ (0.05)^2}$$

$$= 400$$

So, the total number of the sampling group equals 400.

For random sampling, the researcher employed non-probability sampling.

The second sample population of the research is the passengers who used services and facilities in the passenger terminal at Suvarnabhumi International Airport and staff who worked in different service paths around the terminal area.

The sample population was selected from the passengers who walked around terminal area and used services and facilities, and both male and female staff over 18 years old who worked in the service area. The sample population is separated into two sources.

1. Passengers using Suvarnabhumi airport at the international and domestic departure areas of the fourth floor passenger terminal.

2. Staff who worked at Suvarnabhumi airport in airport services such as immigration officers, custom officers, tourism police, airport operations officers, etc.

According to the Airports of Thailand public company limited, the total number of staff involved in service encounters at Suvarnabhumi airport in each period was 500. Therefore, the sampling group was set by using Yamane's

formula which permits errors at 0.05 (Yamane, 1973, p. 583) resulting in 223 samples.

According to the formula, the number of staff would be

$$n \text{ (staff)} = \frac{500}{1 + 510\ (0.05)^2}$$

$$= 222.22$$

Therefore, the number of the sampling group equals 223.

The researcher gave out 1,000 questionnaires separated into 2 categories: 700 questionnaires for passengers and 300 questionnaires for staff at the airport. For random sampling, the researcher employed non-probability sampling.

Variables in the Study

Expectation

Independent variable-Demographic: Gender, Age, Nationality, Marital status, Education, Total annual income, Experience.

Dependent variable-Expectation level in service quality.

Perception

Independent variable-Demographics: Gender, Age, Nationality, Marital status, Education, Total annual income, Experience.

Dependent variable-Perception level in service quality.

Customer Satisfaction

Independent variable-Expectation level and perception level in service quality.

Dependent variable-Customer satisfaction.

Research Instrumentation Test

For the study, the researcher tested the questionnaire to ensure the correlation between the questionnaire and the objectives. Next, the researcher pre-tested with 30 samples who shared the same characteristics with the sampling group. This test was to assure that the questions could be understood, were in logical order, correct, and corresponded between the answers and the study's objectives.

For the pre-test data of 30 samples at Suvarnabhumi airport, the reliability statistics shown by Cronbach's alpha coefficient was 0.932 for the expectation of service and 0.884 for perception of service. As the reliability was over 0.7000, these questions could be used for the study (Cronbach, 1951, p. 297).

Table 1

Cronbach's Alpha Coefficient Score

	Cronbach's Alpha Coefficient
Expectation	0.932
Perception	0.884

Research Instrumentation

The research used a questionnaire consisting of two components which were:

Part 1: Passenger's personal data for the demography questions, for instance, gender, age, nationality, marital status, education, income and experience, with close-ended questions and open-ended question for nationality.

Part 2: Passenger's expectation level and perception level in service quality for the questions that require recommendations or opinions and also ratio scale answers for the international passenger expectation level and perception level of service quality which was divided into 5 categories.

Category 1: Reliability

Category 2: Tangibles

Category 3: Responsiveness

Category 4: Assurance

Category 5: Empathy

Part 2: Passenger's expectation level and perception level in service quality

The research study measured the expectation and perception of Suvarnabhumi airport's service quality by using the Likert scale, which is separated into 7 stages.

The intervals were calculated for each weighted mean score level to obtain the standard score. Expectation and Perception level were determined by range of mean score shown as follows.

Level = 7

Range = Max-Min

= 7-1

= 6

Interval = Range/Level

= 6/7

= 0.86

Range of Means Score	**Expectation/Perception Level**
1.00-1.86	= Very Unsatisfied
1.87-2.72	= Unsatisfied
2.73-3.58	= Slightly Unsatisfied
3.59-4.44	= Neutral
4.45-5.30	= Slightly Satisfied
5.31-6.16	= Satisfied
6.17-7.00	= Very Satisfied

