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TRABALHO FINAL DE MESTRADO
DISSERTATION

PASSENGER PERCEPTION OF SERVICE QUALITY OF CHINESE
AIRLINES AND THE IMPACT ON INTENTION TO RECOMMEND

ZHAO MENGYUAN

October-2019



LISBON
SCHOOL OF
ECONOMICS &
MANAGEMENT
UNIVERSIDADE DE LISBOA

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Abstract

Service quality is crucial for satisfaction and repurchase intention. As the competition has increased strongly in the Chinese airline market, it is important for Chinese airlines to understand passenger perception of service quality, in order to satisfy their needs and to develop loyalty.

The main objective of this dissertation is to analyse passenger perception of service quality through online ratings and reviews, identifying the determinant service attributes of overall rating and of the intention to recommendation.

The data were gathered from the website of Skytrax, 2035 passenger evaluations of four Chinese airlines. The ratings of service attributes (seat comfort, food and beverages, cabin crew service, ground service, inflight entertainment, value for money) were included in the multiple linear regression model and logistic regression analyses, for the purpose of investigating their impact on passengers' overall perception and intention to recommend.

The results of this investigation revealed that, in first place, the six service attributes are all statistically significant in terms of solo and couple leisure travellers' overall quality perception, "Inflight entertainment" is non-significant for family leisure passengers and business passengers. For family leisure passengers, "food and beverages" service quality is also not significant. Secondly, "value for money" is the most important attribute for all types of travellers in both overall service quality perception and passengers' intention to recommend, while, "inflight entertainment" has the least impact. Third, the significant determinants of recommendation vary with traveller type. Finally, content analysis revealed eleven mind themes ("flight," "food," "crew," "service," "experience," "seat," "boarding," "airline," "airport," "check" and "return") of passengers' reviews related to their overall experience.

Keywords: Service quality; E-WOM; Intention to recommend; Chinese airlines

Resumo

A qualidade do serviço é uma parte crucial para a satisfação e para intenção de recompra. Como a concorrência aumentou fortemente para as companhias aéreas chinesas, é importante compreender as avaliações feitas pelos passageiros da qualidade do serviço, a fim de satisfazer as necessidades dos clientes e desenvolver lealdade.

O principal objetivo desta dissertação é analisar a percepção de qualidade do serviço na ótica dos passageiros com recurso a classificações e análises on-line e identificar os atributos determinantes da avaliação global.

Os dados foram coletados das avaliações e classificações de companhias aéreas no site de Skytrax, 2035 itens de avaliações de passageiros da Air China, China Eastern Airlines, Hainan Airlines e China Southern Airlines foram selecionados, além das classificações dos atributos de serviço (conforto do assento, alimentos e bebidas, serviço da tripulação de cabine, serviço em terra, entretenimento a bordo, valor do dinheiro despendido) foram incluídos nas análises de regressão linear múltipla e de regressão logística, com o objetivo de investigar o seu impacto na percepção geral dos passageiros e na intenção de recomendar.

Os resultados desta investigação revelaram que, em primeiro lugar, que os seis atributos de serviço são estatisticamente significativos em termos de percepção geral da qualidade dos viajantes individuais e casais em lazer. Contudo, o entretenimento a bordo não é significativo para os passageiros em lazer e negócios. Além disso, para passageiros em lazer em família, a qualidade do serviço de alimentação e bebidas também não é significativa. Em segundo lugar, “valor ao dinheiro” é o atributo mais importante para todos os tipos de viajantes, tanto na percepção geral da qualidade do serviço quanto na intenção dos passageiros de recomendar, enquanto o “entretenimento a bordo” tem o menor impacto. Terceiro, os determinantes significativos da recomendação variam de acordo com o tipo de viajante. Por fim, a análise de conteúdo revelou onze temas mentais (“voo,” “comida,” “tripulação,” “serviço,” “experiência,” “assento,” “embarque,” “companhia aérea,” “aeroporto,” “check” e “retorno”) das avaliações dos passageiros relacionadas à sua experiência geral.

Palavras-chave: Qualidade de serviço; E-WOM; Intenção de recomendação; Companhias aéreas Chinesas

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CHAPTER 1 – INTRODUCTION

With the development of aeronautic technology and aviation security, air transport became an indispensable part of daily life. Passengers made 4.1 billion trips with scheduled airlines in 2017, an increase of 7.2% compared with the previous year. Moreover, the Asia-Pacific market, led by China, is the region with the strongest growth (10.7%) in passengers transport (ICAO,2018). It is expected that China will be the world’s largest aviation market by 2025 (IATA, 2018). On the other hand, competition is also intense. The four largest airline groups (China National Aviation Holding Group, China Southern Air Holding Group, China Eastern Air Holding Group, and Hainan Airlines Group) represented more than 85% of the total turnover in 2018 (CAAC, 2019). Further, the rapid development of high-speed railway has great impact on short-haul routes, and the domestic competition has increased intensely.

It has been reported that passenger perception of service quality of an airline plays an important role in perceived value (Chen, 2019), satisfaction (Chow, 2014; Jiang & Zhang, 2016) and loyalty (Farooq et al, 2018). Satisfaction is the key factor impacting behavioural intentions, which includes the intention to recommend (Finn, Wang & Frank, 2009). Furthermore, consumer-generated reviews are vital to companies in terms of understanding customer evaluations of products or service and their performance in face of their competition (Clow & Baack, 2018).

Therefore, in order to improve passenger satisfaction and recommendation, it is imperative that for Chinese airlines to understand passenger perception of service quality which help to identify and meet passenger needs. Moreover, although some studies have investigated Chinese airline service quality (Chow, 2015; Jiang & Zhang, 2016; Chen, Li & Liu, 2019), no research evaluated these issues through online ratings, electronic word of mouth, and intention to recommend of Chinese airlines.

This dissertation aims to: (1) analyse the passenger perception of service quality using online ratings and reviews, and (2) identify the determinant service attributes of overall perception and recommendation. Both qualitative and quantitative approaches were used in the research. In the qualitative analysis, passenger reviews in Skytrax of top four Chinese airlines (Air China, China Southern Airlines, China Eastern Airlines, Hainan Airlines) were analysed. In the quantitative analysis, multiple linear regression and logistic regression were used to investigate the impact of service attributes on “overall perception” and “intention to recommend.”

This dissertation is organized in five chapters, including this introductory chapter. The next chapter is the review of previous studies in the research topic. The third chapter presents data collection and methodology. On the fourth, data is analysed, and the results are discussed. The final chapter draws conclusions and presents the limitations of this study and suggestions for future research.

CHAPTER 2 – LITERATURE REVIEW

The review of previous research is organized in three parts. First, the construct of airline service quality is described, as well as the definition of service quality, measurement and attributes of airline service quality. Second, the Chinese airlines market is described. Last, electronic word-of-mouth and intention to recommend the airline are addressed.

2.1 Service quality in the airline industry

A large and increasing number of studies on airlines' service quality pays particular attention to identifying and measuring service quality attributes (Chang & Yeh, 2002; Chou, Liu, Huang, Yih & Han, 2011; Bogicevic, Bujisic & Bilgihan, 2017; Gupta, 2018; Korfiatis, Stamolampros & Kourouthanassis, 2019), and the relationship with customer satisfaction, repurchase intention and loyalty (Anderson, Pearo & Widener, 2008; Chow, 2014; Chow, 2015; Jiang & Zhang, 2016; Farooq, Salam, Fayolle, Jaafar & Ayupp, 2018; Chen & Liu, 2019). Additionally, several studies have analysed customer perception of service quality (Jeeradist, Thawesaengskulthai & Sangsuwan, 2016; Borchado, Oliveira & Oliveira, 2019).

2.1.1 Definition of service quality

Due to the intangibility of services and the involvement of consumers, the quality of services is difficult to define and to measure compared with tangible products (Lovelock & Wirtz, 2016). Lovelock and Wirtz (2016) defined service quality as "the user's perspective as consistently meeting or exceeding customer expectation (p. 551)."

It is important that service companies keep or increase their service quality, because the customer perceived quality determines companies' long-term interests (Doyle & Stern, 2006), besides, low quality leads to competitive disadvantage and customer churn (Lovelock & Wirtz, 2016).

A large amount of research investigates the relationship between airline service quality and satisfaction and repurchase intention. In their analysis of Chinese airlines, Chow (2014)

demonstrated that service quality has a positive effect on satisfaction. Similarly, Jiang and Zhang (2016) found that service quality significantly influences passenger satisfaction which positively impacts leisure travellers' loyalty, while it does not have a significant effect on business travellers. Chen and Liu (2019) analysed service quality and perceived value and found that airline service quality can be a significant and positive factor on repurchase intention.

