

Examining Key Drivers of Traveler Dissatisfaction with Airline Service Failures: A Text Mining Approach

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Identifying the key drivers of travelers' dissatisfaction with service failures is the first step for companies in implementing a recovery strategy to keep loyal customers, improve the company's reputation, and improve financial performance. Using the Latent Semantic Analysis (LSA) text mining approach, we analyze dissatisfaction with airline service failures among American, British, and East Asian travelers in economy and business classes. Although flight delays cause the most traveler dissatisfaction, the type and importance of other key drivers of dissatisfaction vary among travelers from different countries and in different travel classes. These key drivers include operations, facility, quality, and behavior issues. Our study provides implications for airlines to improve service performance by alleviating customer dissatisfaction and using market segment strategies with various demographic groups.

Keywords: Key drivers, Customer dissatisfaction, Service failure, Airlines, Text mining

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I. INTRODUCTION

Service failures are defined as a real or a perceived breakdown of services during the service process or as an outcome (Duffy et al., 2006) that negatively influence customer purchase behaviors and, consequently, negatively impact companies' financial performances (Hess et al., 2003). Service failures incur customer dissatisfaction (Lapre, 2011), which leads to customers' negative behavioral responses (Zeelenberg and Pieters, 2004). One such negative behavioral response is negative word of mouth (Zeelenberg and Pieters, 2004). Through the use of highly

developed information technology, online communication has led to increasingly significant changes in dissatisfied customer behavior (Cantalops and Salvi, 2014). Dissatisfied customers often post their negative reviews online (e.g., on third-party booking websites) after they experience service failures. These negative reviews act as negative electronic word of mouth and play a negative role in future customer purchasing behaviors. The negative reviews often result in loss of 10% to 15% of business (Blodgett et al., 1993).

A service failure offers many instructive lessons (Day, 1994). It provides

an opportunity for service providers to implement recovery actions and turn angry and complaining customers into loyal customers (Lapre, 2011). Preventing customers from switching to another service provider is cost effective because retaining an existing customer costs only one-fifth as much as obtaining a new customer (Hart et al., 1990).

The airline industry is large and growing. It facilitates economic growth, world trade, international investment, and tourism, and it is central to the globalization of other industries. Most previous airline service studies examined the number and frequency of customer complaints. For example, previous studies explored the impact of various service processes, effects, and events such as process variations, organizational learning curves, and service operations failures on the number and frequency of customer complaints (e.g., Tsikriktsis and Heineke, 2004; Lapre and Tsikriktsis, 2006; Anderson et al., 2009). Those studies suggested airlines reduce customer dissatisfaction by providing higher levels of service (Lapre, 2011). However, few studies have explored the types of service failures and the determinants of customer dissatisfaction with these service failures by using customer reviews.

Our study contributes to existing studies by exploring key drivers of dissatisfaction with airline service failures among various demographics through examining travelers' online reviews using a text mining approach. Reviews reflect customer dissatisfaction in more detail than most other methods. Identifying the type and importance of determinants of dissatisfaction in customer reviews is the first step for airlines in utilizing electronic word of mouth to implement service recovery actions. Service providers' ability to understand their customers' views of service failure can be the antecedent for developing an appropriate recovery

processes and providing more robust service operations.

Another phenomenon that may need more attention is that customer demographics are becoming more diversified (Lee and Hwang, 2011). Various types of customers have different perceptions of service failures (Oyewole, 2013). Therefore, a better understanding of the most influential determinants that lead to traveler dissatisfaction with airline service failures in each customer demographic will offer helpful information in understanding customer preferences and needs (Lee and Hwang, 2011). Based on this information, airlines could utilize corresponding strategies with different customer segments (Blackwell et al., 2006). However, research comparing determinants of traveler dissatisfaction with airlines among various demographic groups is rare. Among the few studies about travelers' dissatisfaction with airlines among various demographic groups, Kim and Lee (2009b) conducted a principal component analysis based on surveys to determine the different attitudes and complaint behaviors about irregular airline conditions such as bad weather and airplane mechanical problems among travelers with different nationalities, such as South Korean, Japanese, Chinese, and American. Gilbert and Wong (2003) used analysis of variance (ANOVA) based on survey results to determine the different expectations of airline service among customers of different nationalities—Chinese, Japanese, West European and North American—as well as among business and leisure travelers. Our study uses the text mining method to analyze travelers' online reviews, which provides researchers with a new approach to explore customer dissatisfaction. Due to the open structure of travelers' reviews, the

online reviews provide comprehensive reports of travelers' experiences (Li et al., 2013).