Model Overviews

As explained in Chapter I and II, Parasuraman et al. (1988) created a 22-item instrument called SERVQUAL based on the gap analysis model for evaluating service quality. The SERVQUAL instrument was chosen for this research because many researchers use that to assess service quality; they adapted SERVQUAL to different contexts. The SERVQUAL model identifies five specific criteria relating to service quality that are recognized and evaluated by tourists. Numerous methods can be used to measure the "gap" between consumers' expectations and perceptions of the quality of consumer service. Measures of service quality can be derived by subtracting the expectation scores allowing tourists to focus attention where it is likely to have most impact or where it is most needed. The scores across all the questionnaires are summed and averaged for each question. The results of the question within each dimension are then averaged to obtain a score for each dimension, which can then be used to highlight how well an organization is performing in light of customer expectations. SERVQUAL measures the gap between what the customer expects in terms of service quality from the providers of service and their evaluation of the actual performance of that service provider (Lau, Akbar, & Fie, 2005, p. 48). SERVQUAL is a survey tool that measures the service quality along five dimensions (Gilbert & Wong, 2002, p. 521). Five dimensions of service quality were defined for this research regarding airport service quality.

Table 2

SERVQUAL Dimensions

Dimensions	Definition
Reliability	The airport's accuracy and dependability in service performance.
Responsiveness	The airport's commitment to contribute its service in a timely manner.
Assurance	The airport's competence, courtesy and security.
Empathy	The airport's ability to place itself in passengers' demand.
Tangibles	The appearance of the airport's facilities, equipment, aircraft, personnel and communication material.

The service quality model outlines customers' quality perceptions influenced by five gaps occurring in companies. These gaps on the service provider's side that the customers may perceive to be important are as follows:

Gap 1: Differences between passenger expectations of staff and passenger expectations.

Gap 2: Differences between staff perceptions of passenger expectations and service quality specifications.

Gap 3: Differences between service quality specifications and airport service actually delivered.

Gap 4: Differences between airport service delivery and what is communicated about the service to passengers.

Gap 5: Difference between passenger expectations and perceptions.

Gap 5 is the basis of a passenger-oriented definition of airport service quality. Moreover, it is the difference between a passenger's expectations for excellence and their perceptions of actual service delivered. This difference also is the conceptual basis for the SERVQUAL instrument.

The researcher applied SERVQUAL to airport services by grouping questions about airport service quality in a questionnaire for seven groups of airport services:

1. Access and navigation
2. Airport service facilities
3. Airport securities
4. Airport shopping
5. Restaurant and eating facilities
6. Airline service
7. Arrival/Departure service

SERVQUAL Questionnaire

Many researchers have used the SERVQUAL model to measure service quality in the service industry with modified constructs to appropriate for specific airport service industry situations. The questionnaire in this research was adapted from Skytrax. It was carefully developed through translation and

back-translation techniques. Professors from Chulalongkorn University, Thailand, translated the questionnaire into Thai, Chinese and Japanese. Furthermore, all of these items were back translated by professors from Thammasart University, Thailand. The present empirical study applies an adapted version of Skytrax, which was modified by the researcher to evaluate the service quality of Suvarnabhumi International Airport. The questionnaire was reviewed again by a professor from the Business Administration faculty, Chiangmai University.

Passenger/Staff Expectation Level and Perception Level of Airport Service Quality

The research measured the expectation and perception of Suvarnabhumi airport's service quality by using the Likert scale, separated into 7 stages. The questions require recommendations or opinions and have the ratio scale answers ranked by expectation level and perception level of service quality. This part contains 12 problems within seven sections as follows.

Pilot Test

Reliability and Validity of Scales Used in this Study

The statistical power used was as suggested by Hair, Anderson, Tatham, and Black (1995, p. 105). For the sample size in the factor analysis, the researcher generally would not factor analyze a sample of fewer than fifty observations, and preferably the sample size should be 100 or larger.

Generally, the minimum sample size is to have at least five times as many observations as there are variables to be analyzed, and the more acceptable size would have a ten-to-one ratio (Hair et al., 1995, p. 105).

Reliability and Validity of Service Quality

Within the air transportation industry in particular, the SERVQUAL instrument was well modified and a number of researchers have evaluated its applications. Parasuraman et al. (1988) adapted the SERVQUAL instrument from ten dimensions to five dimensions of service quality for four service firms: banks, credit cards, repair and maintenance, and long-distance telephone. Four questions pertained to the tangibles, five for reliability, four for responsiveness, four for assurance, and five for empathy dimensions. The researchers reported that the reliability coefficients (Cronbach's alpha) of five dimensions was 0.72, 0.83, 0.82, 0.81, 0.86 for tangibles, reliability, responsiveness, assurance, and empathy, respectively. Moreover, the total scale reliability (overall Cronbach's alpha) was 0.92. According to Nunnally (1967, p. 521), coefficients greater than or equal to 0.50 are generally acceptable and are a good indication of construct reliability. An alpha value of at least 0.70 should be considered acceptable as the minimum estimate of reliability for basic research.