There is evidence to suggest the relationship between airline service quality and branding. Chen et al. (2019) argue that airline service quality positively enhances the relationship between customer perceived value and brand awareness, which contribute to customer-based brand equity. Jeeradist et al. (2016) point out that service quality plays a vital role in brand image. Similarly, Dirsehan and Kurtulus (2018) developed a conceptual model of an airline brand and found that service quality positively influences brand image.

2.1.2 Measurement of airline service quality

Lovelock and Wirtz (2016) identified (1) soft measures of service quality which are obtained by interviews or questionnaires to understand customer perceptions and beliefs, and (2) hard measures which analyse by counting, timing or auditing service characteristics and components, as the two major broad categories of service quality measurement.

The most extensive method in the evaluation of service quality is the Service Quality (SERVQUAL) model (Parasuraman et al, 1985). SERVQUAL measures service quality through five dimensions, namely: reliability, assurance, tangibility, empathy and responsiveness (Parasuraman et al., 1985). Foster (2017) stated the advantages of SERVQUAL as standard, valid, reliable, parsimonious, and easy to interpret measure of service quality. In the SERVQUAL survey, customer expectation and perception are measured, which is helpful in examining the service gaps (Foster, 2017).

In the case of measurement of airline service quality, different methods have been created and adopted by different researchers. A considerable number of studies evaluate airline service quality using the SERVQUAL model (Chang & Yeh, 2002; Chou et al., 2011; Basfirinci & Mitra, 2015; Jeeradist et al., 2016; Li, Yu, Pei, Zhao & Tian, 2017; Gupta, 2018), while the AIRQUAL model is also adopted by some researchers (Ali, Dey & Filieri, 2015; Farooq et.al, 2018).

The AIRQUAL scale (Nadiri, Hussain, Ekiz & Erdogan, 2008) specifically measures airline service quality with 43 items scale. This scale has eight dimensions: "airline tangibles, terminal

tangibles, personnel, empathy, image, customer satisfaction, repurchase intention and word-of-mouth communication.”

Besides, Bogicevic et al. (2017) and Brochado et al. (2019) selected and measured service quality by analysing passengers’ electronic word-of-mouth. Additionally, Chow (2014, 2015) examined passenger satisfaction with complaints collected by Civil Aviation Administration of China (CAAC) and Laming and Mason (2014) used the Airs@t survey of International Air Transport Association (IATA).

2.1.3 Airline service quality attributes

Lovelock and Wirtz (2016) define determinant attributes as “those that actually determine buyers’ choices between competing alternatives” (p. 99). Doyle and Stern (2006) in their book identified ten service quality determinants: “reliability, access, credibility, security, knowledge, responsiveness, competence, courtesy, communication, and tangibles” (p. 356). As for the airline industry, Lovelock and Wirtz (2016) suggest that the attributes could be “the convenience of time, availability and privilege related to loyalty, inflight service quality, and reservation service simplicity” (p. 99). However, the determinant attributes of airline service may vary with the purpose and objects of each investigation.

Pearo and Widener (2008) considered airline service as involving six attributes: “interaction, aircraft, personal space, food, flight, and timeliness.” The interaction attribute represents the interaction with personnel in the whole journey including service attitude and wait time in check-in, efficiency in boarding, the information provided and responsiveness of onboard service and the appropriateness of baggage delivery. Aircraft attributes involve cleanliness, conditions and general appearance of the aircraft and cabin. Personal space includes seating space and arm and legroom. Food attribute assesses the quantity and quality of in-flight food. The timeliness describes the punctuality of departure and arrival. Flight attributes involve noise and air quality in flight and the flight smoothness.

Jiang and Zhang (2016) identified three factors of airline service, which are (1) “in-flight entertainment, Frequent Flyer Program (FFP) and airline response to flight delay and passenger complaints,” (2) “departure and arrival experiences, in-flight comfort and cabin crew professionalism” which involves in-flight food and beverage, and (3) “flight selection and ticket purchase experience.”

Gupta’s research (2018) of the Indian airline industry considered seven main attributes based on the SERVQUAL model: “tangibility; reliability, security, and safety; responsiveness;

assurance; effective communication and employees' service; ticket pricing and airline image and additional features." Further, the author points out that the attributes of tangibility, reliability, security, and safety, and ticket pricing are the most important attributes, which means that the catering quality is an indispensable measuring element in the measurement of airline service quality.

Farooq et al (2018) indicate five dimensions of service quality i.e. "airline tangibles; terminal tangibles; personnel services; empathy and image" are significant and positive factors of service quality and satisfaction. They suggest that to improve service quality, airlines should pay special attention to personnel services and image.

Li et al. (2017) analysed specifically in-flight service quality and proposed five criteria and eighteen sub-criteria. According to SERVQUAL survey, the attributes are employees namely cabin crew service, facilities included seats, entertainment and catering quality, flight schedule and information, support service namely travel-related service, and physical environment included air, thermal and sound comfort.

Furthermore, Chow (2014) analysed Chinese passengers' complaints and identified factors influencing complaint and dissatisfaction as "on-time performance, baggage mishandling problems, weather conditions, and individual characteristics." In addition, in another study of this field, Chow (2015) found that improvement of actual on-time performance benefits passenger satisfaction, while increasing expected on-time performance decreases satisfaction.

2.2 The Chinese airline market

In recent years, there has been an increasing number of studies investigating Chinese airline industry (Wang, Fan, Fu & Zhou, 2014; Jiang & Zhang, 2016; Chen, Chen & Wei, 2017; Li et al., 2017; Zhang, Johnson, Zhao & Nash, 2019), since the Asian-Pacific market, led by China, has the strongest growth in 2017 (ICAO, 2018). However, few studies focus on service quality in the context of Chinese airlines (Chow, 2015; Jiang & Zhang, 2016; Chen, Li & Liu, 2019).

According to the Civil Aviation Administration of China (2019), in 2018 there were in total 60 airline companies in China Mainland. The majority of Chinese airlines were state-holdings, particularly the "big three" in which central government directly controls the companies, China Aviation Holding¹, China Eastern Air Holding Group² and China Southern Air Holding

¹ China National Aviation Holding Group includes Air China, Air China Cargo, Shenzhen Airlines, Shandong Airlines, Kunming Airlines, Tibet Airlines, Air China Inner Mongolia, Dalian Airlines and Beijing Airlines.

² China Eastern Air Holding Group includes China Eastern Airlines, China Cargo Airlines, Shanghai Airlines,

Group³ hold more than seven in ten of total turnover in 2018. The largest private airline company is Hainan Airlines Group⁴, which represented approximately 16 per cent of total turnover in 2018. The ownership of airlines influences financial performance as a U-shaped curve, which means that airlines with mixed ownership perform worse in financial indicators (Chen et al., 2017).

Wang et al. (2014) benchmarked the three major Chinese airlines, Air China, China Eastern Airlines and China Southern Airlines, with international leading brands in terms of productivity and profitability. Their study revealed that Chinese airlines put high yield and low price in domestic routes. For this reason, the profitability was high. Meanwhile, Chinese airlines still fell behind international leaders in both productivity and profitability.

The research of Jiang and Zhang (2016) found that passengers of Hainan Airlines are more satisfied with the ticket price and service quality, particularly the in-flight service, which leads to higher re-fly intention and loyalty compared with Air China, China Eastern Airlines and China Southern Airlines.

Moreover, the rapid development of high-speed railway has a great impact on the airline industry in China. Zhang et al. (2019) found that the inter-model competition of railway and air transport prompts airlines to reduce prices and route frequency.

2.3 Electronic word-of-mouth and intention to recommend in the airline industry

Solomon (2018) defines word-of-mouth as “product information that individuals transmit to other individuals” (p. 422), which customers consider more reliable than formal marketing information. WOM is a crucial factor in the purchasing decision, especially when buying for the first time or in expensive purchases (Mckincey, 2010). Positive WOM affects positively customers’ buying decision. Meanwhile, negative comments have greater influence than positive comments (Solomon, 2018). Kim et al. (2018) proved that homophily, tie-strength between website and customer are essential factors for credibility, which determines WOM and consumers’ purchase decision.

China United Airlines, China Eastern Airlines Jiangsu Limited, China Eastern Airlines Wuhan Limited and China Eastern Airlines Yunnan Limited.

³ China Southern Air Holding Group includes China Southern Airlines, Xiamen Airlines, China Southern Airlines Henan Airlines, Guizhou Airlines, Shantou Airlines, Chongqing Airlines, Hebei Airlines, Zhuhai Airlines and Jiangxi Airlines.

⁴ Hainan Airlines Group includes Hainan Airlines, Beijing Capital Airlines, Tianjin Airlines, Suparna Airlines, China Xinhua Airlines, Lucky Air, China West Air, Air Changan, Fuzhou Airlines, Urumqi Air, Guangxi Beibu Gulf Airlines, Air Guilin and Grand China Air.

