A Comparative Evaluation of Airline Service Quality Using Online Content Analysis: A Case Study of Korean vs. International Airlines

Peter Ractham[a], Alan Abrahams[b], Richard Gruss[c], Eojina Kim[d], Zachary Davis[e], Laddawan Kaewkitipong[f*]

[a] Associate Professor, Thammasat Business School and Center of Excellence in Operations and Information Management, Thammasat University Bangkok, Thailand
[b] Associate Professor, Department of Business Information Technology, Virginia Tech VA, USA
[c] Assistant Professor, Department of Management Information Systems, Radford University VA, USA
[d] Assistant Professor, Department of Hospitality and Tourism Management, Virginia Tech VA, USA
[e] Assistant Professor, Davis College of Business, Jacksonville University FL, USA
[f] Associate Professor, Thammasat Business School and Center of Excellence in Operations and Information Management, Thammasat University Bangkok, Thailand

A B S T R A C T

Airlines can employ a variety of quality monitoring procedures. In this study, we employ a content analysis of 8 years of online reviews for Korean airlines in contrast to other international airlines. Online airline reviews are infrequent, relative to the total number of passengers – the number of reviews is multiple orders of magnitude lower than passenger volumes – and online airline reviews are, therefore, not representative of passenger attitudes overall. Nevertheless, online reviews may be indicative of specific service issues, and draw attention to aspects that require further study by airline operators. Furthermore, significant words and phrases used in these airline reviews may help airline operators to rapidly automate filtering, partitioning, and analysis of incoming passenger comments via other channels, including email, social media posts, and call center transcripts. The current study provides insights into the contents of online reviews of Korean vs Other-International airlines, and opportunities for service enhancement. Further, we provide a set of marker words and phrases that may be helpful for management dashboards that require automated partitioning of passenger comments.

Keywords: Service Quality, Service Attributes, Electronic Word-of-Mouth, Airlines, Customer Knowledge Management

Ⅰ. Introduction

The rising popularity of Hallyu, also known as the "Korean Wave", which describes South Korean popular culture, has made South Korea one of the top travel destinations in Asia (Kim and Nam, 2016).

More than 17 million inbound tourists visited South Korea in 2019, which is a significant rise compared to just the 5 million inbound tourists there were in 2000. Moreover, 90% of these tourists arrived by air (Korea Tourism Organization, 2020). The increase in the number of both domestic and international airlines has played an important role in boosting the South Korean tourism industry over the past 2 decades. Currently, Korean airlines include two Full Service Carriers (FSC) and six Low-Cost Carriers (LCC). The emergence and increase in the number of Korean LCC and FSC airlines have contributed largely to South Korea's growing tourism industry, accounting for approximately 4.7% of the country's GDP in 2018 (OECD, 2020). With the increase in the number of airlines and passenger flights, airline service quality has become an important issue; therefore, airlines increasingly need to monitor customer feedback to improve their services. A better understanding of what service attributes are of higher importance to passengers when they assess airline service quality is especially important for LCC airlines that tend to position themselves for good value (compared to price). For FSC airlines, the understanding of customer feedback is even more important as the competition is not only FSC airlines but also LCC airlines for both domestic and international airlines. Also, the airline industry is one of the most competitive industries among all service industry; therefore, this study aims to analyze a large data of airline customer reviews, as well as contribute a set of airline service attribute marker words that could be foundational to passenger comment analysis and airline service improvement.

Airline customers have few opportunities to give immediate or direct feedback to airlines once they have used the services. Although some airlines provide customers with both offline and online channels to provide feedback on their services, the direct channels, such as airline websites, can be very limited due to a lack of constant interaction between airline companies and their customers (Kirk et al., 2016a; Raaij and Pruyn, 1998). Hence, online travel forums have emerged as a popular way that airline customers can use to share their experiences, complaints, or compliments regarding service attributes and service quality of airlines. Customers can also share their past experiences, service expectations, personal needs, and service perceptions through online reviews. Studies have shown that online review sources have increased in popularity for customers with electronic word-of-mouth (e-WOM). Getting customer insights and feedback from online reviews is considered to be important, reliable, and useful, as online reviews are usually voluntarily written by customers (Lim and Lee, 2020; Kirk et al., 2016b). Airline companies can track, respond, and evaluate the needs of their customers through these channels. In the past few years, there are several studies (e.g., Brochado et al., 2019; Stamolampros et al., 2019; Chatterjee and Mandal, 2020; Lucini et al., 2020) attempting to identify airline service attributes and their relations to service quality perceived by customers. However, the prior studies did not provide a comprehensive list of marker words for each airline service attribute. The set of marker words for each airline service attribute can be used as inputs for machine learning or AI applications, such as chatbots.

This paper therefore sets out to 1) identify the attributes of airline service that are usually mentioned by customers when rating the airline's services, 2) build a set of significant marker words for each service attribute, and 3) compare the airline service attributes of Korean airlines and other international airlines to identify opportunities for service improvement and efficiency improvement. Practically, the compar-

ison allows Korean airlines to focus on their strengths and improve their weaknesses. Theoretically, an understanding of what attributes are of high importance to customers, and the set of airline service marker words, organized by attribute, is foundational for passenger comment content-analysis and airline service improvement.

Ⅱ. Literature Review

2.1. Theoretical Background

Customers' overall satisfaction or dissatisfaction could form their post-purchase intention, whether that is to complain, repurchase, not to purchase, or a combination of any of them (Hossain and Quaddus, 2012). Therefore, understanding customers' expectation and satisfaction is important. In consumer behavior literature, Expectation Confirmation Theory (ECT) has been widely used to understand satisfaction and post-purchase intention. According to ECT (Oliver, 1980; Oliver, 1981), customers' expectation and their perception towards performance of a certain product or service form positive, negative, or neutral confirmation, which, in turn, directly influences their satisfaction with the product or service and repurchase intention. As the airline industry is highly competitive, continued use or repurchase intention is of importance to the survival of an airline. This highlights the need to understand customers' expectations and what makes them satisfied or dissatisfied with airline services.

To understand customers' behavior, expectation and satisfaction, e-WoM, including online user/ customer reviews have been widely accepted as a useful source (Filieri and McLeay, 2014; Sithipolvanichgul et al., 2020). Marketing studies highlighted a sig-

nificant influence of e-WoM, including online reviews by users, on intention to purchase/re-purchase. Consumers also rely more on them as an important source of information when they make decisions about product purchase and consumption (Jang et al., 2012). In addition, online reviews can provide customer feedback that enables businesses to assess the quality of their products and services. In recent years, companies worldwide have relied on e-WoM as one of the most critical sources that enable them to gain feedback to improve on their products or services and, ultimately, to drive business performance and growth (Siering et al., 2018).

In addition to the attempt to learn from e-WoM, transforming customer e-WoM into a Customer Knowledge Management strategy has become much more prevalent in today's world (Choi and Scott, 2013). Customer Knowledge Management (CKM) is the process in which companies gain a better understanding of their customers through business processes and personal and information technologies (Garcia-Murillo and Annabi, 2002). CKM usually requires a vast amount of customer experience data, as well as a variety of customer personal data to transform customer information into knowledge about the customers. Hence, online user reviews can provide direct knowledge transfer from customers to companies or service providers and enable them to improve their service or product quality (Abrahams et al., 2012; Shaw and Williams, 2009).

Together, the three strands of literature in the marketing and customer behavior area form the basis of this study. They substantiate 1) the importance of online customer reviews (e-WoM), 2) the need to learn from online customer reviews to better understand how customers perceived services (airlines' services in this study), what are they are happy or not happy with, and 3) the need to transform online

customer reviews to the customer knowledge database. Ultimately, gaining customer feedback and recommendations of products/services can be beneficial to companies as it helps them to gain a better understanding of customer behaviors (Siering et al., 2018).

2.2. Related work in Airline Service Attributes and Airline Service Quality

In the context of airline industries, e-WoM has gained increasing attention for many years (Chiu et al., 2016). Many researchers have tried to identify, from using a number of online user reviews, the attributes or characteristics of services that customers value, as superior service seems to lead to customer retention and loyalty (Brochado, et al., 2019). Understanding how customers assess the service quality of an airline is important (Bellizzi et al., 2020). In fact, delivering high-quality service is considered a top priority for airlines (Namukasa, 2013). Airline service quality has been found to be significantly related to satisfaction (Ali et al., 2015; Kos Koklic et al., 2017), and satisfaction has been found to be related to purchase intention (Saha and Theingi, 2009), and an intention to reuse the service (Park, 2019). Satisfied passengers tend to give positive comments and are likely to repurchase, while the dissatisfied ones are likely to just change airlines without providing any feedback (Saha and Theingi, 2009). In particular, Park (2019) has found that customer in-flight experiences affect overall customer satisfaction and there is a significant relationship between the satisfaction and an intention to reuse the service. This highlight the need to identify the components or attributes of airline services that are important to customers.

Considering airline services, some researchers (e.g., Chen and Chang, 2005) divided airline services into the ground and in-flight services, while other researchers (e.g., Brochado et al., 2019) have looked at the service by using its stages, including before, during, and after flights. The fact that services in each stage could affect each other has made it complex and challenging for airlines to manage three different, separate operations (booking, inflight services, baggage claim) to reinforce each other (Lucini et al., 2020) identified 27 dimensions of satisfaction in airline services from online user reviews. In summary, airline services are complex and composed of various attributes at different service stages.

Therefore, many researchers have attempted to identify the attributes of airline service that are important to customers. According to Siering et al. (2018), airline services can be categorized into core service aspects and augmented service aspects. The core service aspects include aircraft, seat comfort, safety, and punctuality. Augmented service aspects include ground service, cabin staff service, food & beverages, inflight entertainment, as well as Wi-Fi & connectivity. Lacic et al. (2016) categorized online reviews into airport, lounge, airline, and seats. Airport reviews usually mention queuing, airport shopping, and terminal cleanliness. Satisfaction in the lounge is highly correlated with lounge comfort, the catering service, staff service, and area cleanliness. The airline reviews' top associated rating feature is value for money. Passengers also mentioned seat comfort and food & beverages. For seat reviews, the most correlating features are legroom, width, recline and aisle space.