Reliability and Validity of Customer Satisfaction

Oliver (1981, p. 25) explained the construct of customer satisfaction as the "summary psychological state resulting when the emotion surrounding disconfirmed expectation is coupled with the consumer's prior feelings about the consumption experiences". This definition presents customer satisfaction as an overall feeling or emotion derived from a consumer's evaluation of service quality.

Reynolds and Beatty (1999, p. 509) adopted the measure to capture emotional satisfaction. The customers were asked to indicate their feelings with respect to shopping at retail store XYZ on a seven-point Likert scale along measures of emotions such as: "pleased/displeased", "unhappy/ happy", "disgusted/ contented", and "enjoyable/frustrating". The composite reliability coefficient for the emotional satisfaction measure was 0.86.

Chang (1998, p. 9) developed the service quality in fitness service (SQFS) scale and provided evidence of its reliability. In the process of developing the scale, internal consistency was examined for the items of customer satisfaction. The estimated internal consistency (Cronbach's alpha) of the customer satisfaction services scale ranged from 0.59 to 0.74 with the significance level at 0.5 (Chang, 1998, p. 9). According to Nunnally (1967, p. 266), the mean of the estimated internal consistency value was 0.67 and this was deemed acceptable. To be more specific, Nunnally (1967, p. 226) suggested that:

In the early stages of research on predictor tests or hypothesized measures of a construct, one saves time and energy by working with

instruments that have only modest reliability, for which purpose reliabilities of 0.60 or 0.50 will suffice.

After the scales were shown to be reliable, confirmatory factor analyses were conducted to assess the validity of the five dimensions of service quality. Confirmation of scale validity was obtained using AMOS software, a structural equation modeling program. Results from the AMOS program confirmed the validity of the scales. Results from the five-factor solution using AMOS software are shown in Table 3. With two exceptions, the values of coefficients were above .70, providing strong evidence that the items were good indicators of the service quality dimensions.

Table 3

Results from the Confirmatory Five-Factor Solutions for MSS Scores

Dimensions/Items	Coefficients
Reliability	
Q1	.71
Q2	.77
Q3	.80
Q4	.72
Q5	.70
Responsiveness	
Q6	.75
Q[7]	.83
Q8	.78

Table 3 (continued)

Dimensions/Items	Coefficients
Assurance	
Q9	.80
Q10	.79
Q11	.76
Q12	.74
Empathy	
Q13	.62
Q14	.77
Q15	.80
Q16	.79
Tangibles	
Q17	. 71
Q18	.78
Q19	.79
Q20	.77
Q21	.59

The AMOS program also reports various fit indices (See Table 3). The overall model resulted in the chi-square (χ^2) of 486.041 with 179 degrees of freedom and is significant less than the .001 level. However, the significance result was primarily due to a large sample size of the study. An alternative measure of the overall model fit could be calculated by dividing

the chi-square (χ^2) with the degree of freedom. Therefore, the alternative fit index of the model was approximately 2.72 (χ^2 of 486.041, divided by 179 degrees of freedom). According to Hocevar (1985), desirable values of χ^2/df are around 2-3 with acceptable values below 5. Therefore, the model appeared to fit the data very well.

In addition to the chi-square (χ^2) statistics, there are various fit indices reported by the AMOS program. These indices tend to range between 0 to 1 (although only the normed fit index (NFI) is guaranteed to be within the range). Generally, values closer to 1 indicate that the model is a good approximation of the relationships among the variables. From Table 3, several indices such as comparative fit index (CFI), incremental fit index (LH), and Tucker-Lewis Index (TLI) were above .90, indicating a good fit of the model to the data. Other fit indices are above .80. The root mean square error of approximation (RMSEA), another measure of goodness of fit, was .07. Unlike other fit indices, low values of RMSEA are desirable. According to Browne, Churchill, and Peter (1993, p. 127), RMSEA values below .10 are considered acceptable. In summary, these high values of fit indices provided supporting evidence of the validity of the model.