Therefore, consumer-generated reviews are vital to companies in terms of understanding customer evaluations of products or service and their performance in face of competition (Clow & Baack, 2018), and for marketers, dealing with negative reviews is complicated and more important than positive comments (Laczniak, DeCarlo & Ramaswami, 2001). Moreover, social listening contributes to brand image and brand advocacy which can enhance consumer endorsement and brand equity (Clow & Baack, 2018).

Abubaker, Ilkan, Al-Tal and Eluwoled (2017) investigated the medical tourism industry and found that eWOM significantly influences the revisit intention. In the airline industry, previous research has indicated that service quality, perceived value and satisfaction significantly and positively influence passengers' WOM (Nikookar, Rahrov, Razi & Ghassemi, 2015).

As mobile connectivity penetrates in the consumer community, the decision-making process becomes more social. Consumers pay more attention to seeking advice and product reviews (Kotler & Setiawan, 2017). Consequently, positive word-of-mouth and intention to recommend become even more important in the digital age.

Meanwhile, a large number of studies address the intention to recommend construct. Finn, Wang and Frank (2009) developed a model to analyse e-services consumer's intention to recommend moderating online customer satisfaction. They found that satisfaction is the essential factor of behavioural intentions, which includes the intention to recommend, and they found that overall satisfaction positively influences consumers' intention to recommend on e-services, such as airline ticket selling. Hosany and Prayag (2015) found that customers who evaluated tourism service with positive emotions such as happy, content, pleasant and surprise are more likely to recommend the brand. Further, Nikookar et al. (2015) indicated that WOM of airlines positively impacts referral intention.

CHAPTER 3 - DATA COLLECTION AND METHODOLOGY

3.1 Data collection and description

The data were gathered from the website of Skytrax (www.airlinequality.com), the professional organization in passengers' opinion survey of service quality in the civil air industry. The airlines reviews and rating website allows passengers to evaluate their trips for more than 490 airline brands. The reviewer should present their autonym and evidence of flight, but the reviewers' information can be hidden as optional.

For the purpose of analysing airlines of China Continent, passenger evaluations of the flagship brands of the “big four” airline groups i.e. Air China, China Eastern Airlines, China Southern Airlines and Hainan Airlines were selected, since the largest four aviation groups represented approximately 86 per cents of total transport turnover in 2018 (CAAC, 2019).

All airline reviews are in English and ranging between 150 to 3500 characters. Passengers evaluate their trip with an overall rating from 1 to 10. They also assess seven service attributes: (1) value for money; (2) ground service; (3) seat comfort; (4) cabin staff service; (5) food and beverages; (6) inflight entertainment and (7) cabin WiFi and connectivity, on a scale from 1 to 5. In addition, the last three attributes are not mandatory to fill out. Moreover, the airline brand, trip date, route information, cabin class and traveller type are required, while the aircraft type, intention to recommend and trip photos are optional to fill out.

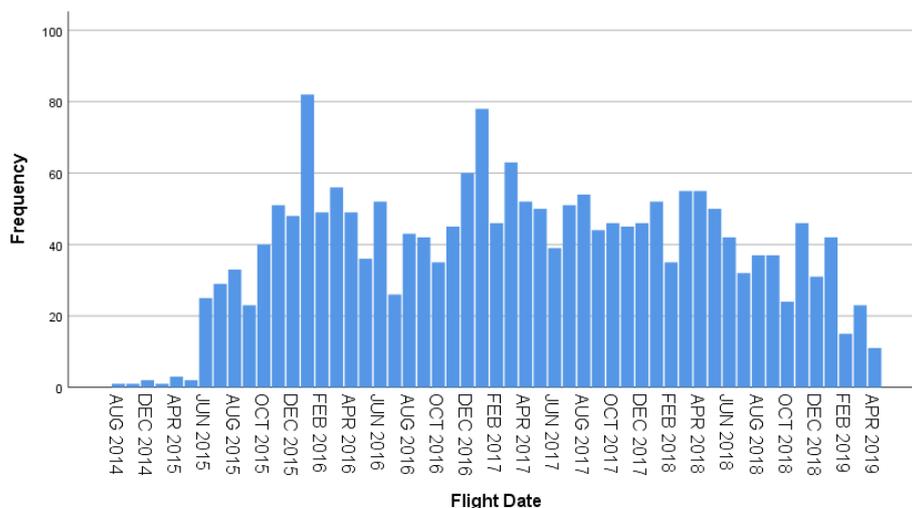
The initial database had 3332 passenger reviews and trip information of the four Chinese airline brands. Data were extracted from the website using Python on the 21st of April 2019. After removing cases with missing values, the valid data consisted of 2035 cases (quantitative and qualitative feedback provided by 2035 airline passengers).

In view of the large volume of missing values, the variable of the author name, aircraft type and cabin WiFi connectivity were excluded from the analysis. The database of this study consists of eighteen variables (1) Airline Brands (Air China, China Eastern Airlines, Hainan Airlines and China Southern Airlines), (2) Overall Rating (from 1 to 10), (3) Review Title, (4) Author’s Living Country, (5) Review Published Date, (6) Review Content, (7) Type of Traveller (Solo Leisure, Couple Leisure, Family Leisure and Business), (8) Cabin Class Type (Economy Class, Premium Economy, Business Class and First Class), (9) Route Type (China Continent Domestic, International/Regional), (10) Flight Type (Direct and Indirect), (11) Flight Date, (12) Seat Comfort (from 1 to 5), (13) Cabin Staff Service (from 1 to 5), (14) Food and Beverages (from 1 to 5), (15) Inflight Entertainment (from 1 to 5), (16) Ground Service (from 1 to 5), (17) Value for Money (from 1 to 5), (18) Intention to Recommend (Recommended, Not Recommended).

More than half of reviews (57.3%) are comments on China Southern Airlines, 18.7 per cent of Air China, 12.7 per cent of China Eastern Airlines and 11.3 per cent of Hainan Airlines.

The flight dates that passengers evaluated are from August of 2014 until April of 2019. Most cases are from June 2015 onwards (Figure 1).

Figure 1. Bar chart of flight date and frequency



The reviews were written by travellers from 62 countries. More than seven in ten reviews were written by passengers from Eastern Asia (27%), North America (26%) and Europe (20%). Approximately 23% of authors were from China.

Table 1. Statistics of airline reviews by passenger residence

Variable	Category	Frequency	(%)
Region	Eastern Asia	544	26.73
	Southern and South-Eastern Asia	140	6.88
	Central and Western Asia	17	0.84
	Europe	413	20.29
	North America	539	26.49
	Latin America and the Caribbean	11	0.54
	Oceania	367	18.03
	Africa	4	0.20
Total		2035	100.00

3.2 Methods

In order to identify the relationship between overall satisfaction and service quality attributes, multiple linear regression method was used, with “overall rating” as the dependent variable. Moreover, the determinants of the dependent variable, passengers’ intention to recommend, were investigated resorting to logistic regression. The determinants of quality perception and intention to recommend resorted in previous studies (Chang & Yeh, 2002; Chou et al, 2011;

Bogicevic et al, 2017; Gupta, 2018; Korfiatis et al, 2019). The variables of seat comfort, cabin staff service, food and beverages, inflight entertainment, ground service and value for money were included as independent variables for the two regressions.

As for the quantitative analysis, cases were divided into four groups based on traveller type (solo leisure, couple leisure, family leisure and business travellers), since the impact of type is significant ($F = 7.231$; $p = 0.000$) on overall perception and on the recommendation. Different type of travellers has different perception of service quality, and the effects of determinants varied.

For the purpose of analysing passenger reviews, content analysis was performed to calculate the frequency of words related to travel experience and to draw a concept map of passenger perception, using the Leximancer software.

CHAPTER 4 - RESULTS AND ANALYSIS

The quantitative analysis is divided into two parts: (1) the analysis of overall service perception using the multiple linear regression method, and (2) the analysis of intention to recommend, adopting logistic regression. In order to account for possible heterogeneity, the results of the analysis are estimated by traveller type as solo leisure, couple leisure, family leisure and business. In the section of qualitative analysis, a content analysis was performed including word frequency analysis and concept mapping.

4.1. General Description

First, the numerical characteristics of the sample were explored by performing a descriptive analysis. Table 2 presents summary statistics for dependent and independent variables. Service attributes are measured on a scale ranging from 1 to 5 and the “overall rating” in a scale ranging from 1 to 10. Passengers grade highest “cabin staff service” (4.02) on average than “value for money” (3.94) while the average for “inflight entertainment” received the lowest score (3.37). Besides, the average for “overall rating” is 6.87 (S.D.=3.06).