The objective of our study is to find out and compare the key drivers of dissatisfaction with airline service failures among American, British, and East Asian travelers in different travel classes: economy and business. To address this issue, we have developed two research questions: (1) What are the types and importance of the determinants of dissatisfaction with airline service failures within each traveler group? (2) Whether the types and importance of the determinants of dissatisfaction with airline service failures are different among various travelers of different nationalities and in different travel classes?

Overall, this paper contributes to the existing literature in several ways. It is one of the first papers to compare both the type and the importance ranking of the determinants of customer dissatisfaction with airlines among various traveler demographic groups. And our use of the Latent Semantic Analysis (LSA) text mining technique to explore the determinants of traveler dissatisfaction with airlines provides a more objective approach in analyzing contexts of reviews due to its mathematical characteristics compared with the elementary summary.

The rest of the paper is organized as follows: In section two we review the related literature. In section three we develop the hypotheses. Then we introduce the research methodology in section four. In section five we provide data analytics results, and the related discussions are in section six. Conclusions, implications, and extensions are provided in section seven.

II. LITERATURE REVIEW

2.1. Service Failure

Airline service failure issues have been

receiving increasing attention from both researchers and practitioners during the last decade (Sousa and Voss, 2009). Service failure can happen during the service process or as an outcome of the service process (Duffy et al., 2006). Service failure can be a real, or a perceived, breakdown, which is related to customer perceptions (Duffy et al., 2006). Service failures in the presence of consumers cannot be avoided (Hart et al., 1990). The sources of service failures come from one or more of the dimensions of service quality not properly delivered to customers (Sousa and Voss, 2009).

Service failures negatively influence customer perception of the service provider. For example, customer satisfaction is lowered, dissatisfaction is generated, and loyalty is reduced when experiencing service failure (Anderson et al., 2009; Zins, 2001). Service failures can also cause negative customer purchasing behaviors such as switching service providers (Sousa and Voss, 2009). As a result, service providers will lose market share, and their financial performance will be negatively influenced (Rhoades and Waguespack, 2008). Furthermore, stock returns will be harmed in both the short and long term (Luo, 2007).

Service recovery strategy is among the most efficient ways to alleviate the negative outcome caused by service failure (Craighead et al., 2004). Effective service recovery techniques enable companies to maintain customer loyalty (Hoffman et al., 1995) by relieving customer anger and frustration (Lapre, 2011), and thus enhance customers' willingness to pay (Xu and Gursoy, 2015a). Service recovery actions also provide an opportunity to improve service levels and optimize the service process (Lapre, 2011).

2.2. Customer Dissatisfaction

Customer dissatisfaction occurs when customers' expectations about a product or service exceed their experiences (Lapre and Tsikriktsis, 2006). Service failures followed by unsuccessful service recovery actions cause customer dissatisfaction (Lapre, 2011) that often is exhibited through customer regret and disappointment (Zeelenberg and Pieters, 2004).

Dissatisfied customers make negative behavioral responses that include complaining, switching airlines, word of mouth, and customer inertia (Zeelenberg and Pieters, 2004). Word of mouth has the highest influence in the social interaction function because negative word of mouth is often taken as a warning by others about the poor performance of the service providers (Zeelenberg and Pieters, 2004). With the increased popularity of online booking in the hospitality industry, online customer reviews often play a vital role in generating word-of-mouth referrals. These online reviews and opinions are known as electronic word of mouth (EWOM) (Cantalops and Salvi, 2014). Compared to the traditional word-of-mouth effect, the negative EWOM effect is more influential in reducing a company's demand due to the widespread existence of Internet users (Kim et al., 2009) and high-speed interaction (Cantalops and Salvi, 2014). Therefore, a company's annual volume of customers can be significantly decreased (Blodgett et al., 1993). Our study explores the key drivers of travelers' dissatisfaction with airline service failures by examining dissatisfied customers' online reviews. In our study, we define the key drivers of traveler dissatisfaction as the service attributes that contribute to travelers' dissatisfied experience (Crotts et al., 2008). These key drivers serve as determinants or factors that have a major

effect on customer perception such as dissatisfaction (Torres et al., 2014). The key drivers of dissatisfaction can also be explained as key dissatisfiers that induce customer dissatisfaction, although they have different priorities and different degrees of influence on customer dissatisfaction (Conklin et al., 2004).

III. HYPOTHESES DEVELOPMENT

3.1. The Importance of Determinants of Traveler Dissatisfaction with Airline Service Failures

According to the attribution theory (Weiner, 1985), customers seek reasons for service failures, and attributions of responsibility for failures influence customer satisfaction (Folkes et al., 1987). Therefore, the importance of each determinant in directing customer dissatisfaction may be different.