Lim and Lee (2020) extracted online reviews to try to understand how service attributes should be defined and which dimension type is required to incorporate airline service-specific characteristics. The study showed that tangibility (e.g., seat comfort, lounge service) and reliability (e.g., transit and trans-

fer service, arrival, and departure punctuality) are the most significant dimensions of airline services for both full-service carriers and low-cost carriers. Sezgen et al. (2019) have found that seat comfort

<Table 1> Prior Studies that Conducted Text Analysis on Online Passenger Reviews

Authors	Research method	Findings
Lacic et al. (2016)	A correlation analysis of rating and textual features and a clustering analysis.	Four categories of topics can be identified: airport reviews, lounge reviews, airline reviews and seat reviews. Rating features, such as airport queuing time, lounge comfort, airline cabin staff quality and seat legroom size, were found to have highly contributed to overall traveler satisfaction.
Bogicevic et al. (2017)	A content analysis	Service, staff, cabin seat comfort, and entertainment are the most discussed themes in both the positive and negative reviews. Negative comments usually involve plane interior, service, timeliness, and seat comfort.
Korfiatis et al. (2018)	A Structural Topic Models (STM) method	Specific dimensions of airline services can predict satisfaction. Customer service is found highly related to increased satisfaction.
Siering et al. (2018)	Explanatory and predictive analyses	Both overall sentiment and aspect-related sentiment (including aircraft type, seats, safety, staff, entertainment, food and beverages, ground service, value for money, Wi-Fi, and punctuality) influence the recommendation decision A bag-of-words model (compared to the other two models, which used overall sentiment and aspect-specific sentiment as input variables) is best for predicting consumer recommendations with high accuracy.
Ban and Kim (2019)	A Text clustering analysis	Keyword classification revealed six categories, namely seat comfort, staff, entertainment, ground service, value for money and airline brand. Value for money had the highest impacts on customer satisfaction and recommendation.
Brochado et al. (2019)	A quantitative content analysis	Nine aspects of airline services are revealed, including flight, seats, services, staff, airlines, ticket classes, airports, entertainment and fly(ing). Seat, entertainment, service, and staff are frequently mentioned by customers who rated 4 (good) or 5 (very good) on value for money. Core inflight services (e.g. delays) and airport operations (e.g. lost, delayed or damaged luggage) are frequently mentioned by customers and rated low on value for money.
Stamolampros et al. (2019)	An ordered logistic regression analysis	There are variations in airline passengers' perceived service quality satisfaction, based on the passengers' inherent cultural values.
Chatterjee and Mandal (2020)	Linear regression and logistic regression analyses	Passengers in different classes (economy vs. business), who travel for different purposes (business vs. leisure) and are from different cultures (individualism and uncertainty avoidance), have different preferences and different levels of expectation that affect how they rate service quality.
Lucini et al. (2020)	A Latent Dirichlet Allocation (LDA) analysis and a sentiment analysis	There are significant differences in the distribution dimensions (e.g. food and drinks, onboard service, onboard entertainment) when considering passenger nationalities, passenger types (leisure, family, business), or cabin flown (business or economy). The top three dimensions that have the highest impact on airline recommendation are cabin staff, onboard service and value for money.

and legroom are important for customers across groups (economy and business). Similarly, Tahanisaz and Shokuhyar (2020) employed a clustering technique to group customers into different segments and determined the satisfaction attributes for each customer segment. Lucini et al. (2020) added that first-class passengers pay attention to customer service, while premium economy passengers are interested in comfort, and economy class passengers consider checking luggage and waiting time the most important service dimensions. Chatterjee and Mandal (2020) found that passengers in different classes (economy vs. business), who travel for different purposes (business vs. leisure) and are from different cultures (individualism and uncertainty avoidance), have different preferences and different levels of expectation that affect how they rate service quality.

<Table 1> below lists related studies that attempted to identify airline service attributes for various purposes. The service attributes from these studies were applied as a coding scheme for this study.

Lastly, we can see from <Table 1> that, while many studies applied text analysis techniques to identify airline service attributes and understand their importance or influence on customers' assessment of service quality and customer satisfaction, prior work did not provide lists of terms or marker words (i.e., an ontology) that could be used for coding and categorizing text into service attributes. Our study aims to address this void by employing a rigorous manual coding protocol, large-scale manual human labeling, and automated text-analysis following the manual labeling. Furthermore, we can leverage our large-scale Service Attribute-based labeling of online reviews to undertake Importance Performance Analysis (IPA) and Data Envelopment Analysis (DEA) to understand, respectively, the relative customer-satisfaction performance and relative efficiency in achieving customer satisfaction, of (for example) Korean vs Other-International airlines.

Ⅲ. Methodology

In this section, we describe our data sources, coding, and analysis procedures. We employed a large dataset containing customer-generated reviews of airline services from popular travel websites. Content analysis is a technique for making inferences by systematically and objectively identifying the special characteristics of messages (Holsti, 1968). It is a useful tool to determine the presence of words, concepts, or themes for qualitative data, such as text, picture, or video. Many prior tourism and hospitality studies have used content analysis to analyze online reviews (Pantelidis, 2010; Schukert et al., 2015; Yi et al., 2018). We employed a consolidated coding vocabulary from the past literature on airline service attributes for our analysis: see <Appendix A> for our content codes, and their origins in the past literature.

3.1. Dataset

We wrote a custom web scraper in Excel VBA (Visual Basic for Applications), which crawled and downloaded passenger reviews from airlinequality. com, an independent airline customer review forum created by Skytrax, the international air transport rating organization, based in London, England. In total a data set of 103,710 passenger reviews was obtained. Our custom web scraper then reformatted the data into tabular format in excel worksheet. The review data covered a period of roughly 8 years, from 1 April 2012 to 16 June 2020. A total of 402 international airlines were reviewed, of which 6 were airlines based in Korea (Air Busan, Asiana Airlines,

Eastar Jet, Jeju Air, Jin Air, and Korean Air).

3.2. Descriptive Statistics

<Table 2> provides descriptive statistics for the dataset, including the distribution of reviews by overall rating, by recommended status (whether the passenger recommends the airline), and by travel type, for Korean vs. other international airlines. The majority of Korean airline reviews were for Korean Air

<Table 2> Descriptive Statistics

Attributes	Korean Airlines	Other International Airlines
Total Airlines	6	396
Review Count	1,079	102,621
Mean Ratings (in parentheses) [Rating count in square brackets] Overall out of 10 points	7.7 (2.7) [1,070]	5.0 (3.5) [98,166]
Aspect ratings (out of 5 stars) Seat Comfort	3.9 (1.1) [970]	2.9 (1.4) [91,679]
Cabin Staff Service	4.3 (1.1) [970]	3.1 (1.6) [91,735]
Food & Beverage	3.9 (1.2) [926]	2.9 (1.5) [76,620]
Inflight Entertainment	3.6 (1.2) [874]	2.8 (1.5) [61,473]
Ground Service	3.7 (1.5) [444]	2.6 (1.6) [63,449]
Wi-Fi & Connectivity	2.9 (1.6) [73]	2.1 (1.5) [19,064]
Value for Money	4.0 (1.2) [1063]	2.9 (1.6) [100,240]
Percentage Recommending	78.5%	44.6%
Seat Type Economy	71%	78%
Premium Economy	0%	4%
Business	26%	14%
First	2%	2%
Not Specified	0%	3%
Travel Type Solo Leisure	18%	23%
Couple Leisure	8%	17%
Family Leisure	9%	13%
Business	8%	11%
Not Specified	58%	37%
Top 10 passenger home countries (count of the reviews written)	The United States (286) Australia (193) The United Kingdom (126) South Korea (75) Canada (42) Japan (37) Singapore (33) New Zealand (31) Hong Kong (28) Thailand (27)	The United States (27,284) The United Kingdom (20,574) Australia (10,232) Canada (7,346) Germany (2,961) India (2,059) Singapore (1,818) Netherlands (1,613) France (1,327) New Zealand (1,307)

and Aseana airlines (533 Korean Air, 476 Asiana Airlines, ≤ 20 for each of Air Busan, Jeju Air, Jin Air, Eastar Air).

Korean airlines scored, on average, higher on their overall assessment (out of 10 points) than other international airlines, and were higher on average, on all aspects, especially on Cabin Staff Service and Inflight Entertainment (△=1.2), Value For Money and Ground Service (△=1.1), Seat Comfort and Food & Beverage (△=1.0). The lower standard deviations for review ratings for Korean airlines indicate that customer sentiment was also less volatile for Korean airlines. The overwhelming majority of passengers recommended Korean airlines (78.5%) vs. a slight minority (44.6%) of their international counterparts. In both cases, Economy class passengers accounted for the majority of reviews (>70%); a greater proportion of Korean airline review writers were Business class passengers (26% vs. 14% for other international airlines).

For both Korean and other international airlines, most of the reviews were written by passengers from the United States, the UK, and Australia. Locals from South Korea were the next biggest segment of Korean travelers. The relatively higher proportion of reviews written by Germans, Indians, Dutch (the Netherlands), and French nationals for other international airlines, coupled with the observation that most travelers are Leisure travelers, indicates that opportunities may exist for Korea to attract more leisure travelers from their home countries.

<Table 3> breaks down the reviews by the year they were published (where this is known) for Korean vs. other international airlines.

3.3. Data Coding

The textual review body narrative in the dataset was coded by a team of undergraduate business students, who were provided with a 1-hour demonstration from the first author. The coders were provided with written instructions and examples in a coding protocol that followed the coding scheme shown in <Appendix A>.

A total number of 187 coders were given two weeks to code the online customer reviews, scraped

<Table 3> Reviews by Date of Publication and the Airlines' Home Country

Year	Korean	International
≤2010	4	3,471
2011	118	2,866
2012	183	4,456
2013	163	8,459
2014	118	13,741
2015	103	14,050
2016	118	12,163
2017	93	11,450
2018	78	13,518
2019	78	14,559
2020 (to June 16)	23	3,898
GRAND TOTAL	**1,079**	**102,631**

from airlinequality.com. All coders were provided with a tagging protocol created by the first and second authors. The tagging protocol was created and tested for clarity by 3 research assistants before it was distributed. Each review was coded into 12 categories and was tagged by one or more coders. The 12 categories were 1) Baggage, 2) Cleanliness, 3) Customer Service, 4) Flight Timeliness, 5) Food and Beverage, 6) In-Flight Entertainment, 7) Seating, 8) Upgrades, 9) Web or Mobile App, 10) Price, 11) Service Compliment and 12) Service Complaint
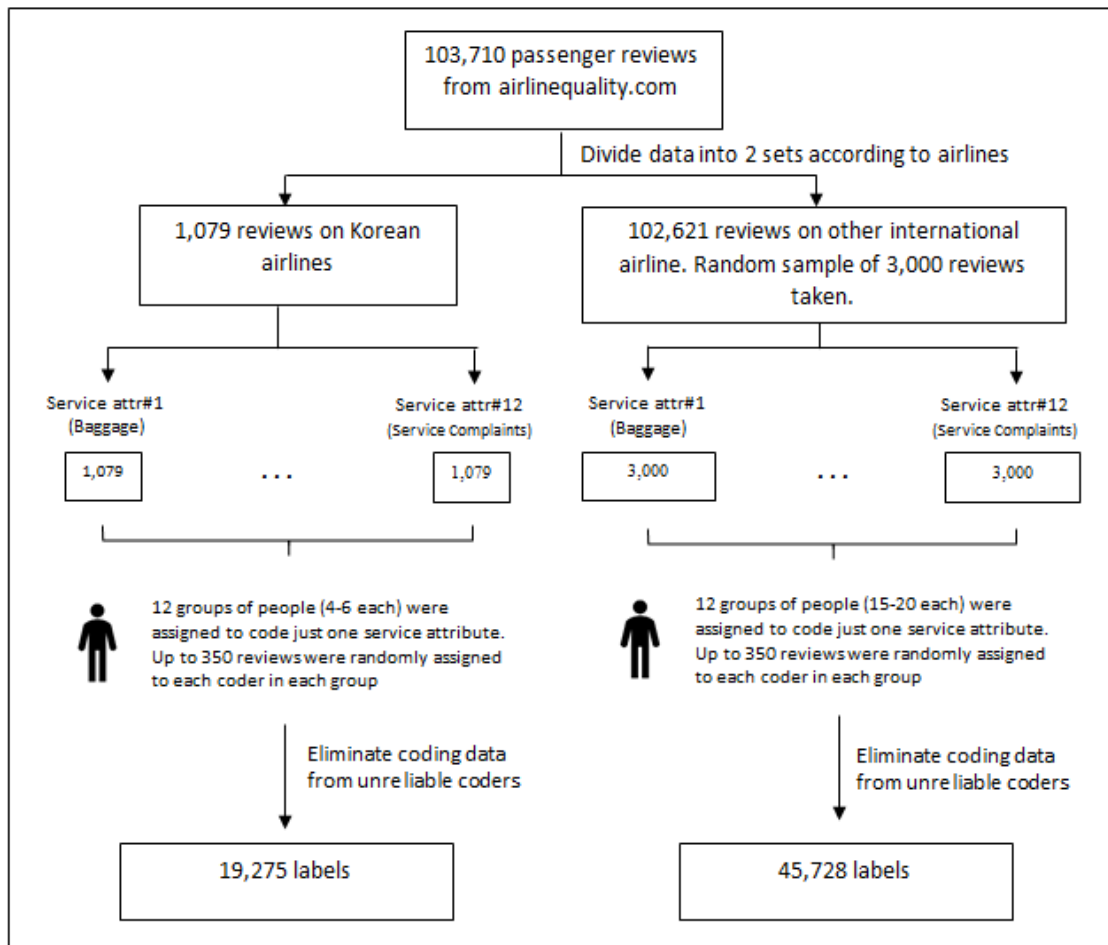
To ensure each coder had good focus and an understanding of a single service attribute category, each coder was assigned to code only one of the 12 service attribute categories (e.g., Food and Beverage) Coders were first assigned into groups to ensure good coverage of each dataset, and coders in each group were assigned random reviews by our proprietary collaborative tagging software (PamTag), with each coder asked to code 350 reviews. Values of "Unhappy", "Happy", or "Not Mentioned" were available for all the codes, except Service Complaints and Compliments, which had values of "Mentioned" or "Not Mentioned" only. All coders were asked to capture the specific text snippet (e.g., "the food was delicious"), which indicated that the review conformed with the code they chose.