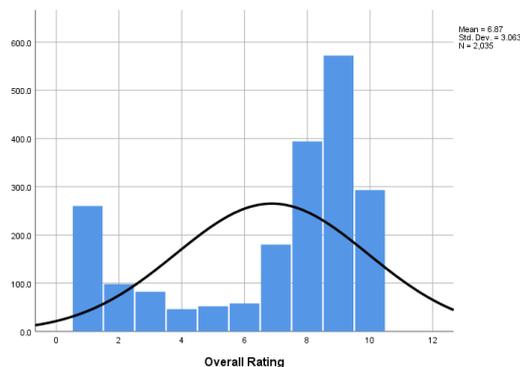
Table 2- Descriptive statistics of dependent and independent variables

Variables	Average	SD	Minimum	Maximum
Seat comfort	3.70	1.27	1.000	5.000
Cabin staff service	4.02	1.42	1.000	5.000
Food and beverage	3.51	1.39	1.000	5.000
Inflight entertainment	3.37	1.32	1.000	5.000
Ground service	3.58	1.51	1.000	5.000
Value for money	3.94	1.37	1.000	5.000
Overall rating*	6.87	3.06	1.000	10.000

Note: *Overall rating was measured on a 10-point scale (1-10). All other attributes on a 5-point scale (1-5).

Figure 2 shows the distribution of “overall rating” as being left-skewed (skewness = -0.94), with most travellers’ ratings being in the range of 7 to 9.

Figure 2 - Histogram of the overall rating



As for traveller type, approximately half (47%) of the passengers travel alone for leisure, which is more than twice higher than couple leisure (17%), family leisure (15%), and business travellers (21%).

Table 3 - Descriptive statistics by traveller type

Type of Traveller	Frequency	%
Solo Leisure	950	46.68
Couple Leisure	343	16.86
Family Leisure	310	15.23
Business	432	21.23
Total	2035	100.00

Differences between the four groups are summarized in Table 4. The results of the non-parametric test One Way ANOVA revealed that the “overall rating” varies according to the traveller type ($F=7.231$; $p=0.000$). Business travellers showed a highest value (7.1) and couple leisure the lowest (6.2). Couple leisure travellers held the lowest averages in all service attributes and overall rating. Solo leisure passengers evaluate service quality, in all dimensions, with higher average score, than total average. In contrast, the average scores from couples are lower in all dimensions. The averages for “ground service” and “value for money” from family leisure group are below the average for all travellers, while business travellers score less in “inflight entertainment”.

Table 4 – Descriptive data for variables by traveller type

Variable	Solo Leisure		Couple Leisure		Family Leisure		Business	
	Average	SD	Average	SD	Average	SD	Average	SD
Seat comfort*	3.71	1.25	3.46	1.37	3.75	1.26	3.81	1.21
Cabin staff service*	4.12	1.36	3.63	1.56	4.04	1.40	4.09	1.42
Food and beverage*	3.56	1.35	3.26	1.46	3.54	1.35	3.56	1.41
Inflight entertainment*	3.45	1.27	3.13	1.42	3.44	1.31	3.34	1.34
Ground service*	3.69	1.48	3.16	1.60	3.56	1.54	3.66	1.43
Value for money*	4.02	1.30	3.71	1.50	3.87	1.41	3.99	1.35
Overall rating**	7.00	2.99	6.18	3.29	6.94	3.09	7.09	2.96

Note: *Assessed with a 5-point scale (1-5); ** Assessed with a 10-point scale (1-10)

More than two thirds (73.6%) of all passengers intended to recommend the airline company. The results of the Chi-square test of independence revealed the existence of association between the intention to recommend and traveller type ($X^2=21.799$; $p=0.000$). Table 5 compares also the proportion (63.9%) of couple leisure travellers who intended to recommend, which is below other groups, while business travellers are more likely to recommend than others.

Table 5 - Descriptive data for recommendation by traveller type

Recommendation	Solo Leisure		Couple Leisure		Family Leisure		Business		Total	
	N	%	N	%	N	%	N	%	N	%
Not Recommend	231	24.3	125	36.4	79	25.5	102	23.6	537	26.4
Recommend	719	75.7	218	63.6	231	74.5	330	76.4	1498	73.6

4.2 Determinants of overall service quality perception

This section presents the results of multiple linear regression in order to test the impact of determinants (i.e., service attributes) on overall perception. Besides, different results between traveller types are analysed and discussed.

According to the ANOVA tests of the four multiple linear regression models based on traveller type and ANOVA of all samples, at least one of the independent variables has a significant impact on overall service perception. The attributes explain approximately 90 per cent of differences in overall service quality perception, on all samples (89.4%), solo leisure (89.6%), couple leisure (89.2%), family leisure (90%) and business travellers (88.9%). Therefore, in order to estimate the significance of each independent variable, coefficients are analysed (Table 6).

Table 6 - Standardized coefficients of multiple linear regression

	Solo Leisure	Couple Leisure	Family Leisure	Business	All
Dependent variable: overall rating					
Seat comfort	0.085***	0.174***	0.126***	0.083***	0.028***
Cabin staff service	0.207***	0.173***	0.243***	0.288***	0.048***
Food and beverages	0.123***	0.143***	0.068*	0.075**	0.024***
Inflight entertainment	0.095***	0.062**	0.046*	0.054*	0.016***
Ground service	0.244***	0.249***	0.225***	0.142***	0.043***
Value for money	0.332***	0.257***	0.335***	0.403***	0.073***
Adj. R ²	0.896	0.892	0.900	0.889	0.894
F	1,363.038**	471.549**	464.358**	574.241**	2871.494**

Note: *Significant at 10%; **significant at 5%; ***significant at 1%

For all samples, all six service attributes have a significant and positive impact on “overall

rating". However, there are differences between traveller type groups. For solo and couple leisure travellers, all six service attributes are statistically significant at the 5% significance level; they positively influence the overall perception (all estimates are positive), as expected. The attribute "inflight entertainment" is not statistically significant for family leisure type as well as the business group. Interestingly, the "food and beverages" quality did not show any significant impact in terms of family travellers. "Value for money" has the most critical and positive influence on evaluating overall service quality in all four groups and all samples. However, the second most important attribute (in terms of average impact) vary. For solo leisure and couple leisure is "ground service", while for family leisure and business is "cabin staff service".

Meanwhile, the least significantly influential attribute for all observations is "inflight entertainment", for solo leisure traveller is "seat comfort", for couple leisure is "inflight entertainment", and for family and business passengers is "food and beverages".

In summary, all six independent variables are significant determinants in all samples, solo leisure and couple leisure travellers' overall perception. For family leisure travellers, five variables are significant: seat comfort, cabin staff service, inflight entertainment, ground service and value for money. While for business travellers, only "food and beverages" attribute is not significant.

4.3 Determinants of recommendation

In this section, the results of logistic regression by traveller type are presented for the purpose of investigating the significant determinants of passengers' intention to recommend. The regression models of four traveller types and of all observations are significant, which means that at least one of the independent variables determines passengers' intention to recommend.

As described in Table 7, only the attribute of "inflight entertainment" is not significant for all samples. While the significant determinants for each traveller type are different. However, "value for money" significantly and positively determines passengers' intention to recommend in all four types and in all samples ($\text{Exp(B)}_{\text{solo leisure}} = 5.661$, $\text{Exp(B)}_{\text{couple leisure}} = 5.622$, $\text{Exp(B)}_{\text{family leisure}} = 5.436$, $\text{Exp(B)}_{\text{business}} = 7.293$, $\text{Exp(B)}_{\text{all samples}} = 5.633$). In other words, passengers who evaluated "value for money" with higher scores, are more likely to recommend the airline brand.

"Inflight entertainment" is not statistically significant for all types of travellers and for all

samples. Moreover, “cabin staff service” quality significantly impacts recommendation, except for couple leisure passengers. “Ground service” quality is significant for all types, except family leisure. Only for couple leisure travellers, the “seat comfort” attribute is statistically significant. “Food and beverages” quality merely influence solo leisure passengers. Consequently, it suggests that Chinese airlines should pay special attention to “value for money”, “inflight staff service” and “ground service” quality in terms of boosting passenger recommendation.

Table 7 – Coefficients of logistic regression

	Solo Leisure	Couple Leisure	Family Leisure	Business	All
Dependent variable: Intention to recommend					
Seat comfort	1.413*	2.839***	2.101	1.139	1.678***
Cabin staff service	2.186***	1.486	2.363**	2.801***	2.189***
Food and beverages	2.127***	1.755	1.752	1.604	1.831***
Inflight entertainment	0.751	0.827	1.015	0.681	0.736*
Ground service	2.809***	2.919**	1.840*	2.177**	2.506***
Value for money	5.661***	5.622***	5.436***	7.293***	5.663***
Cox & Snell R ²	0.607	0.676	0.627	0.603	0.625
Nagelkerke R ²	0.905	0.926	0.924	0.906	0.911

Note: *Significant at 10%; **significant at 5%; ***significant at 1%

In brief, all service attributes except “inflight entertainment” are statistically significant for all samples on the recommendation. For solo leisure there are four significant determinants: value for money, ground service, cabin staff service, food and beverages. There are three significant attributes for couple leisure: value for money, ground service, and seat comfort. Only value for money and cabin staff service are significant for family leisure type. Value for money, cabin staff service, and ground service are significant for business travellers.