Multi-attribute theory can be applied to evaluate the distinctions of attributes for their importance in deciding customer dissatisfaction. The model is as

follows: $A_o = \sum_{i=1}^n B_i a_i$, where A_o is the

attitude, B_i is the strength of belief i

about attribute o , a_i is the evaluation as

the degree of expressed attitude i about attribute o , and n is the number of beliefs (Aijzen and Fishbein, 1980).

Overall dissatisfaction is presented by the function of aggregated importance attributed to an item (i.e., either a product or a service) and the evaluation of that item. The model could accommodate differing levels of importance attributed to airline operations features that lead to customer

dissatisfaction (Gu and Ryan, 2008). Based on the preceding discussion, this study proposes the following:

Hypothesis 1: The determinants of customer dissatisfaction with service failures are not equally important.

3.2. Different Determinants of Dissatisfaction with Service Failures among Travelers of Various Nationalities

Culture plays an important role in customer perceptions of service quality and reactions to service failures (Zhang et al., 2008). According to Hofstede's (2010) culture dimensions, people in various countries show different levels of characteristics such as individualism or collectivism, masculinity or femininity, uncertainty avoidance, power distance, time perspective (long-/short-term perspective), and indulgence or restraint.

Culture influences customers' perceptions of service dimensions. In Cunningham et al.'s (2005) study, service classifications are developed in a perceptual space where the actual services are mapped for customers from different Western and Eastern countries. They find that the dimensions and correlations for the classifications and services show some differences among customers of various nationalities. Besides culture, cognitive style and customer response of the service may also influence perception (Cui et al., 2013). In addition, saving face, which implies maintaining one's public dignity and standing (Lee, 1990), also plays an important role in customers' perceptions (Monkhouse et al., 2012). East Asian customers are particularly conscious of their outer public self, the social image that an individual projects in society, and so saving face is a fundamental goal (Monkhouse et al., 2012).

Customers of different nationalities have different dissatisfaction perceptions of

service failures (Dutta et al., 2007). When service failures happen, customers of different nationalities have different complaint-encouraging factors, and they may choose different complaint-handling methods (Ngai et al., 2007). There is a strong relationship between culture and dissatisfied customers' complaint behaviors (Ngai et al., 2007). Based on the preceding discussion, this study proposes the following:

Hypothesis 2: The type and importance ranking of determinants of customer dissatisfaction with service failures are different among customers of various nationalities.

3.3. Different Determinants of Dissatisfaction with Service Failures among Travelers in Various Travel Classes

Travelers in business class are almost always charged more than travelers in economy class. The higher-priced seat in business class is a signal of a higher service level (Mitra and Fay, 2010). Customers who pay more have higher service expectations.

The expectation-disconfirmation model Oliver (1980) developed describes the mechanism of the individual cognitive process. Customers compare their expectations with the actual perceptions of the service performances and, based on whether the performances meet or exceed their expectations (positive disconfirmation) or are lower than their expectations (negative disconfirmation), customers are satisfied or dissatisfied. Negative disconfirmation of expectations leads to customer dissatisfaction (Szymanski and Henard, 2001). The relationship between disconfirmation of expectations and

customer dissatisfaction is strong (Martinez-Tur et al., 2006). Because travelers in business class are charged more, they have higher service expectations than travelers in economy class. Thus, travelers with business class seats may suffer a higher probability of negative disconfirmation of expectations and therefore be more dissatisfied. Thus, we propose the following hypothesis:

Hypothesis 3: The type and importance ranking of determinants of customer dissatisfaction with service failures are different among customers in various travel classes.

IV. METHODOLOGY

4.1. Data Collection

We collected data from the Skytrax website, which is the largest third-party website for airline reviews. Customers' ratings (from 1 to 10) and reviews of their trip experiences are posted on the corresponding airline's bulletin board. Customers' nationality and seat class are specified in each review. This study explores the reviews from customers with American, British, and East Asian nationalities and in economy and business travel classes. In this way, we have six categories of customers. East Asian samples in our study include travelers from China, Korea, and Japan (Cui et al., 2013; Monkhouse et al., 2013). To control the effect of various service performance offered by different airlines, we only focus on seven full-service U.S. airlines: Alaska, American, Delta, Southwest, United, U.S. Airways, and Virgin America Airlines (Lapre and Tsikritsis, 2006). We consider customers with posted ratings below 4 out of 10 as dissatisfied customers and pick up their reviews from six categories of customers, resulting in a review sample size of 1,120.