The 1,079 Korean airline reviews were duplicated into 12 Korean Airline projects: one project for each Service Attribute (Baggage, Cleanliness, Customer Service, Flight Timeliness, Food & Beverage, In-Flight Entertainment, Price, Seating, Service Compliments, Service Complaints, Upgrades, Website or Mobile App. Each project (1,079 Korean airline reviews x 12 Service Attributes) was assigned its own group of 4-6 distinct students, with each student coding up to 350 reviews for a single Service Attribute only (to ensure that the student was fully focused on only

one Service Attribute), independently. PamTag randomly assigns reviews to coders, ensuring that all reviews get tagged at least once, and some reviews get tagged by multiple taggers. On average, each of the 12 Korean projects (of 1,079 Korean airline reviews, that were coded on only one Service Attribute, per project) received 1,594 labels. Every one of the 1,079 Korean reviews was coded on that single Service Attribute by one student, and some were coded by multiple students.

For the Other-International Airlines, 3,000 reviews were randomly selected from the full dataset of 102,631 Other-International Airlines to ensure manual coding was manageable with the available student resources. The 3,000 International airlines reviews were duplicated into 12 Other-International Airlines projects: again, one project for each Service Attribute. As each project was larger (3,000 reviews each for Other-International Airlines, compared to 1,079 Korean airline reviews), 15-20 distinct students were assigned to each project. Again, each student coded up to 350 reviews for a single Service Attribute only, independently. Again, assigning each student to only a single Service Attribute allowed each student full-focus on just one Service Attribute. PamTag randomly assigns reviews to coders, ensuring that all reviews get tagged at least once, and some reviews get tagged by multiple taggers. On average, each of the 12 Other-International-Airlines projects (of 3,000 Other-International airline reviews, being coded on only one Service Attribute, per project) received 3,811 labels: every one of the 3,000 reviews was coded on that single Service Attribute by one student, and some were coded by multiple students. <Figure 1> provides a visual illustration of the data coding steps described in the two paragraphs above.

Data from unreliable coders – for instance, coders who failed to capture text snippets for more than

<Figure 1> Data Coding Steps

10% of chosen codes – were eliminated from the dataset. After the elimination of data from unreliable coders, 19,275 total labels remained in the Korea data set (12 projects x about 1,600 labels per project), vs. 45,728 labels (12 projects x about 3,800 labels per project) in the Comparative (Other International airlines) dataset.

<Table 4> indicates the kappa score, number of overlapping cases (records coded by multiple coders), and reliability interpretation (Landis and Koch, 1977) for each code that was utilized. When we had two opinions on the same attribute for a review, we picked one at random. When we had more than two judgements, we selected the most frequently occurring judgment. There was perfect unanimity in 823 of the 1063 cases, for which we had three or more opinions (77%) in the Korea set, and 1065 of the 1314 cases (81%) in the comparative set.

Ⅳ. Results and Analysis

Our analysis of Korean vs. other international airline reviews is composed of 1) relative satisfaction

<Table 4> Codes and Inter-rater Reliability

Code and Values	Korean Airlines		Comparative (Other International)	
	Kappa [cases]	Interpretation	Kappa [cases]	Interpretation
Baggage	.903 [139]	Substantial Agreement	.903 [124]	Substantial Agreement
Cleanliness	.803 [335]	Substantial Agreement	.757 [457]	Substantial Agreement
Customer Service	.725 [158]	Substantial Agreement	.506 [88]	Moderate Agreement
Flight Timeliness	.851 [131]	Substantial Agreement	.686 [243]	Substantial Agreement
Food and Beverage	.766 [128]	Substantial Agreement	.538 [130]	Moderate Agreement
In-Flight Entertainment	.769 [312]	Substantial Agreement	.695 [118]	Substantial Agreement
Seating	.681 [193]	Substantial Agreement	.742 [99]	Substantial Agreement
Upgrades	.584 [129]	Moderate Agreement	.700 [430]	Substantial Agreement
Web or Mobile App	.958 [569]	Substantial Agreement	.905 [423]	Substantial Agreement
Price	.804 [383]	Substantial Agreement	.760 [423]	Substantial Agreement
Service Compliment	.584 [365]	Moderate Agreement	.626 [91]	Substantial Agreement
Service Complaint	.500 [380]	Moderate Agreement	.691 [97]	Substantial Agreement

and non-mentioning frequency by service aspect, 2) Importance/Performance Analysis for Korean and International airlines, 3) Data Envelopment Analysis (DEA) and 4) specific textual markers that are indicative of satisfied vs. dissatisfied passengers for each service aspect.

4.1. Relative Satisfaction and Non-mentioning Frequency by Service Aspect

<Table 5> shows the percentage of satisfied (happy) vs. dissatisfied (unhappy) reviews for Korean vs. other international airlines, and the percentage of times that each service attribute was not mentioned in the text, using the manual coding of textual review body narratives. **Bold** is used to indicate whether happy or unhappy predominates for that airline type (Korean vs. other international). Chi-squared (χ^2) tests were executed to determine whether the proportion of Happy vs. Unhappy vs. Not mentioned varied by airline (p-values shown in right-most column in <Table 5>). For all airlines, Customer Service

was the most frequently mentioned aspect (lowest no mentions), followed by Food & Beverage.

Compared to international airlines passengers, Korean airlines passengers appear to be *less* likely to mention Flight Timeliness (Δ-17.6pp for Korean vs. other international no mentions)[1] or Baggage (Δ-15.4 pp)[2]. Other international airline passengers were more likely to express their unhappiness with those aspects. Compared to international airline passengers, Korean airlines passenger were *more* likely to mention In-Flight Entertainment (Δ29.1pp), Seating (Δ14.5pp), and Upgrades (11.7pp): passengers on Korean airlines mentioned those aspects primarily because they were happy with them. In addition, Flight Timeliness and Baggage were the two aspects

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1) 80.1% of Korean reviews did not mention Flight Timeliness, vs 62.5% of Other-International reviews did not mention Flight Timeliness, equating to a 17.6pp (= 80.1% - 62.5%) difference. We used the standard abbreviation, pp, for percentage points.

2) 91.8% of Korean reviews did not mention Baggage vs 76.4% of other-International reviews did not mention Baggage, equating to a 15.4pp (= 91.8% - 76.4%) difference.

<Table 5> Percentage Satisfied vs. Dissatisfied for Korean vs. Other International Airlines, for Each Service Aspect, from Textual Review Body Narratives, Manually Coded

Code	Korean			Other International			Significant Difference?
	Happy	Unhappy	Not mentioned	Happy	Unhappy	Not mentioned	$(\chi^2, 2)$
Baggage	**4.8%**	3.4%	91.8%	11%	**12.6%**	76.4%	.012*
Cleanliness	**13.7%**	2.3%	84%	**11.1%**	3.3%	85.7%	.623
Customer Service	**68.4%**	14.7%	16.8%	**50.1%**	29.2%	20.7%	.006*
Flight Timeliness	**10.7%**	9.2%	80.1%	16.7%	**20.8%**	62.5%	.015*
Food and Beverage	**49.4%**	14.1%	36.6%	**39.9%**	19.8%	41.0%	< .001**
In-Flight Entertainment	**28.6%**	23.3%	48.1%	**11.6%**	11.3%	77.2%	.020*
Seating	**36.1%**	15.2%	48.7%	22.0%	14.8%	63.2%	.013*
Upgrades	**20.4%**	11.6%	67.9%	9.8%	**10.8%**	79.6%	.001**
Web or Mobile App	1.2%	**3.5%**	95.4%	2.4%	5.7%	91.9%	.453
Price	**12.2%**	5.0%	82.2%	**13.8%**	12.7%	73.5%	.049*
Service Compliment	60.2%	⨉	39.8%	54.2	⨉	45.8%	.286
Service Complaint	⨉	26.9%	73.1%	⨉	55.0%	45.0%	< .001**

Note: * Significant at α = .05, ** Significant at α = .001

that passengers from international airlines express their relative dissatisfaction more than the passengers on Korean airlines. Also, In-Flight Entertainment, Seating and Upgrades were three of the service aspects that Korean airline passengers show relative satisfaction with more than international airline passengers.

4.2. Importance/Performance Analysis for Korean Airlines and other International Airlines
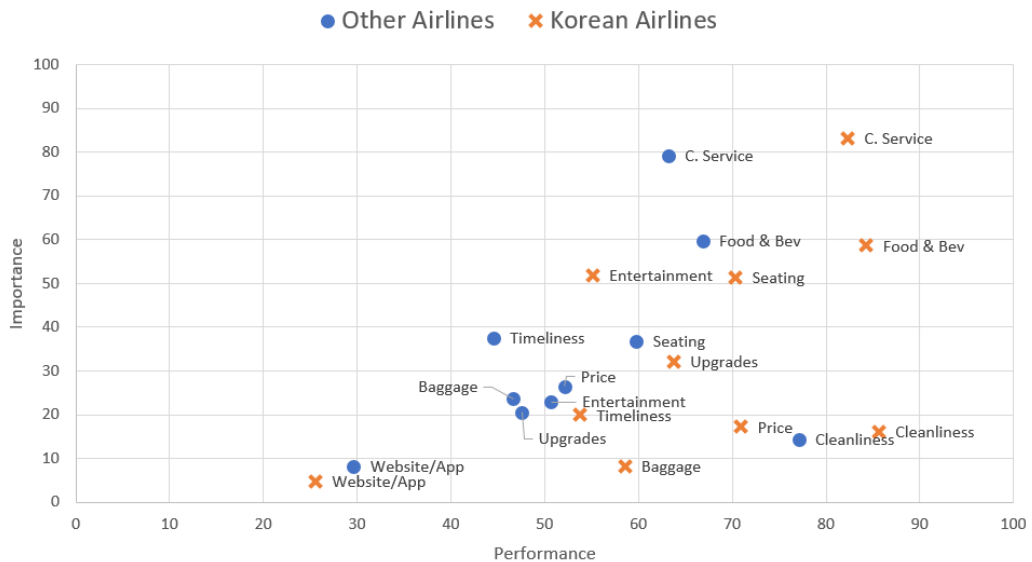
To further exemplify the service attribute analysis, we used the frequency of service attribute mentions as a proxy for that attribute's importance to consumers and the percentage of those mentions that are positive as a measure of performance to conduct an importance/performance analysis (IPA).

An importance/performance analysis (IPA) provides a compact way of visualizing the importance of a service attribute to consumers, along with the success with which the expectations for that service are being satisfied (Martilla and James, 1977). IPA is considered to be very useful technique to examine customer service and management strategies. Sever (2015) believe that IPA can help tourism stakeholders to diagnose deficiencies and help improve important priorities in tourism development. IPA has been employed previously to assess the service quality of airlines based on customer questionnaire responses (Chiang Leong, 2008) as well as online reviews (Nam and Lee, 2019).