4.4 Content analysis of passenger reviews

In this section, the results of the content analysis of 2035 passenger reviews are presented. Figure 3 illustrates a word cloud of the two hundred most frequent words of all comments. As can be seen, the most frequent concepts are, for example, “flight,” “time,” and “service”.

Figure 3 – Word Cloud of passenger reviews

4.4.1 Theme of “flight”

The theme of “flight” is regarded as the most relevant theme, which is the core service of airlines. This theme consists of seven concepts: “flight” (count = 3943; relevance = 100%),

“[T]his flight was nice, but you just want to be finished with the long trip, so I do not remember much of this 4[-]hour flight. Air China had a nice special price for this trip, without the price I would have taken another option, with a much shorter transit stop.”

(Norway, Air China)

“We sat in the lounge from 6[pm] to 2:30[am] before [the] flight took off at 3:00[am]. To my most surprise, after 10:30[pm], there was no staff in the lounge and there were no snacks or food anymore.”

(China, China Eastern Airlines)

“[We had] a four[-]hour transit time which we needed, as the international long haul flights we took all required bus transfers from the plane to the terminal and reverse. The China Southern lounge covers two floors - the lower part is the catering area and offers hot and cold foods as well as hot/cold beverages and limited alcoholic drinks.

(New Zealand, China Southern Airlines)

“Tokyo Haneda to San Jose via Beijing. I have flown quite a bit and was curious to try out a 5-star Chinese airline. The ticket was a good deal and I had the chance to have a few hours in Beijing during my layover.”

(US, Hainan Airlines)

“staff” (1215; 31%), “time”(1253; 32%), “hours” (915; 23%), “long” (366; 9%), “lounge” (226; 6%), and “people”(171; 4%).

4.4.2 Theme of “food”

There are seven concepts of the second theme: “food”(1131; 29%), “meal”(701; 18%), “entertainment” (684; 17%), “provided” (526; 13%), “English” (461; 12%), “served” (323; 8%), and “movies” (341; 9%), which are related to the inflight supplementary services of full service airlines. A majority of passengers evaluated inflight supplementary services. There are

comments, for example:

“Good entertainment, [t]hey have Hindi and English movies. OK food.”

(US, China Southern Airlines)

“The in-flight entertainment had a lot of good [A]merican films but not so much tv shows.”

(US, China Eastern Airlines)

“Great food and drink[s], [two] mean meals and [a] free light meal between these with snacks.”

(US, Hainan Airlines)

“This has to be the worst service/food/treatment I've ever experienced. First the food was terrible. I couldn't even eat any of it and it seems that was a common thing for the people around me.”

(US, Air China)

4.4.3 Theme of “crew”

In this theme, concepts of “crew” (997; 25%), “cabin” (842; 21%), “attendants” (637; 16%), “friendly” (578; 15%), “helpful” (522; 13%), “nice” (501; 13%), “during” (283; 7%) are presented. The theme of “crew” is considered as passenger perception of airline staff service.

“The staff in Amsterdam was nice and helpful. From Amsterdam to Guangzhou airplane was A330, [the] cabin crew was friendly.”

(China, China Southern Airlines)

“Cabin crew on the international flights cannot communicate in any other language than Chinese. At the same time [,] you would not find them neither attentive nor friendly nor pleasant at [the] occasion.”

(Poland, Air China)

“Both customer service office[s] in Melbourne and [in] Sydney were very helpful. [...] Crew Very professional in all flights.”

(Australia, China Eastern Airlines)

“Hainan Airline[s] not only surprise me with how great their service was, but also let me fe[el] how important a well-trained flight attendant was for a customer with acrophobia, for the first time.”

(China, Hainan Airlines)

4.4.4 Theme of “service”

The Theme of “service” is made up of four concepts: “service” (1748; 44%), “Chinese” (414; 10%), “offered” (422; 11%), and “use” (404; 10%).

“The greatest improvement I realised is that mobile phones are allowed to use in flight mode, no longer having to switch off.” (Australia, China Southern Airlines)

“However, refills were offered more than twice. Wines were only Chinese or substandard European brands [;] beers onboard only Yanjing was provided.” (Denmark, Air China)

“They offered no accommodation, no apologies, despite it being their issue. I spent 300 AUD on accommodation out of my own pocket.” (Australia, China Eastern Airlines)

“We were immediately offered a welcome drink (including a choice of Champagne) and [we] were warm-heartedly taken care of, with help in stowing our belongings etc. This went on for the entire flight.” (Austria, Hainan Airlines)

4.4.5 Theme of “experience”

In this theme, passengers’ travel experiences are demonstrated with the concepts of “experience” (707; 18%), “fly” (647; 16%), “via” (892; 23%), and “price” (278; 7%).

“Overall, this experience confirms no price can justify such low quality, I will definitely never fly with them again.” (Netherland, China Eastern Airlines)

“But given the experience, bonuses and price, I would fly China Southern [Airlines] again.” (Netherland, China Southern Airlines)

“I will fly again with Hainan Airlines, maybe next time, I will invest in [the] business seat[s], as I've heard [that] it [was] awesome.” (China, Hainan Airlines)

“Bearing in mind the price of the flights I can't see what people complain about. Bearing in mind the overall standard and price I would fly again.” (UK, Air China)

4.4.6 Theme of “seat”

The theme of “seat” consists principally of the following concepts: “seat” (1402; 36%), “comfortable” (652; 17%), “clean” (306; 8%), “aircraft” (274; 7%), which are related to cabin facilities.

“The aircraft was quite new and clean. The seat was very comfortable.” (China, Hainan Airlines)

“The seats were comfortable and had a good recline.” (Ireland, China Eastern Airlines)

"[W]e boarded our flight back to Vancouver on a very old fashion plane where the seats were hard and uncomfortable." (Canada, Air China)

"I was pleasantly surprised with the quality of the aircraft, service and staff. Aircraft was clean and well maintained with very comfortable seats." (US, China Southern Airlines)

4.4.7 Theme of "boarding"

In this theme, travellers' evaluation relating to "boarding" (572; 15%), "plane" (534; 14%), "passengers" (541; 14%), and "leg" (351; 9%) are assumed.

"Boarding and [out]boarding in Shanghai was always by bus, so boarding time was 1 h[our] before take off." (France, Air China)

"For CAN-SFO leg, boarding was chaotic slightly as there a number of wheel-chair bound elderly passengers and airport assistants shouting and checking out using walkie-talkie before confirming with the shuttle bus that all were on[]board to the plane."

(Malaysia, China Southern Airlines)

"This makes the Shanghai to Yantai leg a domestic flight. Seven passengers including my mother w[ere] denied boarding." (United Arab Emirates, China Eastern Airlines)

"Boarding with too much checking, keeping people in a long line outside the plane (before going up the stairs, taken to the plane by bus) and then checking again when entering the plane. Though I could hear the movies loud enough on a low volume, crew messages were very quiet and could not be heard properly." (US, Hainan Airlines)

4.4.8 Theme of "airline"

This theme shows traveller perception of airline brands with the concepts of "airline" (1085; 28%), "trip" (448; 11%), and "customer" (346; 9%).

"Worst experience with this airline. Poor customer service round trip from the helpless crew in [John F. Kennedy International Airport] to the rude and lost in Shanghai."

(US, China Eastern Airlines)

"I ran into lots of trouble[s] on this trip, and it ended up costing me much more than if I had flown with a more reputable company [or] with better customer policies. I ended up paying lots of money for a very frustrating experience, not even able to take my trip after all." (Japan, Air China)

“It was, actually, beyond our expectations. We fly a lot and have been on a lot of airlines, but this was certainly one of the nicest experiences we had (if you ignore the poor lounge-performance). Highly recommended!” (Austria, Hainan Airlines)

“I have no complaints regarding China Southern [Airlines], you get what you pay for. If you want more legroom, a better quality of food and a larger selection of movies[,] then pay double the price for a better[-]known airline.” (UK, China Southern Airlines)

4.4.9 Theme of “airport”

The theme of “airport” is the evaluation related to ground service, with the concepts: “airport” (551; 14%), “delays” (441; 11%), “arrived” (384; 10%), “luggage” (336; 9%), “due” (181; 5%) and “hotel” (225; 6%).