4.2. Research Methodology

Most of the reviews are informative; however, reading all of the reviews can result in information overload. It is difficult to summarize a customer's main point of view without any technical analysis tools. Thus, we use text mining, which refers to the process of extracting useful, meaningful, and nontrivial information from unstructured text (Netzer et al., 2012) to tackle this information overload. As noted previously, we use LSA text mining, which is an algebraic-statistical method that can detect the underlying topical structure of a document corpus (Evangelopoulos, 2011) and extract hidden semantic structures of words and sentences. Using LSA to examine reviews and conduct summaries is more objective than other approaches due to its mathematical characteristics.

The use of LSA in this study involves three steps that follow the well-established text mining procedures discussed in prior studies (e.g., Li and Joshi, 2012). Positive reviews are consolidated in a spreadsheet, and negative reviews are consolidated in a separate spreadsheet for each demographic group of customers. The data is loaded into a leading data mining tool, RapidMiner Studio, and processed using the following steps.

The first step is preprocessing and term reduction. Each spreadsheet is converted into a document object in RapidMiner Studio and is sequentially assigned a unique document ID before it is analyzed. Then the documents go through a series of preprocessing procedures: (1) all of the letters in these documents are set as lowercase; (2) the documents are tokenized with non-letter separators; (3) the "stop words" (which include English words such

as “and,” “the,” “is,” “are,” “a,” and “an”) in the identified word list are removed because they do not provide meaningful information, and their presence unnecessarily increases the dimensionality of the term frequency matrix; (4) all the tokens that are less than two letters (i.e., “s,” “x,” and so on) are removed because they do not contain meaningful information; (5) the words or tokens that appear only in one document are removed because they only apply to a specific study and do not indicate any theme; and (6) term-stemming techniques are applied to a word list. Term-stemming identifies the word’s root and regards all words with the same root as one token. Therefore, variants of the same word are combined and the dimensionality is decreased. These term reduction procedures eventually result in more than 600 tokens in the reviews data set for each demographic group of customers.

The second step is term frequency matrix transformation. All documents are converted into the term frequency by the document matrix. Each cell of the matrix records the frequency of occurrences for a particular token in a specific document. We transform the values in the matrix using a term frequency–inverse document frequency (TF–IDF) weighting method (Husbands et al., 2001). This approach puts more weight on the rare terms and discounts the weight of the common terms so the uniqueness of each document, rather than the commonality, emerges in the result (Sidorova et al., 2008).

The third step, singular value decomposition, is the core of the latent semantic analysis. The computation of singular value decomposition is discussed in a large amount of prior literature (Golub & Reinsch, 1970; Klema & Laub, 1980; Baker, 2005). Its main idea is based on a theorem from linear algebra, which describes that a rectangular matrix A can be broken down into the production of three matrices – an orthogonal

matrix U , a diagonal matrix S , and the transpose of an orthogonal matrix V (Baker, 2005). That is, $A_{mn} = U_{mm}S_{mn}V_{nn}^T$, where $U^T U = I$ and $V^T V = I$. The columns of V are orthonormal eigenvectors of $A^T A$; The columns of U are orthonormal eigenvectors of AA^T ; and S is a diagonal $m \times n$ matrix containing the square roots of eigenvalues from U or V in descending order. These eigenvalues indicate the variance of the linearly independent components along each dimension showing the factors.

In this study, singular value decomposition is applied to convert the TF–IDF weighted term matrix into the production of three matrices, the term-by-factor matrix U , singular value matrix (square roots of eigenvalues) S , and the document-by-factor matrix V . The term-by-factor matrix U shows the term loadings on a particular latent factor. The document-by-factor matrix presents the document loadings to a particular latent factor V . The singular values, which are the square roots of eigenvalues, represent the importance of a particular factor.

The interpretation of LSA results is similar to the interpretation of factor analysis (Evangelopoulos, 2011). In this paper we associate each factor with its high-loading terms and documents to assist in factor interpretation. For each solution we create a table containing all high-loading terms and documents sorted by absolute loadings. Then the factors are labeled by examining the terms and documents (reviews) related to a particular factor, interpreting the underlying area, and determining an appropriate label. All of these terms and documents are interpreted, and the factors are labeled with practical meaning according to their contained high-loading terms.