In <Figure 2>, each service attribute is plotted according to its importance on the y-axis and its performance on the x-axis. Service attributes in the upper left quadrant (high importance and low performance) represent opportunities. Service attributes in the lower right quadrant (high performance and low importance) represent an unnecessary ex-

Importance/Performance Analysis

● Other Airlines　✕ Korean Airlines

<Figure 2> Importance/Performance Analysis for Korean Airlines vs International Airlines

penditure of effort. From the figures below, Customer Service, and Food & Beverage aspects show high important/performance ratio for both Korean and international airlines. However, Korean airlines appear to provide superior performance on price, cleanliness, although this appears to be a low priority. International airlines provide superior performance on Entertainment which show low priority for the passengers. Timeliness is a lower priority among Korean airline passengers, but Korean airlines are nevertheless displaying better performance on this. Among both Korean and international airlines, Website/app features are consistently a low priority and all airlines show low performance in this category. However, from the IPA analysis, Customer Service, Food & Beverages and Seating represent the most important service aspects that customers want the most from both airlines. These three aspects also represent 'in-flight experience' for passenger which

resonate in past studies about airline customer journey where passengers have the most satisfactions when it comes to traveling experiences by flight (An and Noh, 2009; Han and Hwang, 2017). Our IPA analysis reveals that during-flight Service Attributes (e.g., Customer Service, Food and Beverage, Entertainment, Seating) could be more important contributors to Customer Satisfaction (overall review rating) than Before-flight (e.g., Website/App, Price) and After-flight (e.g., Baggage, Timeliness) attributes. This is a finding of potential practical and theoretical importance.

4.3. Data Envelopment Analysis

Another way to use the proportion of positive comments in each attribute for strategic decision-making is to compare the relative "efficiency" of each airline on how well it translates service performance

into customer satisfaction. Data Envelopment Analysis (DEA) is an optimization-based method of comparing several decision-making units (DMU) on how efficiently they translate inputs into outputs. Efficient DMUs, those that lie on the "efficiency frontier," are those that use the least amount inputs to achieve the greatest output. In our analysis, "inputs" are the proportion of positive comments on a particular attribute, and "output" is customer satisfaction, which is operationalized here as star rating. Therefore, to be maximally efficient, an airline needs to allocate its efforts toward those service attributes that most effectively translate to higher star rating. High performance on service attributes that do not contribute strongly to customer satisfaction is wasted effort.

A graphical example of an efficiency frontier appears below in <Figure 3>. For ease of visualization, only two service attributes are plotted: *Baggage* and *Cleanliness*. "Cleanliness divided by Overall Star Rating" ap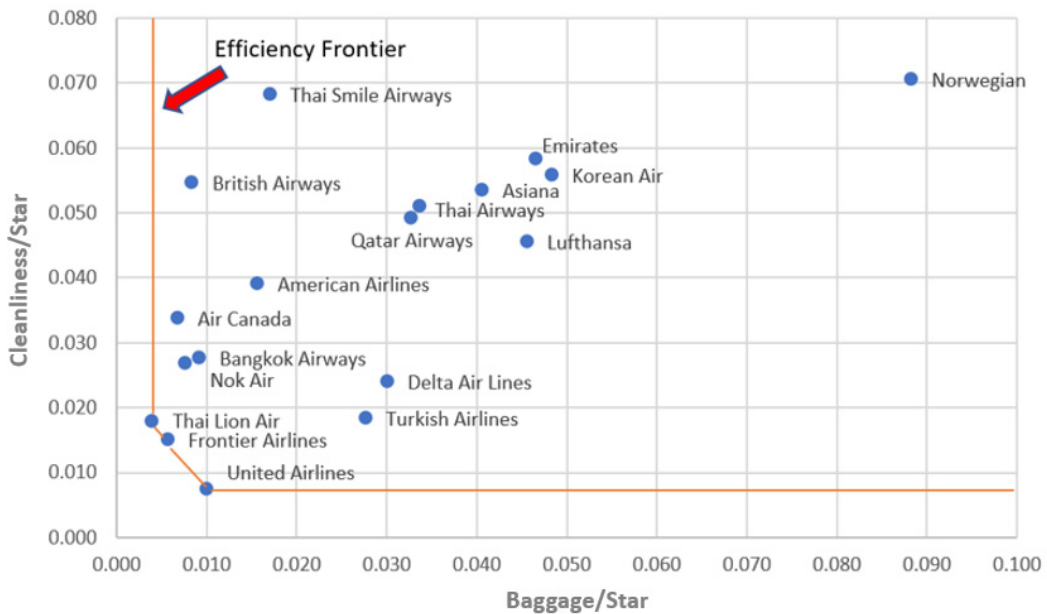pears on the y-axis and "Baggage divided by Overall Star Rating" is on the x-axis, so efficient airlines are those closest to the origin.

Airlines above the efficiency frontier should aspire to move toward the origin, either by the reducing the effort on these attributes or increasing their star ratings. This entails solving the following optimization problem:

$$\text{Maximixe } \frac{Stars(v_1)}{Baggage(u_1) + Cleanliness(u_2)}$$

$$\text{Subject to: } \frac{Stars(v1_i)}{Baggage(u_{1i}) + Cleanliness(u_{2i})} \leq 1 \text{ for all other DMUs } u_i, v_i \geq 0$$

The parameters u_1 and u_2 represent the factors by which those attributes should be decreased to make the DMU efficient. We extend this problem to 10 dimensions, one for each service attribute and solve using DEA Frontier Free (http://www.deafrontier.net/deafree.html). We limit the analysis to the 20 airlines that had at least 20 reviews in our data set.

Results appear in <Table 6>. There were 16 airlines

<Figure 3> Efficiency frontier for *Baggage* and *Cleanliness*.

<Table 6> Results of Data Envelopment Analysis (DEA)

	Baggage	Cleanliness	Customer Service	Flight Timeliness	Food and Beverage	In-flight Entertainment	Prices	Seating	Upgrades	Website or Mobile App
Delta Air Lines	0.069	0.074	0.379	0.138	0.345	0.172	0.069	0.138	0.214	0.034
	0.027	0.072	0.370	0.109	0.232	0.083	0.067	0.134	0.076	0.009
Nok Air	0.261	0.190	0.441	0.270	0.324	0.054	0.333	0.191	0.136	0.118
	0.225	0.115	0.381	0.233	0.232	0.047	0.288	0.152	0.104	0.000
Thai Airways	0.104	0.118	0.598	0.136	0.515	0.201	0.093	0.304	0.114	0.014
	0.054	0.105	0.536	0.122	0.400	0.142	0.084	0.214	0.069	0.006
Turkish Airlines	0.111	0.120	0.444	0.148	0.444	0.222	0.185	0.148	0.040	0.000
	0.046	0.100	0.341	0.020	0.250	0.095	0.082	0.123	0.033	0.000
Korea Air	0.027	0.095	0.458	0.077	0.322	0.165	0.084	0.197	0.095	0.002
	0.037	0.161	0.683	0.103	0.442	0.300	0.113	0.346	0.177	0.008

Note: For each inefficient airline, the white row indicates the proportion of positive comments on each attribute, and the gray line represents the new target, to minimize effort to achieve maximum star rating.

on the efficiency frontier, and four inefficient ones. For each inefficient airline, the white row indicates the proportion of positive comments on each attribute, and the gray line represents the new target, to minimize effort to achieve maximum star rating. So for example, Delta Airlines had 6.9% of reviews mentioning positive comments on baggage, but it could have achieved comparable customer satisfaction with 2.7%, so managers could redirect effort to other areas. *Cleanliness*, *Flight Timeliness*, *Prices*, and *Seating* for Delta airlines are already close to optimal, so those should not change. Airlines that are already 100% efficient do not need to alter their effort allocation. Korean Air, for example, was more than 100% efficient when all 10 dimensions are considered. Therefore, the airline has "slack", such that improvements on these attribute scores will not contribute significantly to star rating.

This analysis demonstrates one way that managers could use the results of text analytics for strategic decision-making.

4.4. Specific Textual Markers by Service Aspect

This section identifies specific marker words that are indicative of satisfied vs. dissatisfied passengers for each service aspect.

For the computation of words and phrases most highly correlated with each service attribute, we identified the unique n-grams (1, 2, and 3 word phrases), in the dataset (<Table 7>). For each of these n-grams, we then used the Correlation Coefficient score for that n-gram in reviews in the target category (e.g., "Positive Baggage") vs. those in the non-target category (all other reviews), as per (Abrahams et al., 2012). Terms were sorted from largest Correlation Coefficients downwards, and the 10 single-words, 10 two-word phrases, and 10 three-word phrases with highest correlation coefficient in the customer service category were selected and are displayed in <Table 7>. <Appendix B> provides the words and phrases most correlated with satisfaction vs. dissatisfaction for each service attribute for Korean airlines. <Appendix C> provides a similar exposition, but

<Table 7> Top 10 Common Words and Phrases Associated with Customer Services for Korean Airlines and other International Airlines

	1-Gram (10 Single Words)		2-Gram (10 Two-Words)		3-Gram (10 Three-Words)	
	Positive	Negative	Positive	Negative	Positive	Negative
Customer Service (Korean Airlines)	friendly, friend, excel, efficient, help, very, polite, great, staff, nice	seem, customer, english, disappoint, rude, didn't, app, her, lack, improve	friend and, profession and, the staff, staff were, crew were, polite and, very attentive, and professional, and smile, very efficient	customer service, ask for, did not, didn't see, able to, in english, their ground, the meal, that there, unfriendly and	cabin crew were, were very friendly, friendly and helpful, flight attendants are, the staff were, polite and helpful, throughout the flight, with a smile, and ground staff, the crew are	I asked for, the custom service, duty free item, a glass of, service was not, seem to be, language skill, the ground staff, due to the, english to me
Customer Service (International Airlines)	friendly, good, crew, great, attentive, efficient, pleasant, nice, polite, pleased	not, rude, poor, worst, her, never, terrible, low, his, unprofessional, unfriendly,	friendly and, cabin crew, and attentive, and efficient, polite and, and professional, staff were, and food, very efficient, and smile	customer service, did not, rude and, the worst, were rude, very poor, not helpful, very disappointed, no apology, lack of	cabin crew were, very friendly and, friendly and efficient, friend and helpful, service was excellent, extremely helpful and, were professional and, polite and attentive, pleasant and help, and cabin crew	was not a, or custom service, there was no, due to the, crew did not, did not seem, at the gate, and did not, I have never, the plane and

Note: Full list available in <Appendix B> and <Appendix C>

for other international airlines.

Ⅴ. Conclusion

The need to understand customers' expectations and what makes them satisfied or dissatisfied together with the highly competitive environment of the airline industry provided a basis for this research. This study attempted to learn from the readily-available online customer reviews what are the service attributes usually mentioned by the online customers, what are the marker words for each service attributes, and what service attributes are of high importance to the airline passengers, especially those of Korean airlines compared with those of other international airlines. Towards this goal, we extracted 103,710 reviews from airlinequality.com and conducted manual coding and content analysis of a representative, random sample. Comparison was also made between the reviews concerning Korean airlines and those concerning other international airlines.

Our research demonstrated that customer service ranked as the top priority for all travelers. Flight timeliness and baggage services were also important

aspects of service quality for the airlines. However, the passengers on international airlines expressed their relative dissatisfaction on the two service attributes more than the passengers on Korean airlines. In addition, in-flight entertainment, seating and upgrades were three of the service attributes that Korean airline passengers show higher relative satisfaction than international airline passengers.

The IPA analysis further reveals that during-flight service attributes (e.g., Customer Service, Food and Beverage, Entertainment, Seating) could be more important contributors to customer satisfaction (overall review rating) than before-flight (e.g., Website/App, Price) and after-flight (e.g., Baggage, Timeliness) attributes.

In addition, we conducted the DEA as a showcase of how airlines can leverage our service attribute-based labeling of online passenger reviews for their strategic decision making. The analysis showed which service attributes could be to most effectively translated to higher customer satisfaction. For example, the analysis revealed that Delta Airlines could redirect effort to Food & Beverages, in-flight entertainment, and upgrades, the areas where the efficient score is not close to optimal.