Table 4

Fit Indices from the Confirmatory Five-factor Solutions for MSS Scores

Selected Fit Indices	Values
X^2	486.041
Degree of freedom (*df*)	179
p-value	< .001
χ^2/df (486.041/179)	2.72
Comparative Fit Index (CFI)	.92
Incremental Fit Index (IFI)	.92
Tucker-Lewis Index (TLI)	.91
Normed Fit Index (NFL)	.88
Relative Fit Index (RFD	.86
Goodness-of-Fit Index (GFI)	.86
Adjusted Goodness-of-Fit Index (AGFI)	.82
Root Mean Square Error of Approximation (RMSEA)	.07

Perception and Expectation

Given that the SERQUAL instrument was adapted, further validity analysis was carried out. The KMO (Kaiser-Meyer-Olkin) analysis was carried out to ascertain whether the perception expectation data was suitable for factor analysis.

Table 5

KMO Bartlett's Perception

KMO	chi-square		*p*-Value
.973	24691.983102	990	0.000

Table 6 shows that the data is eminently suitable for factor analysis.

Table 6

Passenger Perception Factor Analysis

	1	2	3	4	5	6	7
P_airport services/facilities6	0.69618						
P_airport services/facilities5	0.69533						
P_airport services/facilities2	0.66127						
P_airport services/facilities3	0.65907						
P_airport services/facilities7	0.63622						
P_airport services/facilities4	0.62823						
P_airport services/facilities9	0.60038						
P_airport services/facilities8	0.55640						
P_airport services/facilities1	0.49847						

Table 6 (continued)

4.52	1	2	3	4	5	6	7
P_shoping4		0.68176					
P_shoping6		0.68064					
P_shoping5		0.67493					
P_shoping7		0.67275					
P_shoping3		0.67142					
P_shoping8		0.63356					
P_shoping2		0.62532					
P_shoping1		0.59947					
P_restaurant5			0.75817				
P_restaurant4			0.70116				
P_restaurant3			0.68131				
P_restaurant6			0.67975				
P_restaurant2			0.64598				
P_restaurant7			0.63419				
P_restaurant1			0.57004				
P_access/navigation2				0.69541			
P_access/navigation3				0.67147			
P_access/navigation4				0.66355			
P_access/navigation6				0.66191			
P_access/navigation5				0.64654			
P_access/navigation1				0.63718			
P_airport security3					0.74734		
P_airport security4					0.72459		
P_airport security2					0.67192		
P_airport security6					0.61847		
P_airport security5					0.61083		
P_airport security1					0.53658		

Further Principal Component Analysis: (PCA), (Factor Rotation) and (Orthogonal Rotation) plus (Varimax) analysis were carried out on the two concepts.

Perception

1. Airport services/facilities
2. Shopping
3. Restaurant
4. Access/navigation2
5. Airport security
6. Airline
7. Arrival

Table 7

KMO Bartlett's Test on Perception

KMO	chi-square		*p*-Value
.961	7637.999	990	0.000

KMO (Kaiser-Meyer-Olkin) analysis was carried out and KMO score of 0.961 and *p*-value of .0000 significance were obtained. Factor Analysis was found to be possible.

Table 8

Staff Perception Factor Analysis

	1	2	3	4	5	6
P_airport services/facilities9	0.70331					
P_access/navigation5	0.69726					
P_airport services/facilities6	0.65185					
P_airport services/facilities5	0.64723					
P_airport services/facilities2	0.63907					
P_airport services/facilities3	0.61403					
P_airport security1	0.59749					
P_restaurant1	0.52558					
P_airport services/facilities4	0.51850					
P_airport services/facilities7	0.50388					
P_access/navigation6	0.50026					
P_airport services/facilities8	0.49251					
P_access/navigation2	0.46407					
P_airport services/facilities1	0.42011					
P_airline3		0.73276				
P_arrival3		0.65283				
P_airline6		0.64797				
P_airline1		0.64248				

Table 8 (continued)