“The issue was when I arrived Shanghai my luggage was still in Guangzhou. I need to stay at the airport 3 hours to pick up it otherwise I need to pay the bill for delivering my luggage to the hotel.” (US, China Southern Airlines)

“China Eastern Airlines lost our luggage on the way, so that the nightmare continued [...] To sum up, we arrived in Tokyo after a 38 hours trip and nearly 19 hours delay.” (France, China Eastern Airlines)

“Two legs delayed by an hour[.] [A]t least one was due to air traffic control restrictions which is not Air China's fault as such, but something you have to consider if you choose to transit through any airport in PRC. Also[,] worth knowing is that they will put you up in a cheap hotel [near] the airport if you have an overnight layover but you have to know to ask.” (Switzerland, Air China)

“My negative comment is during my transfer in Beijing airport, where I had just over two hours to transfer, someone that I believe was an employee of Hainan airlines [who] requested money for helping me take my luggage from terminal (arrival) to terminal (departure). I accepted due to politeness of employee and the fact I was nervous about this transfer and welcomed assistance, but I wonder whether I could have received same assistance without need to pay, as Hainan Airlines kiosks were located along the route.” (China, Hainan Airlines)

4.4.10 Theme of “check”

This theme is composed of “check” (454; 12%), “asked” (232; 6%), “minutes” (200; 5%), “gate” (177; 4%), “left” (162; 4%), and “security” (130; 3%).

“It would have been nice to have been able to check my baggage at [Taiwan Taoyuan International Airport] much earlier and still take a train to visit a nearby area for example like Zhongli. I arrived at the airport 5 hours before the flight since I had to check out of my hotel anyway. But then I had to wait until about 2.5 hours before departure before I was allowed to actually check my bag in, so I ended up spending a long time just sitting at the airport.”

(Germany, Air China)

“We were guided to the transfer desk, security check and the pointed to the next departure gate. All done in 20 mins.”

(US, Hainan Airlines)

“It took me more than 90 minutes of my two-hour transfer time to get through [customs] and security on the way to Beijing, and only slightly less on the way back. The whole process is chaotic after passport control on the way into China, you have to queue to get a golf cart to domestic departures, where you're left with no signage or directions at all.”

(Australia, China Southern Airlines)

“One was received the next day but another one got held at [Shanghai Pudong International Airport] for security check. I was asked if the staff at [Shanghai Pudong International Airport] actually can destroy my lock (my suitcase is Commodore brand, meaning if they did, the whole suitcase would be destroyed!)”

(Taiwan China, China Eastern Airlines)

4.4.11 Theme of “return”

In the last theme, only two concepts are presented, which are “return” (322; 8%) and “tickets” (242; 6%).

“The ticket only states that [if] rebooking they will recalculate fees so that leaves them free to charge what they want. I could have booked a cheaper ticket on the spot going to Expedia but then they were going to cancel my return flight and I was returning with my friend which was already there.”

(US, Air China)

“We purchased our return tickets to Phuket from Vancouver for only \$679 which was the only bright side of this flight. Our flight from Vancouver to Nanjing was cramped and the seats were way too small for two adult men who are 5’10 and 6’2.”

(Canada, China Eastern Airlines)

“My flight was one way from Seattle to Bangkok, and at first[,] they would not let me check[-]in, indicating I needed a return ticket. This is actually normal. I was a bit frustrated and[,] in my panic[,] neglected to say I had a visa.”

(New Zealand, Hainan Airlines)

“Recently I flew from Guangzhou to Amsterdam with China Southern Airlines in economy class, and I will fly back again in January. The price of the return ticket was acceptable because of some holiday discount from the official website.”

(China, China Southern Airlines)

CHAPTER 5 – CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 Conclusions

This dissertation has discussed the impact of airlines’ service attributes (seat comfort, cabin staff service quality, food and beverages, inflight entertainment, ground service, value for money) on passengers’ overall perception and their intention to recommend. Moreover, travellers’ e-WOM was also be investigated and presented as themes and concepts.

The results of this investigation show that, to begin with, for solo and couple leisure travellers, the six service attributes are all statistically significant in terms of passengers’ overall quality perception, but the attribute of inflight entertainment is not significant for family leisure and business passengers, besides, for family leisure passengers, food and beverages service quality is also not significant. Second, value for money is the most important attribute for all types of travellers in both overall service quality perception and passengers’ intention to recommend, while, inflight entertainment has the least impact. Third, in terms of intention to recommend, four attributes (cabin staff service, food and beverage, ground service, value for money) are significant for solo leisure travellers. Only ground service and value for money are statistically significant, and for family leisure and business passengers, only cabin staff service and value for money. Last but not least, content analysis revealed eleven mind themes (“flight”, “food”, “crew”, “service”, “experience”, “seat”, “boarding”, “airline”, “airport”,

“check” and “return”) of passengers’ reviews related to their overall experience.

5.2 Implications

These findings may have managerial implications for Chinese airlines to understand and confirm customer needs and their perception of service quality, which provide a possibility to improve customer experience and to develop brand preference. Moreover, these findings have important implications for developing customer recommendation through electronic word-of-mouth.

First of all, according to the Annual Reports (2019) of Air China, China Eastern Airlines, Hainan Airlines, and China Southern Airlines, all four airlines are committed to develop an international strategy. Nevertheless, the “Passenger Load Factor” and “average Revenue per Passenger Kilometre” of international routes are below domestic routes. Hence, it is important for Chinese airlines to improve brand preference through increasing passenger satisfaction. Since the ratings and reviews are written by passengers from 62 countries, the results of this investigation provide Chinese airlines with better understanding of international customer perception of service quality and the determinants of their satisfaction. Second, the perception of “value for money” is nothing but crucial for all types of traveller. Passengers express their satisfaction and intention to recommend when they evaluated value for money high. The evidence from the dissertation suggests that Chinese airlines are supposed to give close attention to value for money in terms of service quality.

5.3 Limitations and suggestions for future research

Finally, a number of limitations need to be considered. First, due to the small observation number of couple leisure, family leisure and business travellers, the results may have limited generalizability. Second, only ratings and reviews of Air China, China Southern Airlines, China Eastern Airlines and Hainan Airlines were included in the analysis, which may not represent the passenger perception of Chinese airline industry. Third, the data was extracted from the website of Skytrax, and the reviews are in English, which indicates that the results not include the reviews of many Chinese passengers. Finally, only six attributes were included in analysis, nevertheless, other variables (e.g., brand, route and flight type, cabin WIFI and connectedness) may have impact on dependent variables.

Furthermore, there are some suggestions for further research. The data of Chinese passengers and reviews of more Chinese airline brands from Chinese online travel platforms such as Ctrip and Fliggy can be gathered and analysed. Finally, more variables can be included in the

analysis, and other advanced data analysis methods can be used.

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Appendices:

Appendix 1. Questionnaire of airline service quality in Skytrax

Submit your airline review

* is required

1. Your Name *

HIDE YOUR NAME : We can publish your review using a screen name (not your real name), but we need to see the correct customer name details on ticketing you provide to be able to do this (select option below).

2. How do you want to Verify your Review?

Please choose below how you would like to verify your review, and select if you want a "screen name" to be used instead of your real name.

- OK** : I will attach my e-ticket / boarding pass now **OK** : I will verify my review later (*by email*)

3. Your Email Address *

4. Country where you live *

5. Which airline are you reviewing? *

6. When did you last fly with this airline? *

7. Your route? *

8. Cabin flown *

- First Class Business Class Premium Economy Economy Class

9. Aircraft type (if known)

20. What type of traveller are you? *



Business



Family



Couple



Solo

21. Do you want to add any photos of this trip?

Please upload photos less than 5mb and in .jpg or .png format. Maximum of 5 photos.



Any images you upload must be your personal trip photos. You guarantee they have no restrictions or license agreements and are free of any copyright protection. All photos must be relevant to the review.