We also computed the Correlation Coefficient score to identify words and phrases that are most highly correlated to each service aspect. The full list of significant marker words are provided in Appendices B and C. From the list of 1-, 2-,3-gram words, we can learn more specific qualities that the passengers were interested in. The list of marker words associated with customer service attribute, for example, shows that the passengers expected friendly, polite, attentive, and professional services and not only from the cabin crew but also ground staff.

Ⅵ. Theoretical and Practical Implications

Theoretically, the provided set of significant marker words for 12 service attributes contributes to the literature in airline service quality, as it allows airlines to rapidly categorize online reviews and allows academic researchers to undertake formal studies of categorized online reviews. While other studies (e.g., Lacic et al. 2016, Korfiatis et al. 2018), which also analyzed data from online reviews, identified what the core airline service attributes are, this study provides marker words that could be used for rapid filtering and coding, and as input features for machine learning. Our list of marker words, thus, adds to the void of the prior studies, attempting to learn from online passenger reviews. Future study can skip the labelling process and cut through finding relationships or identifying any hidden patterns in the online reviews. Our rigorous manual coding and large-scale human manual labelling procedures also provide a theoretical contribution to the text analysis research. It can be replicated and used with other online reviews in various contexts.

Practically, Korean airlines may use our findings to develop a deep understanding of their customers to improve their business processes as well as a long-term strategy to improve customer service. Airline managers can learn from our IPA analysis what are the important service attributes and then can focus on the right attributes for service improvement and overall performance. From our study, Korean airlines could improve their service quality by improving the baggage check-in service for international travelers. For example, an end-to-end baggage check-in from passengers' hotels to the airport could be implemented with the through check-in services available in many airports around the world.

This would further improve the service quality of the airlines. Our methods may help Korean airlines to improve their service quality by gaining a better understanding of their customer feedback and preferences. Furthermore, the marker words and phrases used in airline reviews may help airline operators in the rapid automated filtering, partitioning, and analysis of incoming passenger comments (to track customer service quality) via other channels, including email, social media posts, and call center transcripts. As inputs to an automated categorization tool, the words can be used to dynamically update an information system with new reviews so that attribute quality can be easily tracked over time. They could also be used for management dashboards that require the automated partitioning of customer comments. The 12 categories of marker words – Baggage, Cleanliness, Customer Service, Flight Timeliness, Food and Beverages, In-flight entertainment, Seating, Upgrades, Web or Mobile App, Price, Service Compliments and Service Complaints – represent service attributes that both Korean and Non-Korean airlines can use to examine airline service quality. They can also serve as an initial phase of creating a long-term Customer Knowledge Management System, as our categorized marker terms (words and phrases) for each of the 12 service attributes are structured for rapidly recognizing mentions of each service attribute, appeared in online reviews. Subsequently, airlines may be able to use the set of already-categorized specific textual markers to service aspects as the basis for further AI development such as chatbots.

Ⅶ. Limitations and Future Work

This study contains data from a large airline review website: airlinequality.com. Although it is one of the largest airline review websites in the world, future studies could expand the data sources to cover a larger variety of customer inputs from other websites as well. First, airlinequality.com is powered by Skytrax, which is well-known for frequent flyers; thus the reviews extracted from the site may not be able to represent the general airline passengers. Second, there are other airline review sites, such as tripadvisor.com or airlineratings.com, that can be analyzed by future work. By expanding the data sources, researchers can also gain more insights from additional sets of data, as well as expand customer demographics from different review sites. Also, it will be very interesting to explore customer reviews from local Korean travel sites and view the input from Korean passengers. Gaining online customer reviews from the local market could help to expand future studies that will increase understanding of one of the largest tourism markets in Asia. In addition, it should be noted that due to self-selection bias and the very limited portion of passengers that write reviews, the results are representative of the population of Skytrax reviews, but not representative of the population of airline passengers. Our results should thus be regarded as indicative of passenger opinion, and not representative of passenger opinion. An interpretation and application of the study's results should be careful of this limitation.

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<Appendix A> Service Dimensions

Table A1 lists the service dimensions (topic categories) used for coding, including the origin (source) of the code and the equivalent code name in prior research. A tick mark (ü) indicates the code was very similarly or identically named or defined in prior work.

<Table A1> Service Dimensions used for Coding Airline Reviews

Topic Category	Description	Siering et al. (2018)	Bogicevic et al. (2017)	Ban & Kim (2019)	Brochado et al. (2019)	Chatterjee & Mandal (2020)	Korfiatis et al. (2019)	Lacic et al. (2016)	Lucini et al. (2020)	Stamolampros et al. (2019)	Tansitpong (2020)	Tsaur et al (2002)	Xu & Li (2016)
Baggage	User comments on luggage facilities, allowable luggage, late/on-time luggage arrival, luggage lost or damaged or recovered.	✓		"Ground service"³	"Airport" 1		"Check-in/ Boarding" 1	"Ground Service" 1	"Checking luggage" 1	"Check-in/ Boarding" 1	"Ground Service" 1		
Cleanliness	User comments on aircraft cabin or aircraft toilets being dirty/clean; include mentions of dirty/clean planes or bad/good hygiene.						✓			✓		"Comfort and cleanness of seat"	
Customer Service	User comments about poor / good service, or rudeness / helpfulness, of ground staff or in-flight staff (employees).	✓	"Staff Service"	"Staff"	"Services" "Staff"	"Cabin Staff Behaviour"	✓	"Cabin Staff"	✓ "Onboard Service" "Communication"	✓	"Cabin Staff"	"Courtesy of Attendants" "Responsiveness of attendants" "Professional skills" "Customer complaints handling" "Language skill of airline attendant" "Appearance of crew"	"Crew"
Flight Timeliness	User comments about flight being delayed or on time.	"Punctuality"			"Flights"				"Delays" "Waiting Times"		"Timeliness"	"Timeliness"	"Flight Delay"

³ These articles include "Baggage" reviews in the section of "Ground service" or "Check-in". Some of "Ground Service" also pertains to "Customer service".

\<Table A1\> Service Dimensions used for Coding Airline Reviews (Cont.)

Topic Category	Description	Siering et al. (2018)	Bogicevic et al. (2017)	Ban & Kim (2019)	Brochado et al. (2019)	Chatterjee & Mandal (2020)	Korfiatis et al. (2019)	Lacic et al. (2016)	Lucini et al. (2020)	Stamolampros et al. (2019)	Tansitpong (2020)	Tsaur et al. (2002)	Xu & Li (2016)
Food and Beverage	User comments about the food or drinks being bad or good.	✓	"Catering"	✓		✓	✓	✓	✓	✓	✓	"Food"	"Food"
In-Flight Entertainment	User comments about the in-flight entertainment (e.g. in-flight movies, in-flight games) being bad or good.	✓	"Entertainment"	"Entertainment"	"Entertainment"	✓	✓	✓	"Onboard Entertainment"	✓	✓	"On-board entertainment"	✓
Seating	User comments that the seats are uncomfortable / comfortable or about unpleasant / pleasant seat assignment.	"Seat Comfort"	"Seat Comfort"	"Seat Comfort"	"Seats" "Classes"	"Seat Comfort"	"Seat Comfort" "Legroom"	"Seat Comfort"	"Seats"	"Seat Comfort" "Legroom"	"Seat Comfort"	"Comfort and cleanness of seat"	"Facility"
Upgrades	User comments that the airline's upgrades program is poor/good.												
Web or Mobile App	User comments that the airline's website or the airline's mobile app is bad or good.							"WiFi Connectivity"					
Price	User comments that the airline's prices or charges or fees are good value or poor value.	"Value for Money"	"Value"	"Value for Money"		"Value for Money"	"Value for Money"	"Value Money"	"Value for Money" "Airline prices"	"Value for Money"	"Value for Money"		
Service Compliment	Identify the one most important great customer experience that you believe resulted in a positive customer review or leave blank if there were no service compliments.	Most-prominent compliment is not specifically treated in prior literature.											
Service Complaint	Identify the one most important terrible customer experience that you believe resulted in a negative customer review or leave blank if there were no service criticisms.	Most-prominent complaint is not specifically treated in prior literature.											

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines

The panels below list words and phrases that are most highly correlated[4] with each service aspect, for Korean airlines.

Feature	Positive	Negative
Baggage	arrive, carousel, use, out, time, carousel, screw, me, gate, connect, surprise, turn, ate, return, asia, help, ice, inform, son, tight, immigration, form, prior, hold, automatic, clear, star, sent, safe, procedure, ,claim, destination, stay, heat, bout, final, flight, light, luggage, quick, sea, cabin, seat, flight, layover, lose, handcarry, transfer, american, fragile, escort, fast, mark, London me and, luggage was, to our, flight to, baggage came, luggage arrive, time and, the carousel, on time ,my bag, with our, on time, the gate, charge for, retrieve my, tight connect, our flight, carry on, check me, free piece, minute after, passport queue, number of, was fast our bags were, passengers to have, retrieve my bag for the flight, and luggage arrived, on the carousel, baggage came out, on time and, luggage at the, on return in the, surprised that it, the flight attend, baggage handler at, to check in, a lot of, on the plane, your were, air were the, was so comfortable, overhead luggage bin, had our luggage, safe and sound, to the gate, with ground staff, the rather tight, avoid the annoying, tight connect my, no passport queue, was no layover, cabin staff took, baggage very quick, were the flight, luggage arrived safe	online, kg, low, sin, now, 30 know, nothing, pen, ask, 15kg, pay, but, his, even, allow, this, app, them, long, open, disappoint, 23, count, treatment, fair, economy, 30kg, since, found, like, broke, unfair, 100, broken, point, tea, counter, upset, said, kgs, treat, leave, 00, weigh, check, put, 10, ft, hat, from, 20, concern, organ, greet, huge, rearrange, quit, special, bagdrop, space, difficult, schlepp, 19kg, checkedin, pound pay for, me check, the bag, throw away, hand carry, baggage allow, overhead bin, most of, to pay, with much, checkin bag, the plane, check in, felt upset, huge line, empty bag, weight limit, difficult to, leave it, broken luggage, record of, not help, less they, leg of, lift the in the air, they are not, have to pay, the overhead bin, on both flights, space in the, of my flight, only allow 1, check my bag, you need to, need to pay, stuff on, frequent check on, well as have, were good to, for seat assignment
Cleanliness	clean, cabin, bin, kept, in, well, good, go, with, lavatory, interior, modern, still, mode, throughout, service, condition, cleanliness, entertain, food, fresh, main, see, real, airplane, spacious, nice, maintain, excel, economy, a330, great, inflight, each, great, tend, age, 330, toilet, room, bathroom, comfort, son, carpet, dim, bed, facilities, space, pleasant, crisp, meticulous, roomy, pristine, hygiene was clean, were clean, very clean, cabin was, kept clean, spotless clean, toilet the seat, back of, business class, the aircraft, a bit, seat cover, lounge at, class clean, cabin clean, clean throughout, clean aircraft, always clean, still clean, and on, passenger trash, lazy to, cover tatty, more regular, previous flight, plastic fresh, well maintained, were spotless, throughout the, lavatory was, nice clean, and bag pillow cover, no meal, proper snack, lousy seat, bit dirty, could have, and well kept, clean with, new and, good condition, it was, out the, food clean, aircraft, were no, was just, forward toilet, rather old, door was, window was, comfort and, pristine condition	dirty, old, terrible, me, seat, look, cover, blanket, over, back, ok, busy, lousy, see, real, disgust, can, purple, change, little, snack, spoon, proper, window, bag, lazy, more, feel, fee, recline, head, faulty, felt, meal, tatty, rice, fault, upholstery, messy, should, fold, door, seal, pillow, ate, washroom, uncomfortable, fabric, plastic, might, headrest often messy, toilet door, my pillow

[4] Using Correlation Coefficient score for target vs. non-target document category, as per (Abrahams et al., 2012).