	1	2	3	4	5	6
P_airline5		0.62673				
P_airline4		0.61031				
P_arrival2		0.59610				
P_airline2		0.56564				
P_arrival1		0.55922				
P_airport security3		0.45592				
P_airport security2		0.44334				
P_shoping7			0.74720			
P_shoping8			0.73955			
P_shoping6			0.73629			
P_shoping3			0.71009			
P_shoping5			0.65077			
P_shoping2			0.55947			
P_shoping1			0.55928			
P_shoping4			0.52363			
P_restaurant6				0.70111		
P_restaurant7				0.66300		
P_restaurant2				0.62790		
P_restaurant4				0.61988		
P_restaurant5				0.59519		
P_restaurant3				0.55423		
P_access/navigation1					0.75205	
P_access/navigation4					0.68962	
P_access/navigation3					0.49512	
P_airport security6						0.68762
P_airport security5						0.67330
P_airport security4						0.65000

Further analysis was carried out:

1. airport services
2. airline
3. shopping
4. restaurant
5. access/navigation
6. airport security

Table 9

KMO Bartlett's Test on Expectation

KMO	chi-square		*p*-Value
.967	24297.633	990	0.000

The suitability for factor analysis is shown in Table 10.

Table 10

Passenger Expectation Factor Analysis

	1	2	3	4	5	6	7
E_airport services/ facilities6	0.73371						
E_airport services/ facilities4	0.72162						
E_airport services/ facilities5	0.71307						
E_airport services/ facilities9	0.70665						

Table 10 (continued)

	1	2	3	4	5	6	7
E_airport services/ facilities3	0.70338						
E_airport services/ facilities7	0.70115						
E_airport services/ facilities8	0.69473						
E_airport services/ facilities2	0.63266						
E_airport services/ facilities1	0.58287						
E_restaurant2		0.73441					
E_restaurant3		0.72825					
E_restaurant4		0.72505					
E_restaurant6		0.70083					
E_restaurant7		0.69854					
E_restaurant5		0.69187					
E_restaurant1		0.63819					
E_shoping3			0.71104				
E_shoping2			0.69018				
E_shoping1			0.68970				
E_shoping7			0.67079				
E_shoping6			0.66582				
E_shoping5			0.65448				
E_shoping8			0.63185				
E_shoping4			0.62344				
E_access/navigation2				0.76371			
E_access/navigation3				0.74551			
E_access/navigation4				0.74005			

Table 10 (continued)

	1	2	3	4	5	6	7
E_access/navigation1				0.72090			
E_access/navigation5				0.69625			
E_access/navigation6				0.68618			
E_airport security3					0.75145		
E_airport security4					0.70610		
E_airport security2					0.69417		
E_airport security1					0.68391		
E_airport security5					0.65216		
E_airport security6					0.54902		

Data Analysis

After collecting data, the researcher re-checked the data before analyzing. Next, the overall data was coded and processed by *t* test and ANOVA.

The researcher analyzed the data by using descriptive statistics to describe the passengers' and staffs' personal data and expectations and perception level of service quality in terms of the quantitative method.

A formal coding sheet was designed and used to code all the questions in a systematic way. In order to achieve the stated objectives and to test the hypotheses, various kinds of statistical techniques were employed. These techniques included basic descriptive, factor analysis, multiple regressions analysis, and one-way analysis of variance (ANOVA). Data were entered into the Statistical Package for Social Sciences Windows Version 16.0 (SPSS) program to analyze the findings.

Table 11

Statistical Techniques Employed in This Study

Statistical Techniques Employed	Research Purposes	Hypotheses
Basic Descriptive (means, standard deviations, and frequency)	Examine the distribution of responses	
Factor Analysis	Delete the inter-correlations among the dimensions	
Correlation Analysis	Determine the relationship between service quality factors, overall customer satisfaction	
Multiple Regression Analysis	Extent service quality factors predict overall customer satisfaction	
one-way Analysis of Variance (ANOVA)	Test significance of overall service quality factors based on customers' demographic profile	
Independent-Samples *t* test	Compare the mean among Thai and international customers relative to the/service quality attributes	

Descriptive Statistics

Descriptive statistics are used to describe the basic data in a study. Descriptive statistics provide simple summaries about the sample and the measures. Together with simple graphics analysis, descriptive statistics form the basis of virtually every quantitative analysis of data and used to present quantitative descriptions in a manageable form. The research used the descriptive method to explain the characteristics of the situation. It was applied the central tendency with "MEAN" to describe the demographic characteristics of the respondents.

Summary

The chapter examined the methodological issues arising from using the SERQUAL instrument. It looked at how the instrument was translated and pilot tested. The reliability and validity analysis is also included. In Chapter 4, the findings and its implications are presented.