I agree to the Skytrax Editorial policy *

[View Skytrax Editorial policy](#)

resource: www.airlinequality.com/write-a-review/?type=airline

Appendix 2. Descriptive Statistics for Categorical Variables

Airline Brand

	N	%	Cumulative %
Air China	381	18.7	18.7
China Eastern Airlines	258	12.7	31.4
Hainan Airlines	230	11.3	42.7
China Southern Airlines	1166	57.3	100.0
Total	2035	100.0	

Type of Traveller

	N	%	Cumulative %
Solo Leisure	950	46.7	46.7
Couple Leisure	343	16.9	63.5
Family Leisure	310	15.2	78.8
Business	432	21.2	100.0
Total	2035	100.0	

Cabin Class

	N	%	Cumulative %
Economy Class	1403	68.9	68.9
Premium Economy	62	3.0	72.0
Business Class	514	25.3	97.2
First Class	56	2.8	100.0
Total	2035	100.0	

Route Type

	N	%	Cumulative %
Domestic Route	147	7.2	7.2
International Route	1888	92.8	100.0
Total	2035	100.0	

Flight Type

	N	%	Cumulative %
Direct Flight	1094	53.8	53.8
Indirect Flight	941	46.2	100.0
Total	2035	100.0	

Intention to Recommend

	N	%	Cumulative %
Not Recommended	537	26.4	26.4
Recommended	1498	73.6	100.0
Total	2035	100.0	

Flight Date

	N	%	Cumulative %
AUG 2014	1	.0	.0
OCT 2014	1	.0	.1

DEC 2014	2	.1	.2
FEB 2015	1	.0	.2
APR 2015	3	.1	.4
MAY 2015	2	.1	.5
JUN 2015	25	1.2	1.7
JUL 2015	29	1.4	3.1
AUG 2015	33	1.6	4.8
SEP 2015	23	1.1	5.9
OCT 2015	40	2.0	7.9
NOV 2015	51	2.5	10.4
DEC 2015	48	2.4	12.7
JAN 2016	82	4.0	16.8
FEB 2016	49	2.4	19.2
MAR 2016	56	2.8	21.9
APR 2016	49	2.4	24.3
MAY 2016	36	1.8	26.1
JUN 2016	52	2.6	28.6
JUL 2016	26	1.3	29.9
AUG 2016	43	2.1	32.0
SEP 2016	42	2.1	34.1
OCT 2016	35	1.7	35.8
NOV 2016	45	2.2	38.0
DEC 2016	60	2.9	41.0
JAN 2017	78	3.8	44.8
FEB 2017	46	2.3	47.1
MAR 2017	63	3.1	50.2
APR 2017	52	2.6	52.7
MAY 2017	50	2.5	55.2
JUN 2017	39	1.9	57.1
JUL 2017	51	2.5	59.6
AUG 2017	54	2.7	62.3
SEP 2017	44	2.2	64.4
OCT 2017	46	2.3	66.7
NOV 2017	45	2.2	68.9

DEC 2017	46	2.3	71.2
JAN 2018	52	2.6	73.7
FEB 2018	35	1.7	75.4
MAR 2018	55	2.7	78.1
APR 2018	55	2.7	80.8
MAY 2018	50	2.5	83.3
JUN 2018	42	2.1	85.4
JUL 2018	32	1.6	86.9
AUG 2018	37	1.8	88.7
SEP 2018	37	1.8	90.6
OCT 2018	24	1.2	91.7
NOV 2018	46	2.3	94.0
DEC 2018	31	1.5	95.5
JAN 2019	42	2.1	97.6
FEB 2019	15	.7	98.3
MAR 2019	23	1.1	99.5
APR 2019	11	.5	100.0
Total	2035	100.0	

Appendix 3. Statistics for review writers

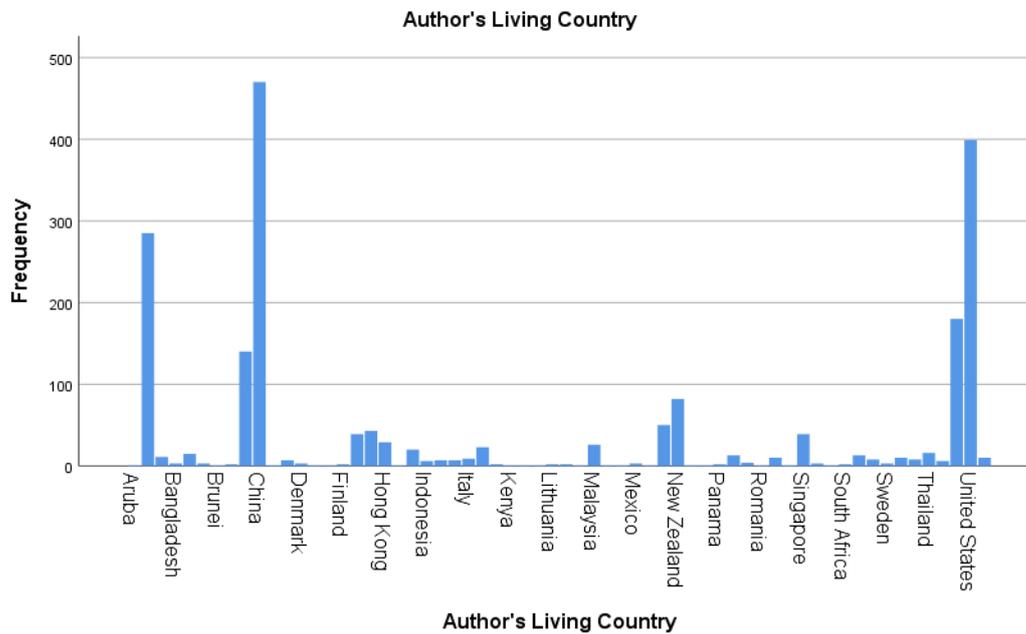
Reviewer's Living Country

	N	%	Cumulative %
Aruba	1	.0	.0
Australia	285	14.0	14.1
Austria	11	.5	14.6
Bangladesh	3	.1	14.7
Belgium	15	.7	15.5
Brazil	3	.1	15.6
Brunei	1	.0	15.7
Cambodia	2	.1	15.8

Canada	140	6.9	22.7
China	470	23.1	45.7
Costa Rica	1	.0	45.8
Czech Republic	7	.3	46.1
Denmark	3	.1	46.3
Ecuador	1	.0	46.3
Estonia	1	.0	46.4
Finland	2	.1	46.5
France	39	1.9	48.4
Germany	43	2.1	50.5
Hong Kong	29	1.4	51.9
Hungary	1	.0	52.0
India	20	1.0	53.0
Indonesia	6	.3	53.3
Ireland	7	.3	53.6
Israel	7	.3	54.0
Italy	9	.4	54.4
Japan	23	1.1	55.5
Kazakhstan	2	.1	55.6
Kenya	1	.0	55.7
Kuwait	1	.0	55.7
Laos	1	.0	55.8
Lithuania	2	.1	55.9
Luxembourg	2	.1	56.0
Macau	1	.0	56.0
Malaysia	26	1.3	57.3
Malta	1	.0	57.3

Mauritius	1	.0	57.4
Mexico	3	.1	57.5
Nepal	1	.0	57.6
Netherlands	50	2.5	60.0
New Zealand	82	4.0	64.1
Norway	1	.0	64.1
Pakistan	1	.0	64.2
Panama	2	.1	64.3
Philippines	13	.6	64.9
Poland	4	.2	65.1
Romania	1	.0	65.2
Russian Federation	10	.5	65.7
Saudi Arabia	1	.0	65.7
Singapore	39	1.9	67.6
Slovakia	3	.1	67.8
Slovenia	1	.0	67.8
South Africa	2	.1	67.9
South Korea	13	.6	68.6
Spain	8	.4	68.9
Sweden	3	.1	69.1
Switzerland	10	.5	69.6
Taiwan	8	.4	70.0
Thailand	16	.8	70.8
United Arab Emirates	6	.3	71.1
United Kingdom	180	8.8	79.9
United States	399	19.6	99.5
Vietnam	10	.5	100.0

Total	2035	100.0
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Appendix 4. ANOVA test of traveller type on overall rating

ANOVA

Overall Rating

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	201,726	3	67,242	7,231	,000
Within Groups	18885,799	2031	9,299		
Total	19087,525	2034			

Appendix 5. Multiple linear regression model summary by traveller type

Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.946 ^a	.895	.894	.0997

a. Predictors: (Constant), value_for_money, inflight_entertainment, seat_comfort, ground_service, food_and_beverages, cabin_staff_service

* all samples

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,947 ^b	,897	,896	,963

- a. Type of Traveller = Solo Leisure
 b. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,945 ^b	,894	,892	1,081

- a. Type of Traveller = Couple Leisure
 b. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,950 ^b	,902	,900	,978

- a. Type of Traveller = Family Leisure
 b. Predictors: (Constant), Value for Money, Inflight Entertainment, Cabin Staff Service, Seat Comfort, Ground Service, Food and Beverages

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,944 ^b	,890	,889	,988

- a. Type of Traveller = Business
 b. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

Appendix 6. ANOVA test of multiple linear regression by traveller type

ANOVA^{*a}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	171.257	6	28.543	2871.494	.000 ^b
	Residual	20.168	2029	.010		

Total	191.426	2035			
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a. Dependent Variable: overall rating

b. Predictors: (Constant), value_for_money, inflight_entertainment, seat_comfort, ground_service, food_and_beverages, cabin_staff_service