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines (Cont.)

Feature	Positive	Negative
Cleanliness	cabin was clean, plane was clean, toilets were clean, were kept clean, clean and in the back, passengers can not, on this route, blanket and a, the seats are, fresh, clean and well, clean and comfort, nice clean 777, in good condition, ice on the, was a bit, on the seat, business class was, on both legs, the first clean the bathroom, flight attendant clean, modern and clean, plane were leg, the seat in, for the first, was an older, incheon airport was, first leg was, spotless, usual cabin was, were regular clean, clean lot of, in the toilet, pitch seat in the, the toilets were, the aircraft was, clean the toilet, the plane was, and clean, throughout the flight, often and pass,	seat are wider, limit disturb from, width in economy, frequent check on
Customer Service	friendly, friend, excel, efficient, help, very, polite, great, staff, nice, professional, seem, customer, english, disappoint, rude, didn't, app, her, lack, improve, have, eat, mile, crew, smile, attention, always, courteous, ice, throughout, wonder, point, online, wait, unprofessional, bother, ignore, depart, appear, said, count, won, most, entertain, fast, light, hospitality, food, gracious, asian, comfort, pass, understand, other, in, here, ask, forgot, phone, below, complain, forgotten, welcome, pleasant, greet, prompt, usual, seat, dress, respect, consist, taste, active, unfriend, cold, should, disappear, worst, departure, while, organ, glass, poor, joy, standout, perfect, immaculate, smiley, tend, compete, fantastic, love, posit, under, would, speak, counter, low, just, limit, know, rest, old, yet, concern, expect, cheer, overall, impressed, value, proactive, baggage, enjoy, level, genuine, announce, item, worst, proper, engage, refund, chat, week, half, deliver, lower, delight, present, come, smart, best, care, sit, fast, face, keep, personnel, choice line, sell, blind, explanation, tray, into, nation, rep, focus, proficient, disorganized, upset, run, error, annoy, think, horrible, toward, leaev, bad, rush, stop, miss, terrible, interest, robot friend and, profession and, the staff, staff were, crew were, polite and, very customer service, ask for, did not, didn't see, able to, in english, their ground, attentive, and professional, and smile, very efficient, and courteous, good service, the meal, that there, unfriendly and, to understand, not even, speak english, smile and, flight at, flight attend, always smile, good english, gracious and, quick the wine, english proficiency, the phone, to disappear, below, to bother, attend to, cabin crew, very nice appear, wait for, duty free, very unprofessional, no effort cabin crew were, were very friendly, friendly and helpful, flight attendants are, i asked for, the custom service, duty free item, a glass of, service was not, seem the staff were, polite and helpful, throughout the flight, with a smile, and ground to be, language skill, the ground staff, due to the, english to me, very bland staff, the crew are, staff friend and, professional and friendly, spoke good english selection, with exception of, and it was, the short flight, was terrible a, glass of water, downside is the, announcement was made, check in luggage
Flight Timeliness	time, arrive, ontime, early, all, departure, quick, profession, despite, efficient, delay, layover, hour, at, late, connect, to, min, s, miss, minute, aft, pass, 30, flawless, law, checkin, left, layover, real, transfer, ahead, fast, baggage, enjoy, because, wait, slight, 5, 2, due, it, they, bound, problem, 9, way, inbound, 90, prompt, perform, idea, forecast, overall, horrid, friend, wet, earlier, shanghai, after, before, explanation, online, lax, later, run, reason, cancel, gate, repeat, 777, great, heathrow, respect, punctual, trip, noon, few, captain, ideal, product, again, aka, tokyo, mean, offer, meant, half, call, clear, will, not, make, outbound, joy, flew, claim, sector, deal, destination, snowy, smooth, ever, art	worry, control, up, start, flight

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines (Cont.)

Feature	Positive	Negative
Flight Timeliness	on time, flight arrived, was on, arrive early, both flight, no delay, ontime was delay, delay by, connect flight, an hour, hour delay, flight to, wait for, departure, quick and, left and, smooth and, very pleased, destination without, miss our, flight delay, take off, hour late, due to, 30 min, return flight, late return trip, was smooth, few minutes, hour until, no issues, until departure, departure, delay from, 90 min, slight delay, delay so, was the, the gate, no baggage came, are quick explanation, cancel due, traffic control, and again, delay due, slight late, 4 hour arrive on time, were on time, was on time, flight on time, flight arrived early, our flight was, was delayed by, before the flight, we received a, at the gate, board on time, quick and efficient, both flight depart, ontime departure and, to the gate, received a call, inform us that, service before the, to be delayed, on time despite, almost on time, a few minutes, fast checkin ontime, 30 minutes and we would, there was a, that our flight, the gate and, check me in, return early, but the plane	flight was, need to wait
Food and Beverage	good, excellent, delicious, flight, tasty, light, meal, entertain, hot, beverage, great, poor, low, tasteless, bit, terrible, but, less, id, limit, point, ask, down, on, tray, wine, fine, crew, well, nice, frequent, plenty, high, enjoy, lunch, sent, joy, present, once, little, dry, app, weak, assortment, soft, finish, spoon, mediocre, atrocious, coffee, friend, pleasant, decent, impress, cut, course, cutlery, pleasant, chose, bore, meagre, truly, quantity, fragment, miss, row, almost, got, term, custom, box, love, wonder, restaurant, super, large, fantastic, bar, recommend, superb, morn, heat, edible, disappoint, extra, old, rather, drink, if, offer, rice, still, never, beautiful, cream, spirit, top, pasta, terrific, towel, sea, short, amount, sandwich, cold, mine, class, slow, uninterested, complaint, starter, spicy, lousy, deteriorate itself, cater, child, fair, everyone, felt, warm good food, the meal, was delicious, and wine, mean service, beverages were, to eat, very poor, both leg, food not, not great, very limited, no meal, biz class, hot meal, very tasty, especially the, wine were, great service, flight food, delicious soft drink, small and, below average, most tasteless, portions were, snack on, meal, option were, was nice, food great, food clean, choices were, ice cream, limited food, tray of, bland and, the dessert, no food, not even, was terrible, course meal, hot towel, traditional korean, cup of very hungry, the custom, rush to, choices and, seem to food was excellent, was very good, food was great, was served a, especially the on both legs, to eat the, i was given, was a bit, they are not, in term of, the korean, in flight meal, food and wine, drink and snack, quality of the, meal food is, food is not, get my vegan, is a bit, is not so, seem to be, not so great, was better, dinner and breakfast, drinks were served, in meal options were, option of fruit, complaint was the, i have never, what i expected, i given other a hot meal, soon after takeoff	option, once on board, there was no, glass were never, the western option
In Flight Entertainment	eat, food, fine, plenty, wide, large, touch, impressed, accept, seat, room, comfort, limit, old, poor, few, hat, small, bit, hollywood, need, app, thin, without, low, pretty, variety, new, decent, service, notch, sat, seatback, recent, clear, usb, pitch, own, lack, set, little, my, improved, outdated, loop, choice, off, long, disappoint, varied, watch, pass, press, seen, latest, easy, than, track, broad, fantastic, display, headset, carried, tv, too, compare, ondemand, system, movie, non, huge, art, drama, collect, friend, monitor, modern, 32, various, power, interest, option, hen, channel, seoul, speak, tag, virtual, minus, joke, add, want, form, view, believe, music, lot, show, adequate, rang, back, fill, port, connect, multimedia, rare, felt, complain, bore, remote, singapore, meagre, grainy, find, substandard, negative phone, superior	

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines (Cont.)

Feature	Positive	Negative
In Flight Entertainment	touch screen, plenty of, variety of, good entertainment, of entertain, movie music, good entertainment, cancel headphones, good inflight, in english, the seat, was good selection, cancel headphones, the new, to date, seatback entertain, impressed, options were, release movies, the new, to date, seatback entertain, large screen, individual screen, biggest screen, wide choice	very limited, was poor, limited selection, is limited, the screen, the inflight, small screen, rather limited, a loop, no tv, hollywood movies, few movies, small and, only 4, with poor, old and, without a, outdated and, poor lack of, wasn't working, video system, 10 hour, was old, entertain can, on this, no ondemand, movie, channel of, and poor quality
	entertainment was great, movies music and, noise canceling headphones, good selection of, there was a, with plenty of, a good selection, easy to use, plenty of movies, up to date, of movie music, screen with a, variety of movies, the biggest screen, screens were wide, big touch screen, and television shows	the inflight entertainment, on a loop, to other airlines, compared to other, not as good, entertain was not, is not a, during the flight, but not as, it is a, was a bit, are a bit, good as the, in 3 languages, needs to be, update on content, to be desired, not ondemand but, to reboot the, is good but
Price	cheapest, price, other, reason, cheap, free, asiana, par, overall, value, best, east, offer, quit, pleased, major, adequate, 100, compare, seoul, top, per, surprise, year, count, check, fair, wine, 1000, bit, way, made, big, lounge, cheaper, economy, competitive, time, discount, countless, drink, onboard	pay, dollar, forced, thousand, usa, unless, told, approximately, squeezed, our, seat, class, fee, 50, 5, paid, fare, korean, korea, inflight, privilege, port, schedule, infant, cheapo, code, obtain, bad, 4000, amen, lack, airport, lift, section, refuse, lot, sat, 4500, hundred, meal, late, competitor, lowcost
	value for, for money, excellent value, cheaper than, in economy, reasonable price, the best, low cost, the cheapest, great value, more than, this was, you get, round trip, was great, price and, was free, their price, price paid, cheapest airline, direct route, use again, also offer premium economy, price on, as it, cheapest option, got more, the low	not worth, forced to, a premium, of dollar, class this, this is, pay a, the first, not a, not good, of money, per ticket, have paid, we wound, to squeeze, i cant, origin ticket, not there, change and, family member, in kindergarten, sector would, a differ, we obtain, waste of, after pay, and we, when we, air unless, it look, we paid, a lot, money for, extra fee
	value for money, excel value for, cheaper than the, very good price, fares were cheap, i got more, the ticket price, less than 10, was the best, would use again, business class price, cheap on drink, cheapest airfare for, for their promo, the termination fee, considerably cheaper than, was offered the, bit price conscious	for business class, charge for bag, the food was, the value of, annoyed us charging, the ticket and, is not a, was not the, with less than, a waste of business class service, us charged for, price for the, to pay the
Seating	comfort, room, pitch, leg, economy, spacious, generous, eco, nice, experience, comfy, best, legroom, storage, service, crew, roomy, asian, wise, blanket, fine, adjust, huge, fun, pleasant, layflat, pack, size, seatback, exit, whole, design, similar, choice, wider, bigger, compartment, perfect, ample, lay, cabin, class, charm, redesign, abreast, transfer, 300, fabulous, chair, web	uncomfortable, old, hard, narrow, row, little, lane, lit, only, plane, plan, cramp, bit, terrible, ramp, small, need, our, difficult, too, worn, book, tire, back, 747, felt, light, older, do, angle, firm, possible, ride, thick, 12, close, feel, fee, agency, them, make, after, stiff, foot, almost, around, unable, crowd, laid, round, never, near, problem, aft, age

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines (Cont.)