V. RESULTS

5.1. Factors Leading to Dissatisfaction with Service Failures in Each Customer Demographic Group

An LSA based on reviews for each customer demographic group is presented to discover the influential factors that determine negative reviews (customer dissatisfaction) for each customer demographic group. Table 1 to Table 6 exhibit the top factors identified by LSA, each of which represents an aspect of reviews. In each table, the importance of each factor is indicated by a corresponding singular value. The singular values are derived from the matrix *S* discussed in Section 4.2. Singular value is the square root of eigenvalue, which indicates how much variance a factor explains (Baker, 2005). The factors with higher singular

values explain more variance and thus indicate a higher importance for that particular factor. Therefore, factors with higher singular values indicate that factor has a larger influence on customer dissatisfaction. For example, in Table 1, factor 1 (seat assignment) has a higher singular value (1.469) than factor 2 (flight departure and cancellation) (1.337), showing seat assignment has a higher influence on the dissatisfaction of U.S. travelers in economy class than flight departure and cancellation. Noting that each factor contains more than 600 terms, we selected the top 10 terms as the “high-loading terms” for demonstration purposes. The LSA results indicate that these top factors cover over 95% of all the unique terms and reviews, which means these factors represent all the aspects of reviews for each demographic group.

TABLE 1. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM U.S. TRAVELERS IN ECONOMY CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|-----------------------------------|------------------------|---|
| Factor 1 | Seat assignment | 1.469 | Seat, assign, seat_assign, economi, system, seat_i, attend, extra, worst, aisl_seat |
| Factor 2 | Flight departure and cancellation | 1.337 | Tomorrow, cancel, flight_depart, final, i_book, hr, happen, flight_got, depart, frustrate |
| Factor 3 | Flight delay | 1.229 | Weather, flight_delai_hour, stop, rebook, watch_flight, minut_i, return, rebook_flight, delai_mint, delai |
| Factor 4 | Unfriendly crew | 1.203 | Crew, unfriendly, section, unfriendly_flight, response, sit, flight_crew, unhelp, complet, mobil |

TABLE 2. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM U.K. TRAVELERS IN ECONOMY CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|-----------------------------------|------------------------|--|
| Factor 1 | In-flight entertainment | 1.364 | Poor, inflight, inflight_entertain, entertain, pai, tv, watch, game, screen, voice |
| Factor 2 | Facility | 1.243 | Exit, emerg, light, emerg_exit, exit_row, seat_alloc, window, row, phone, ear |
| Factor 3 | Connecting and checking-in issues | 1.228 | Long, connect, check_in, connect_flight, line, land, servic, safeti, termin, pass |

TABLE 3. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM EAST ASIAN TRAVELERS IN ECONOMY CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|---------------------------------|------------------------|--|
| Factor 1 | Checking-in issues | 1.634 | Attend, flight_attend, check_in, minut, seat, line, board, inform, priority, seat_i |
| Factor 2 | Flight delay | 1.146 | Fly, delai, return, experi, arriv, delai_i, t_fly, seem, lax, dai |
| Factor 3 | Crew service | 1.128 | Carbin, crew, board_crew, pai, carbin_crew, appal, reason, train, try, custom_servic |
| Factor 4 | Food | 1.081 | Food, option, poor, miser, eat, board, glass, gave, expect, dirti |

TABLE 4. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM U.S. TRAVELERS IN BUSINESS CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|---------------------------------|------------------------|---|
| Factor 1 | Facility | 1.447 | Uncomfort, poor, bed, recline, dirti, old, leg, worn, busi_class, bad |
| Factor 2 | Flight delay | 1.399 | Delai, delai_hour, flight_delai, line, agent, final, pm, miss, arriv, miss_connect |
| Factor 3 | Unfriendly crew | 1.319 | Staff, rude, customr_servic, counter, worst_custom, worst_custom_servic, statu, custom, worst, airlin_staff |

TABLE 5. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM U.K. TRAVELERS IN BUSINESS CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|---------------------------------|------------------------|---|
| Factor 1 | Food | 1.207 | Class, serv, busi_class, offer, fly, banana, drink, experi, club, water |
| Factor 2 | Unhelpful crew | 1.069 | Attend, attend_poor, flight_attend, flight_attend_poor, plane, unhelp, depart, crew, disappoint, came |
| Factor 3 | Facility | 1.064 | Unit, plane, experi, problem, old_plane, find, seat, unit_s, room, connect |
| Factor 4 | Flight delay | 1.014 | Ask, ladi, said, delay, return, hour_flight, delai_hr, desk, book, solute |

TABLE 6. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM EAST ASIAN TRAVELERS IN BUSINESS CLASS.