* all samples

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7581,775	6	1263,629	1363,038	,000 ^c
	Residual	874,225	943	,927		
	Total	8456,000	949			

a. Type of Traveller = Solo Leisure

b. Dependent Variable: Overall Rating

c. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3307,949	6	551,325	471,549	,000 ^c
	Residual	392,844	336	1,169		
	Total	3700,793	342			

a. Type of Traveller = Couple Leisure

b. Dependent Variable: Overall Rating

c. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2663,092	6	443,849	464,358	,000 ^c
	Residual	289,618	303	,956		
	Total	2952,710	309			

a. Type of Traveller = Family Leisure

b. Dependent Variable: Overall Rating

c. Predictors: (Constant), Value for Money, Inflight Entertainment, Cabin Staff Service, Seat Comfort, Ground Service, Food and Beverages

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3361,634	6	560,272	574,241	,000 ^c
	Residual	414,662	425	,976		
	Total	3776,296	431			

a. Type of Traveller = Business

b. Dependent Variable: Overall Rating

c. Predictors: (Constant), Value for Money, Inflight Entertainment, Seat Comfort, Ground Service, Food and Beverages, Cabin Staff Service

Appendix 7. Coefficients of multiple linear regression by traveller type

Coefficients*^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.190	.007		-25.856	.000
	seat_comfort	.028	.003	.114	9.157	.000
	cabin_staff_service	.048	.003	.223	15.497	.000
	food_and_beverages	.024	.003	.110	7.974	.000
	inflight_entertainment	.016	.003	.068	5.596	.000
	ground_service	.043	.003	.214	16.593	.000
	value_for_money	.073	.003	.328	23.965	.000

a. Dependent Variable: overall rating

* all samples

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2,101	,110		-19,034	,000
	Seat Comfort	,203	,043	,085	4,695	,000
	Cabin Staff Service	,454	,044	,207	10,334	,000
	Food and Beverages	,273	,043	,123	6,364	,000
	Inflight Entertainment	,223	,041	,095	5,379	,000
	Ground Service	,451	,038	,224	11,992	,000
	Value for Money	,763	,044	,332	17,434	,000

a. Type of Traveller = Solo Leisure

b. Dependent Variable: Overall Rating

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,794	,171		-10,498	,000

Seat Comfort	,418	,076	,174	5,519	,000
Cabin Staff Service	,364	,079	,173	4,578	,000
Food and Beverages	,322	,078	,143	4,127	,000
Inflight Entertainment	,143	,065	,062	2,194	,029
Ground Service	,512	,066	,249	7,807	,000
Value for Money	,563	,074	,257	7,586	,000

a. Type of Traveller = Couple Leisure

b. Dependent Variable: Overall Rating

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,782	,186		-9,563	,000
	Seat Comfort	,308	,082	,126	3,760	,000
	Cabin Staff Service	,538	,079	,243	6,782	,000
	Food and Beverages	,156	,082	,068	1,895	,059
	Inflight Entertainment	,110	,073	,046	1,511	,132
	Ground Service	,453	,069	,225	6,539	,000
	Value for Money	,736	,087	,335	8,509	,000

a. Type of Traveller = Family Leisure

b. Dependent Variable: Overall Rating

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,682	,164		-10,244	,000
	Seat Comfort	,203	,066	,083	3,089	,002
	Cabin Staff Service	,599	,070	,288	8,563	,000
	Food and Beverages	,158	,067	,075	2,347	,019
	Inflight Entertainment	,118	,062	,054	1,896	,059
	Ground Service	,294	,057	,142	5,181	,000
	Value for Money	,881	,069	,403	12,677	,000

a. Type of Traveller = Business

b. Dependent Variable: Overall Rating

Appendix 8. Omnibus test of model coefficients of logistic regression by traveller type

Omnibus Tests of Model Coefficients*

		Chi-square	df	Sig.
Step 1	Step	1994,768	6	,000
	Block	1994,768	6	,000
	Model	1994,768	6	,000

*all samples

Omnibus Tests of Model Coefficients^a

		Chi-square	df	Sig.
Step 1	Step	886,330	6	,000
	Block	886,330	6	,000
	Model	886,330	6	,000

a. Type of Traveller = Solo Leisure

Omnibus Tests of Model Coefficients^a

		Chi-square	df	Sig.
Step 1	Step	387,014	6	,000
	Block	387,014	6	,000
	Model	387,014	6	,000

a. Type of Traveller = Couple Leisure

Omnibus Tests of Model Coefficients^a

		Chi-square	df	Sig.
Step 1	Step	305,768	6	,000
	Block	305,768	6	,000
	Model	305,768	6	,000

a. Type of Traveller = Family Leisure

Omnibus Tests of Model Coefficients^a

		Chi-square	df	Sig.
Step 1	Step	398,658	6	,000
	Block	398,658	6	,000
	Model	398,658	6	,000

a. Type of Traveller = Business

Appendix 9. Logistic regression model summary by traveller type

Model Summary*

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
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1	360.690 ^a	.625	.911
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a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

* all samples

Model Summary^a

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	167,587 ^b	,607	,905

a. Type of Traveller = Solo Leisure

b. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Model Summary^a

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	62,951 ^b	,676	,926

a. Type of Traveller = Couple Leisure

b. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Model Summary^a

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	46,138 ^b	,627	,924

a. Type of Traveller = Family Leisure

b. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Model Summary^a

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	73,566 ^b	,603	,906

a. Type of Traveller = Business

b. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Appendix 10. Coefficients of logistic regression by traveller type

Variables in the Equation*

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a seat_comfort	.518	.156	10.960	1	.001	1.678
cabin_staff_service	.783	.137	32.468	1	.000	2.189
food_and_beverages	.605	.158	14.706	1	.000	1.831

inflight_entertainment	-.307	.157	3.818	1	.051	.736
ground_service	.919	.130	50.050	1	.000	2.506
value_for_money	1.734	.189	84.202	1	.000	5.663
Constant	-13.646	.937	212.002	1	.000	.000

a. Variable(s) entered on step 1: seat_comfort, cabin_staff_service, food_and_beverages, inflight_entertainment, ground_service, value_for_money.

* all samples

Variables in the Equation^a

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^b Seat Comfort	,346	,248	1,945	1	,163	1,413
Cabin Staff Service	,782	,204	14,679	1	,000	2,186
Food and Beverages	,755	,245	9,499	1	,002	2,127
Inflight Entertainment	-,286	,240	1,424	1	,233	,751
Ground Service	1,033	,195	28,107	1	,000	2,809
Value for Money	1,734	,277	39,307	1	,000	5,661
Constant	-14,128	1,432	97,389	1	,000	,000

a. Type of Traveller = Solo Leisure

b. Variable(s) entered on step 1: Seat Comfort, Cabin Staff Service, Food and Beverages, Inflight Entertainment, Ground Service, Value for Money.

Variables in the Equation^a

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^b Seat Comfort	1,043	,378	7,601	1	,006	2,839
Cabin Staff Service	,396	,320	1,535	1	,215	1,486
Food and Beverages	,562	,388	2,105	1	,147	1,755
Inflight Entertainment	-,190	,386	,243	1	,622	,827
Ground Service	1,071	,341	9,887	1	,002	2,919
Value for Money	1,727	,442	15,236	1	,000	5,622
Constant	-14,525	2,416	36,136	1	,000	,000

a. Type of Traveller = Couple Leisure

b. Variable(s) entered on step 1: Seat Comfort, Cabin Staff Service, Food and Beverages, Inflight Entertainment, Ground Service, Value for Money.

Variables in the Equation^a

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^b Seat Comfort	,742	,508	2,136	1	,144	2,101
Cabin Staff Service	,860	,426	4,072	1	,044	2,363

Food and Beverages	,561	,419	1,791	1	,181	1,752
Inflight Entertainment	,015	,425	,001	1	,971	1,015
Ground Service	,610	,362	2,841	1	,092	1,840
Value for Money	1,693	,529	10,234	1	,001	5,436
Constant	-14,065	2,668	27,787	1	,000	,000

a. Type of Traveller = Family Leisure

b. Variable(s) entered on step 1: Seat Comfort, Cabin Staff Service, Food and Beverages, Inflight Entertainment, Ground Service, Value for Money.

Variables in the Equation^a

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^b Seat Comfort	,131	,381	,117	1	,732	1,139
Cabin Staff Service	1,030	,319	10,416	1	,001	2,801
Food and Beverages	,473	,339	1,940	1	,164	1,604
Inflight Entertainment	-,384	,367	1,097	1	,295	,681
Ground Service	,778	,288	7,279	1	,007	2,177
Value for Money	1,987	,501	15,757	1	,000	7,293
Constant	-13,068	2,173	36,171	1	,000	,000

a. Type of Traveller = Business

b. Variable(s) entered on step 1: Seat Comfort, Cabin Staff Service, Food and Beverages, Inflight Entertainment, Ground Service, Value for Money.



* Word Cloud of China Southern Airlines (100 words)