Feature	Positive	Negative
Seating	very comfortable, leg room, were comfortable, plenty of, seat pitch, wide and, for economy, comfort and, the best, of legroom, seat was, generous leg, and of, the new, seat with, were wide, was quite, comfy seat, and recline, full flat, adequate a, legroom, more comfort, new seat, and there, , bed and, to the, with excel, as excel, was go, were great, in to, is comfort, room was, comfort lie, the bed seats were comfortable, of leg room, plenty of leg good seat pitch, were wide and, generous leg room, leg room for, i was able, room and storage, nice and wide, lay flat seat, generous seat pitch, seats are wide, of legroom and, seat with enough, ample leg room, quite lie flat, seat with a, first class seat, the	very comfortable, uncomfortable seat, not lie, hour flight, flat but, in business, for economy, comfort and, the best, of legroom, seat was, generous leg, and of, not fully, pretty uncomfortable, quite narrow, seat assignment, not full, seat a, the seat, not comfort, flat and, bed but, small seat, get comfortable, terribly uncomfortable, laid back, for long, old and, an angle, seat felt, old style, not allow, up some, as newer, close together, were old. a window, hard and not as comfortable, seat are not, need to be, front of me, and not fully, seats were old, this was the, to get comfortable, comfortable as competitor, together so my, most of the, of refurbish and, the aircraft to, seem a little, in need of, seat was not, the quality of, in an older, very uncomfortable seat, is difficult to, not as good
Service Compliments	service, flight, good, eat, crew, cabin, staff, excellent, seat, friendly, attendants, per, comfort, great, room, meal, professional, nice cabin crew, service was, flight attendants, the flight, the food, crew were, food was, in a, the cabin, the cab, staff were, with a, the cabin, very good, leg room, very attentive, cabin staff, comfortable seat cabin crew were, the flight attendants, the food was, the service was, throughout the flight, service was excellent, food was excellent, were on time, food and drink, with a smile, on time and, at the airport	
Service Complaints		flight, service, air, with, seat, food, cabin, english, my, poor, food, check, there, ever, plane, passengers the flight, was no, the cabin, cabin crew, business class, flight was, not a, flight attendant, service is, the crew, ask for, so i, are no, but no, were not, very uncomfortable, ground staff, us the, and of, the airport, not work, from a, need to there was no, the cabin crew, the flight was, of the flight, i had to, flight was delayed, flight attendants were, the entertainment system, i asked for, business class seat, there was not, when i ask, the bathroom was, there was a, they are not, command of english, i went to, was told the, asked for a, was told they, to pay for, i called the

<Appendix B> Common Words and Phrases for Service Aspects for Korean Airlines (Cont.)

Feature	Positive	Negative
Upgrades	economy, con, leg room, best, comfort, service, attention, were, clean, press, we, crew, spacious, food, taste, seoul, screen, surprise, star, staff, configure, jfk, super, won, wide, space, free, legroom, groom, new, mid, shop, recline, class, year, snack, ice, upper, same, premium, bed, fun, relax	economy, con, leg room, best, comfort, service, attention, were, clean, press, disappoint, poor, app, system, not, standard, ticket, small, doe, custom, uncomfortable, tire, have, change, pay, is, hope, lower, choose, stand, move, code, lag, user, worst, proper, spoil, support, cant, purchase, view, cheaper, wait, region, day, hot, know, error, gate, jacket, tricky, fuss, ensure, length
	economy class, food was, leg room, service was, crew we, an airline, this airline, a pleasant, the aircraft, them again, and had, new seat, seat to, fly with, reclining in, bed and, crew were, touch screen, the night, class seat, class service, value of	entertainment system, very poor, very disappointed, pay for, customer service, the meal, the window, old and, change seat, haul flight, impossible to, our seat, of their, upgrade the, plane on, up to, air are, or so, wait for, to seat, you pay, the price, with my, want to, option of
	of leg room, flat bed and, seat on the, class seats are, the service and, duty free shop, the upper deck, the whole experience, the flight attendant, to business class, nothing to complain, as compared to, of the aircraft, it was an, flight was a, more leg room, seats are wider	a long haul, the return flight, what you pay, a first class, you pay for, on this route, the choice of, you get what, pitch was abysmal, to the gate, is a bit, at the cheaper, seat and regular, we could have, the food a, cabin crew on, in the back, top of the, the cheaper end,
Website or Mobile App	easy, quick, hassle, smartphone, catch, read, wait, line, great, foreign, price, allow, always, fare, ready, bless, smart, free, use, you, have, app, less, hour, per, mobile, userfriend, checkin, light, pay, user, select, franc, inflight, firm, six, fill, slow, paper, method, suggest	website, web, korea, do, one, of, on, korean, difficult, online, navigate, system, rebook, ua, prebook, server, out, down, port, code, 3, english, card, number, unfriend, assign, reason, load, complaint, backward, without, download, tricky, elite, from, onboard, magazine, disappoint, restrict, preselect, version, fall, fail
	easy to, purchase ticket, to use, was quick, was easy, use a, a while, have to, checkin was, to flight, mobile app, available 24, it seat, always hassle, allow to, while back, it that, hassle free, or to, no wait, you use, over 10, checkin available, smartphone app, to pay, app is, userfriendly websit, online website, app which, that allow	website and, their website, not very, as the, not a, seat on, web site, is difficult, my ticket, ticket online, the flight, purchase my, seat online, to the, and on, not able, way to, that the, and download, prebook of, do online, english version, to verify, find anything, couldn't find, user unfriendly, cumbersome and, my frequent, is so, at and, wrong on
	web check in, have to pay, seat for free, fare and per, was able to, that allow to, catch good fare, use the web, website that allows, to pay over, always hassle free, easy to book, with no wait, smartphone app is, great price app, checkin available 24	website is difficult, difficult to navigate, i could not, able to check, i was not, for seat assignment, there was no, select a seat, to beat the, select online not

<Appendix C> Common Words and Phrases for Service Aspects for Comparative Airlines

The panels below list words and phrases that are most highly correlated[5] with each service aspect, for non-Korean airlines.

Service Attribute	Positive	Negative
Baggage	free, quick, arrive, treat, great, crew, service, smooth, fast, prompt, enjoy, joy, pay, old, told, charge, hour, day, take, wait, lost, late, cost, tri, did, never, long, clean, love, live, deliver, fast, first, checkin, thank, among, welcome, happy, miss, line, there, rude, hang, where, find, extra, more, your, book, luggage, 15kg, airway, stand, waive, fine, receive, exceed	pay, old, told, charge, hour, day, take, wait, lost, late, cost, tri, did, never, long, miss, line, there, rude, hang, where, find, extra, more, your, book, luggage, excess, delay
	on time, baggage delivered, time and, the crew, came out, very good, will definitely, free check, no problem, good flight, bin crew, overhead bin, cabin to pay, had to, could not, they charged, charged us, an hour, to wait, pay crew, cabin crew, were out, checkin was, luggage check, as soon, clean and, for, to get, bag to, our luggage, we had, pay a, to take, to the, my bag, told quick bag, not charged, time depart, not lost, priority luggage	to pay, had to, could not, they charged, charged us, an hour, to wait, pay for, to get, bag to, our luggage, we had, pay a, to take, to the, my bag, told us, lost my, ate a, our bag for ever, was told, to charge, to me, for our, excess baggage, pay the, baggage fee, connecting flight, they lost, pay extra
	on time and, kg baggage allow, free checked bag, no problem with, my hand luggage, the baggage charge, from check in, check in was, minutes of landing, bag drop facility, no lost bag, first off the, in good shape, luggage was delivered, over head bin, my carry on, our bags were, the extra baggage	had to pay, we had to, to pay for, you have to, have to pay, at the airport, my bag was, due to the, when we arrived, check in luggage, to wait for, if you do, the fact that, of check in, on the plane, the bag drop, online check in, the ground staff, pay extra for, in the overhead, the price of, a long time, airport, over an hour
Cleanliness	clean, new, air, nice, cabin, comfort, modern, aircraft, tidy, condition, maintain, aircraft, time, kept, spotless, fresh, comfy, washroom, appear, wash, keep, perfect, bright, fine, newish	dirty, old, seat, bad, worn, out, window, disgust, floor, wear, back, carpet, stain, coffee, glass, rip, oily, crummy, worst, outdated, plastic, stuck, touch, ant, wipe, screen, improper, sticky
	was clean, new and, clean aircraft, well maintained, clean plane, cabin is, were kept, nice and, light on, and tidy, old but, and modern, clean toilet, the interior, super clean, clean enough	was dirty, old and, not clean, very dirty, were not, table was, my seat, worn out, seats were, seat was, stain on, need to, the floor, after the, here was, regular clean, to the, ad to, system is, not regular, and wear, lipstick mark, dust show, dirty carpet, gum stuck
	plane was clean, new and clean, cabin was clean, very clean and, nice and clean, dean and tidy, toilets were kept, clean and modern, clean and comfortable, old but clean, and well maintained, look new and, in good condition	seat was not, my seat was, there was a, the flight crew, ashtray in the, the previous flight, on the floor, stain on the, food was served, the back of, flight crew kept, the toilet were, a bit worn, my seat to

[5] Using Correlation Coefficient score for target vs. non-target document category, as per (Abrahams et al., 2012).

<Appendix C> Common Words and Phrases for Service Aspects for Comparative Airlines (Cont.)

Service Attribute	Positive	Negative
Customer Service	friendly, good, crew, great, attentive, efficient, pleasant, nice, polite, pleased, professional, courteous, smile, perfect, superb, journey, well, love, both, high, fine, help, welcome, charming, delight, kind, genuine, warm, wheelchair, ready, chair, hair, compliment, quick, sincere	not, rude, poor, worst, her, never, terrible, low, his, unprofessional, unfriendly, didn't, unhelpful, apologize, response, disappear, slow, refuse, horrible, communication
	friendly and, cabin crew, and attentive, and efficient, polite and, professional, staff were, and food, very efficient, and smile, very helpful, and courteous, kind and, great staff, was attentive, all flight, good English	and customer service, did not, rude and, the worst, were rude, very poor, not helpful, not very disappointed, no apology, lack of, the gate, refuse to, to check, tired and, unfriendly could not
	cabin crew were, very friendly and, friendly and efficient, friend and helpful, service was excellent, extremely helpful and, were professional and, polite and attentive, pleasant and help, and cabin crew, friend cabin crew, staff were of, pleasant, smile and help	was not a, or custom service, there was no, due to the, crew did not, did not seem, at the gate, and did not, i have never, the plane and, the attitude of, we had to, staff was not, customer service was, look like they, seem to have, the price of,
Flight Timeliness	time, early, ontime, arrival, left, depart, land, smooth, fast, ahead, head, nice, direct, earlier, schedule, quick, board, departure, within, joy, swift, despite, overnight, posit, ideal, bare, fine	delay, layover, hour, late, cancel, minutes, hang, day, miss, cause, change, wait, connect, almost, until, never, reason, hrs, explanation, up, plan, worst, origin, last, told, inform
	on time, flight on, and arrived, departed on, left on, land on, flight depart, flight left, depart and, and land, no delay, depart an, flight were, light were, both flight, flight we, arrived early, left and, board on, of schedule, ahead of, and bag, and ontime departure	was delayed, delayed by, due to, hour delay, an hour, hour late, slight delay, was canceled, my flight, ate in, late arrival, hour later, original flight, my connection, flight time, cancel a, will never, supposed to
	flight on time, were on time, depart on time, left on time, land on time, both flights on, all flights on, on time departure, minutes late but, ahead of schedule, off on time, late but arrived, flight left, board was fast, took off from	flight was delayed, flight was canceled, we had to, the flight from, our flight was, an hour late, for more than, the next flight, was supposed to, due to a, over an hour, the return flight, flight had been, flight got delayed
Food and Beverage	delicious, treat, great, tasty, nice, hot, cent, efficient, plenty, taste, decent, good, love, snack, fine, clean, drink, lounge, outstanding, dessert, alcohol, frequent, variety, fresh, champagne, juice, croissant	poor, not, worst, disappoint, terrible, delay, disgust, tasteless, below, bread, our, could, cart, ticket, plastic, tray, children, ring, web, piece, outside, leave, dirty
	was good, very good, food and, snack and, short flight, was excellent, good food, was delicious, and dry, meals were, and beverages, hot meal, plenty of, very tasty, good quality, juice and, surprisingly good, as nice, full meal, on board, snack box, a coffee, rang of, alcohol drink, one hour, pre order	the worst, no food, very poor, was terrible, they do, food or, poor quality, ran out, was awful, had to, not a, disappointed with, lack of, no drink, was cold, below average, to ask, for me, was disgusting, at least, low standards, not even, piece of, or drink, poor selection, take off

<Appendix C> Common Words and Phrases for Service Aspects for Comparative Airlines (Cont.)