| Factors | Interpretations (Labels) | Singular Values | High-Loading Terms |
|----------------|---------------------------------|------------------------|--|
| Factor 1 | Food | 1.173 | water, snack, drink, gave, seen, seen_hour, smile, seem, food, plate |
| Factor 2 | In-flight entertainment | 1.171 | entertain, inflight, inflight_entertain, sai, unit, lax, screen, tv, sydney, member |
| Factor 3 | Flight delay | 1.125 | hour_delai, access, delai, refund, fly_airlin, refund Ticket, aircraft, class_ticket, paid |
| Factor 4 | Facility | 1.101 | Busi_class, Broken, fix, storage, class_seat, bed, problem, flat, flat_bed, legroom |

TABLE 7. DETERMINANTS OF CUSTOMER DISSATISFACTION WITH SERVICE FAILURES FROM EACH CUSTOMER DEMOGRAPHIC GROUP.

| Factors | Reflections | Ranking | | | | | |
|--------------------------|--|---------------------------------|---------------------------------|---------------------------------------|----------------------------------|----------------------------------|--|
| | | U.S. Travelers in Economy Seats | U.K. Travelers in Economy Seats | East Asian Travelers in Economy Seats | U.S. Travelers in Business Seats | U.K. Travelers in Business Seats | East Asian Travelers in Business Seats |
| Operations Issues | | | | | | | |
| Flight delay | hour delayed, missed connection | 3 | N/A | 2 | 2 | 4 | 3 |
| Flight cancel | cancel, frustrated | 2 | N/A | N/A | N/A | N/A | N/A |
| Checking-in issue | line, long | N/A | 3 | 1 | N/A | N/A | N/A |
| Seat assignment | seat, assign, aisle seat | 1 | N/A | N/A | N/A | N/A | N/A |
| Facility Issues | | | | | | | |
| Facility | flat bed, old plane, light, broken, legroom | N/A | 2 | N/A | 1 | 3 | 4 |
| Quality Issues | | | | | | | |
| Food | food, meal, snack, drink, water | N/A | N/A | 4 | N/A | 1 | 1 |
| In-flight entertainment | inflight entertainment, TV, screen | N/A | 1 | N/A | N/A | N/A | 2 |
| Behavior Issues | | | | | | | |
| Crew | rude, unhelpful, worst customer service, poor attendance | 4 | N/A | 3 | 3 | 2 | N/A |

5.2. Summary of Determinants of Dissatisfaction with Service Failures in Each Traveler Demographic Group

The determinant factors of dissatisfaction with service failures among all of the six traveler demographic groups are different. According to the framework of categories of service failure (Dutta et al., 2007), we find out that the determinant factors in our study include operations, facility, quality, and behavior issues. Table 7 summarizes the determinants of dissatisfaction with airline service failures from multiple traveler demographic groups based on Tables 1–6. For each traveler demographic group, the ranking of each determinant of travelers' dissatisfaction is based on the singular value of each factor in the corresponding table of the specific traveler demographic group. A high singular value represents the high importance of that particular factor. Therefore, a higher singular value leads to a higher ranking of the factor, showing the higher influence of the failure of that particular service dimension on travelers' dissatisfaction.

VI. DISCUSSIONS

6.1. Unequally Important Determinants of Customer Dissatisfaction with Service Failures

From Table 7 we find there are four main determinants of customer dissatisfaction with airline service failures. These four main determinants are operations issues, which include flight delays, flight cancellations, checking-in, and seat assignment; facility issues; quality issues, which include food and in-flight entertainment; and behavior issues such as crew problems.

Our results support hypothesis 1: Determinants of customer dissatisfaction in

each customer demographic group are not equally important, which is shown by the different singular values of each review matrix in Table 1 to Table 6. The higher the singular values, the more important the factor is in influencing customer dissatisfaction. Most previous studies discussing customer dissatisfaction only focus on identifying these factors; comparisons of the importance of each factor are missing. Therefore, our study fills the gap by referring to the singular values.

Although the types and the importance rankings of the determinants of customer dissatisfaction are different among the customers with various demographics, there are some common factors that lead to dissatisfaction for most customers. For example, flight delays make most customers dissatisfied. Flight safety and timeliness are the airlines' core services (Keiningham et al., 2014). Customers purchase products and services mainly for their core values. Thus, failure of the core services causes dissatisfaction among most customers, which results in complaint behavior (Lapre, 2011). The delayed flight could lead to missed connections, canceled schedules, and other serious negative consequences for customers (Keiningham et al., 2014). The dissatisfaction is even greater if the flight delay is caused by internal factors such as mechanical problems or crew and flight schedule issues rather than external factors such as bad weather (Anderson et al., 2009).

6.2. Different Types and Importance Ranking of Determinants of Customer Dissatisfaction among the Customers of Various Nationalities

Our results also support hypothesis

2: The type and importance ranking of determinants of customer dissatisfaction with service failures are different among customers of various nationalities. Almost all customers care most about flight delay issues. And comparatively, U.S. customers care more about behavior issues while U.K. customers pay more attention to facility issues, and East Asian customers demonstrate more dissatisfaction with quality issues.

The kindness and friendliness of customer service personnel is an important part of the overall product provided in the service industry (Schneider and Bowen, 1985). Because the hospitality industry is service intensive, customers' evaluations of flight services depends heavily on their satisfaction or dissatisfaction with their interactions with employees (Anderson et al., 2009). The lack of efficient and helpful interactions between crews and passengers significantly reduces customer satisfaction and incurs their dissatisfaction (Anderson et al., 2009). Customers from all of the countries in this study mention their dissatisfaction toward crew. However, U.S. customers show more dissatisfaction with crew service than customers from the U.K. or East Asia because crew behavior issues are an important determinant of dissatisfaction from U.S. customers in both economy and business classes. One reason may be that customers from different countries have features in each of the culture dimensions that include power distance, individualism or collectivism, masculinity or femininity, uncertainty avoidance, indulgence or restraint, and long- or short-term orientation (Hofstede, 2001). Based on those dimensions, national stereotyping occurs. And airline crews show different attitudes toward passengers from different countries, based on different cultures and stereotyping (Kim and Lee, 2009a). Crews demonstrate more respectful curiosity when

serving foreigners, which leads to more patient and kind service behavior (Kim and Lee, 2009a). Thus, domestic passengers report more dissatisfaction with crews. In addition, U.S. customers say they care more about employee friendliness and service reliability, and so the failure of appropriate employee behavior incurs their dissatisfaction (Mathe-Soulek et al., 2015; Liu and Jang, 2009). Furthermore, the powerful collectivist culture of East Asia and its face-saving orientation encourage Eastern Asian customers to strengthen people's relationships, so they are usually more tolerant of bad service (Monkhouse et al., 2012), and that cultural difference generates less dissatisfaction with crews from East Asians. In addition, compared with U.K. service providers, U.S. service providers show fewer positive attributes and more negative attributes when serving customers (Pettijohn et al., 2010), which shows they have less job satisfaction, and that negatively influences customer satisfaction (Chi and Gursoy, 2009).

U.K. customers show more dissatisfaction from airplanes facility than customers from other countries. The British culture has the highest indulgence index value among three demographic customer groups with various nationalities (Hofstede, 2001). British customers care most about the comfort provided by good facilities (Radojevic et al., 2014). However, the limited legroom and poor condition of flat beds or seats restrict their activities, which incur customer dissatisfaction. In addition, British customers are known for their preference for high fashion (Choi et al., 2014). Thus, old planes and broken facilities cause U.K. customers' dissatisfaction.

East Asian customers' dissatisfaction with quality issues mainly

focus on food and in-flight entertainment. While most of the major East Asian airlines offer free hot meals during flights longer than two hours, the majority of airlines in the United States do not offer free meals during flights, which incur East Asian customers' dissatisfaction. In addition, East Asian customers care more about selection of food (Ortega et al., 2015). Thus, the limited food selection (e.g., soft drinks and snacks) during flights and the Western food also can incur East Asian customers' dissatisfaction. In addition, the limited selection of in-flight entertainment such as the choice of TV shows—and especially the language limitations—may incur East Asian customers' dissatisfaction.

6.3. Different Types and Importance Ranking of Determinants of Customer Dissatisfaction Among the Customers in Various Travel Classes

Our results support hypothesis 3: The type and importance ranking of determinants of customer dissatisfaction with service failures are different among customers in various travel classes. Customers in business class care more about facility and quality issues whereas customers in economy class care more about checking in and seat assignment. Generally speaking, tardy flight schedules such as flight delays cause dissatisfaction from customers in both business and economy classes. This shows the important role of flight delays and even flight cancellations in generating traveler dissatisfaction (Anderson et al., 2009). A punctual and predictable flight schedule highly affects travelers' perception of the airline and is one of the keys to increasing an airlines' competitiveness and productivity (Kim and Lee, 2009b).

There are almost always more

customers in economy class than in business class. Efficient operational processes such as checking-in and making seat assignments are important when serving customers in economy class. Economy class customers typically wait in much longer lines to check in due to more customers without priority. According to the queuing theory, customers' frustration and impatience, the reduction in loyalty, and the incurred negative behaviors such as leaving, complaining, and spreading negative word of mouth are significantly related to wait time (Qian and Chan, 2015). These all show customers' dissatisfaction.