Service Attribute	Positive	Negative
Food and Beverage	food was good, food was delicious, food and beverage, snack and drink, food and drink, and drinks were, the meals were, hot meal on, food was decent, food was fine, value for money, of the best, on this short, meals were tasty, follow by a, short flight and, drink service was, food was fantastic, serve a sandwich	food i had to, was a bit, i asked for, by the time, less than a, there was only, we had to, i ended up, have ever had, food was poor, they seem to, with them and drink, apart from the, you pay for, i couldn't eat, bring your own, again, we had on, and a pack, did not respond
In-flight Entertainment	good, great, movie, show, nice, wide, decent, variety, tv, free, game, new, plenty, section, recent, lounge, release, joy, range, watch, press, throughout, camera, impress, kid, inseat, hollywood, extensive, onboard, music, choose, touch, included, live, compliment, remote, lcd, news	no, not, poor, old, work, didn't, limited, here, there, online, broke, video, tore, small, mall, less, disappoint, broken, sound, outdated, need, change, hang, slow, pay, bore, art, monitor, fashion, should, couldn't, turn, read, unless, screen, freeze, extra, box, bar, entertainment, serious, into, reset, due, basic
	entertain was, tv show, was excellent, good selection, movies and, tv series, selection of, of movies, free wifi, variety of, and music, recent movies, plenty of, range of, choose from, own headphones, board wifi, hollywood movies, choice of, camera view, good variety	no entertainment, not working, very old, the seat, didn't work, very limited, no seat, the online, the video, to find, not up, the head, no music, was broken, music no, not much, small and, long flight, work for, the tv, screen was, video screen, the first, with limit, own entertain, kept freezing
	inflight entertainment was, good selection of, movies and tv, and tv shows, of movies and, a good selection, wide range of, good choice of, a wide variety, your own headphones, and tv programs, on board wifi, tv series and	no inflight entertainment, there is no, there was no, had to be, on my seat, none of the, in the seat, and not much, could have been, entertain select is, with the inflight, which you could, to yet a, at the front, had to pay, given free inflight, now but this
Price	good, value, price, overall, cheap, compare, quality, cheaper, money, definitely, pleasant, recommend, low, lit, afford, decent, room, cheapest, deal, budget, lowcost, cent, promo, bar, rent, beer, access, sold, fullservice, sale, surcharge, frill	ha, pay, not, charge, bag, expense, lug, our, luggage, ad, fee, baggage, light, extra, amount, high, paid, dollar, cancel, worst, told, expect, own, lion, avoid, pricey, be, 100, plan, hour, refund, double, unacceptable
	value for, the money, good value, the price, great value, the fare, cheaper than, the cheap, par to, compared to, reasonable price, a budget, its price, the me, for bag, to charge, charged for, cheapest, worth it, competitive price, for economy, price is, free snack, right, in comparison, included in, product for, my opinion, lowcost airline, not expensive	to pay, had to, we had, i had, pay a, they charged, charged us, an extra, charged the check in, baggage fee, had paid, it cost, the amount, very expensive, my bag, more expensive, not worth, you have, a ticket, for baggage, not even, flight cost, purchased in, be charged, per kilo
	value for money, the price is, great value for, very good value, for the price, all in all, cheaper than a, low cost carrier, a good deal, with the service, worth worth the, the extra, the fare was, par to other, a budget airline, compared to other, price of, i paid, the price of, for a budget	have to pay, had to pay, we had to, i had to, to pay for, for the flight, not would have, you have to, with other airlines, we had paid, a couple of extra money and, is not a, pay the extra, we paid for, more than the, flight was a, very poor value, for an extra, the most expensive

<Appendix C> Common Words and Phrases for Service Aspects for Comparative Airlines (Cont.)

Service Attribute	Positive	Negative
Seating	comfortable, comfort, room, leg, spacious, great, generous, more, easy, comfy, best, reason, better, enough, than, spa, amen, lot, main, impress, slim, roomy, much, new, width, 1st, fast, soft, brand, spare, joy, decent, pillow, smooth were comfortable, was comfortable, of leg, plenty of, better than, of legroom, was good, quite comfortable, legroom was, good leg, good legroom, leg room, extreme comfort, generous leg, short haul, spacious and, for sleep, as economy, and width, brand new, pillow and, hot seat, new seat seats were comfortable, seat was comfortable, plenty of leg, seat very comfortable, lot of leg, plenty of legroom, comfort for a, for a short, for the, of legroom and, with lot of, with a good, lot of space, one of the, of leg room, exit row seat, pillow and blanket, plenty of storage, seat to stretch	uncomfortable, not, eat, seat, old cramp, ram, cram, sit, hard, dirty, broke, broken, narrow, thin, tight, ad, worst, poor, recline, small, head, hang, row, knee, felt, when, rest, after, difficult, fit, screen uncomfortable seat, very uncomfortable, seat back, my seat, cramped seat, old and, could not, hard and, we were, no seat, narrow and, in front, very narrow, and cramped, my knee, business seat, was dirty, and hard, the foot, request a, head rest the seats are, the seats in, seat in front, seat on the, sit next to, there were no, seat is not, seat are very, not very comfortable, in front of, in front reclining, front of me, i paid for, ask for a, bit old, seat pitch is, back of the, the ground staff, lie flat seat, a window seat, seat were not, the cabin and, the left hand, cramp space of
Service Compliments	flight, service, very, end, excellent, good, crew, air, friend, staff, us, food, cabin, time, seat, great, comfort, ten, nice cabin crew, the flight, on time, friend and, very good, crew were, service was, food was, was very, flight attendant, food and, inflight entertainment, check in, nice and the cabin crew, the food was, very friendly and, on time a, the service was, on time and, the flight was, the staff were, was very good, the flight attendants, value for money, food and drink	
Service Complaints		not, air, we, flight, eat, service, they, airline, seat, my, that, con, but, ever, staff, had, layover, delay, food, app the flight, the air, was no, and i, customer service, the seat, flight was, this airline, to be, was not, it was, flight a, worst airline a, cabin crew, very disappoint, rude and there was no, i had to, i will never, the flight was, will never fly, ever fly with, at the airport, fly with them, never fly with, the food was, flight was delayed, one of the, custom service is, there was a, with this airline, with them again, the cabin crew, on the plane, is the worst, worst airline in

<Appendix C> Common Words and Phrases for Service Aspects for Comparative Airlines (Cont.)

Service Attribute	Positive	Negative
Upgrades	free, good, great, upgrade, cab, cabin, 747, fort, wifi, pleasant, spa, very, comfort, staff, plenty, done, easy, spacious, smooth, clean, wine, recommend, surprise, early, carrier, juice, spent, fantastic, deal, modern, super, thank, love, snack, bed, room, included, full, alcohol, legroom comfort and, to business, cabin crew, from the, board a, a free, this flight, upgrade to, free of, in first, cost carrier, flat bed, include a, of charge, economy passenger, space and, was expecting, were offered, voucher which, more room, provided free seat very comfortable, they have a, free of charge, it was a, and it was, cabin crew were, an upgrade to, an earlier flight, to business class, to premium economy, voucher which i, the airport in, able to use, the moment we, at a hotel, catch some sleep, was able to, flat bed with, was a good, premium economy on, was better than, food voucher to, exit row seat	no, not, call, nothing, compensate, rude, id, pay, get, bag, cancel, old, delay, for, have, refund, late, customs, hour, poor, info, book, night, another, last, force, day, baggage, response, unacceptable, angle, card, worst, tv, refuse and not, us to, we were, were not, to pay, airport the, can not, a bus, to check, told me, were not, would have, not worth, need to, no food, they charged, canceled flight, my bag, and to, unable to, the cost, no compensation there is no, we were not, we had to, a business class, with other airlines, so i could, they do not, for the next, not worth the, we had paid, compensate for the, flight which was, we paid for, prove to be, on the website, i will never, to the lounge, of the service, economy class on
Website or Mobile App	easy, ease, cheap, seat, free, good, fast, much, quick, checkin, efficient, check, online, save, application, enjoy, expedite, queue, quit, smartphone, cheaper, far, joy, cheapest, smart, happy, smooth, process, internet, printer was easy, online booking, easy to, and checkin, checkin easy, them again, cheaper than, business class, our seat, expedite the, seat selection, and check, to confirm, queue at, efficient checkin, book service, process was, much better we checked in, website is user, and seat select, easy online booking, the flight and , expedite the process, the internet check, easy to use, their website is, click seat select, with check in, the price of	no, not, nothing, but, don't, didn't, site, work, are, told, contact, difficult, web, then, system, accept, error, buy, never, mail, email, sit, fee, worst, load, ripoff, paid, enter, down, message, min, receive, mess, request did not, try to, i booked, i tried, was no, to check, not a, the web, and no, web site, ok the, the app, email a, to buy, was not, had to, had book, on an, month in, it would, the point, to pay, paid for, impossible to, slow and there is no, this is the, there was no, month in advance, i could not, no option to, for checked bag, in the air, they do not, able to check, a few extra, not book a, for all seat, take age to, return flight was

◆ About the Authors ◆

Peter Ractham

Peter Ractham is an Associate Professor in the Department of MIS and a director of Center of Excellence in Operations and Information Management, Thammasat Business School, Thammasat University. His research focuses on ICT-Enabled Innovation, Social Media Analytic and E-Business. He has published in JAIS, ISJ, CIHB amongst other IS and Business journals. He holds a PhD in Information Systems & Technology from Claremont Graduate University, Claremont, USA.

Alan Abrahams

Alan Abrahams is an Associate Professor in the Department of Business Information Technology at Virginia Tech, and a member of the Affiliated Faculty at the Center for Injury Research and Policy at the Johns Hopkins Bloomberg School of Public Health. His research on quality analytics from text is published in Production and Operations Management, Decision Support Systems, and other high-impact journals. He holds a PhD in Computer Science from the University of Cambridge, and a Bachelor of Business Science degree in Information Systems from the University of Cape Town.

Richard Gruss

Richard Gruss is an Assistant Professor in the College of Business and Economics at Radford University. He received a PhD from Virginia Tech, an MBA from Loyola University Chicago, a master's degree in Information Science from UNC-Chapel Hill, and a Master of Education from the University of Virginia. His research interests include social media and text analytics, and his work has appeared in Decision Support Systems, Expert Systems with Applications, the International Journal of Medical Informatics, and the Journal of Computing Sciences in Colleges.

Eojina Kim

Eojina Kim is an assistant professor in the Howard Feiertag Department of Hospitality and Tourism Management, Pamplin College of Business, Virginia Tech. The emphases of her research are on consumer behaviors and service management in the hospitality & tourism industry. Her research works have been published in several top-tier journals including the Journal of Business Research, International Journal of Hospitality Management, Journal of Hospitality and Tourism Research. She holds a PhD from Iowa State University in hospitality management with a minor in business and a PhD degree from Yonsei University, Seoul, Korea in food and nutrition.

Zachary Davis

Zachary Davis is an assistant professor of Decision Sciences and Information Management in Davis College of Business, Jacksonville university. He received a PhD in Business Information Technology from Virginia Tech in 2018.

Laddawan Kaewkitipong

Laddawan Kaewkitipong is an associate professor in the Department of MIS and a member of Center of Excellence in Operations and Information Management, Thammasat Business School, Thammasat University. Her research interest is in E-business and Social Media adoptions and challenges in various contexts. Her research work has been published in CIHB, JAIS, and other IS and Business journals. She holds a PhD in Management Science from Lancaster University, UK.