Seat assignments are another issue for customers in economy class. Most customers prefer a window or aisle seat over a middle seat due to privacy and convenience. According to the utility theory, it is highly possible that economy class customers become dissatisfied when only the middle seats are left because the same expense does not generate the same utility as customers in the window or aisle seats (Li et al., 2013). However, this is not a problem for business class customers because all of the seats in business class are either window or aisle seats. Besides, airlines often face overbooking issues, and the economy class overbooking issue is more serious than in business class.

Customers in business class typically pay a premium for upgraded facilities including reclining seats, flat beds, extra legroom, better food, and more in-flight entertainment options. Customers paying a premium have higher expectations and, thus, an increased possibility that their service expectations will not be met, which leads to more dissatisfaction (Oliver, 1980). Travelers in business class usually travel more often than travelers in economy class because a majority of them are business

travelers. Frequent fliers experience more negative emotions, such as boredom, than occasional flyers and, thus, they desire more appealing food and in-flight entertainment options. When the food and in-flight entertainment services they desire do not meet their expectations, they consider that a service failure (Duffy et al., 2006). Thus, regret and disappointment arises, which leads to dissatisfaction (Zeelenberg and Pieters, 2004).

VII. CONCLUSIONS AND IMPLICATIONS

7.1. Conclusions

Through applying LSA to customer online reviews, we have identified and compared the determinants of dissatisfaction with airline service failures among customers of different nationalities and in various travel classes. We found that although flight delays cause customer dissatisfaction from most customers, the type and importance of other determinants of customer dissatisfaction with airline service failures vary among customers of different nationalities and in various travel classes.

From the nationality perspective, U.S. customers are more dissatisfied with behavior issues such as unhelpful and unfriendly crews. U.K. customers care more about the old, broken, or uncomfortable facility issues such as seats and flat beds. Quality issues such as the limited selection of food and in-flight entertainment increase most East Asian customers' dissatisfaction levels.

From the economy and business class perspective, generally speaking, economy class customers' dissatisfaction comes more from operations issues such as flight cancellations, checking in, and seat assignment. In business class, customers are more dissatisfied with in-flight facility issues, food,

and in-flight entertainment quality issues. Flight delays cause dissatisfaction in both economy- and business-class customers.

7.2. Theoretical Implications

Our study is one of the first showing the different determinants of dissatisfaction among airline customers of different nationalities and in different travel classes. The differences of determinants of dissatisfactions among customers of different nationalities can be explained primarily by cultural differences; and the dissatisfaction among customers in different travel classes can be explained primarily by utility theory.

We use text mining as the methodology in our study. Customers' reviews usually contain more information than customer ratings because the words can show customers' detailed ideas, opinions, plans, and experiences. However, it is more difficult to determine the key points from the tedious text when the sample size is large. Text mining provides an efficient way to collect and summarize the key issues from a large number of customer reviews and, therefore, customers' key ideas can be shown more clearly.

We used Latent Semantic Analysis (LSA), a mathematical tool to conduct the text mining and determine the key factors from a large number of texts. The interpretation of LSA results is similar to the interpretation of factor analysis (Evangelopoulos, 2011), and customers' dissatisfaction factors are explored in a more efficient and accurate way compared with the elementary summary of the texts.

7.3. Managerial Implications

Identifying the determinants of

customer dissatisfaction toward airline service failures is the first step for service providers to implement service recovery strategies, which is an efficient way to mitigate customer dissatisfaction and retain loyal customers (Craighead, 2004). Also, service recovery can alleviate the negative word-of-mouth effect, which is an efficient way to manage business crisis and raise companies' reputations. In this way, service providers can have sustainable development of their financial performance (Xu and Gursoy, 2015b).

In our study we found flight delays are a common determinant for most customers' dissatisfaction. Our findings support Tsiriktsis and Heineke's (2004) study, which found that delays and denied boarding cause customer dissatisfaction. Enhancing the on-time performance of flights can alleviate customer dissatisfaction and enhance customer satisfaction (McCollough et al., 2000).

Besides the flight delay factor, we found that the other determinants of dissatisfaction with airline service failures among customers of different nationalities and in various travel classes vary. Therefore, airlines can use market segmentation strategies to decrease customers' dissatisfaction for each demographic group. For example, to deal with East Asian customers' dissatisfaction with food and in-flight entertainment quality issues, an increased selection of Asian-flavored foods and multilanguage in-flight entertainment can be provided on flights from Asia to the United States. To address the business class customers' dissatisfaction with facility issues, upgraded and updated facilities can be provided in business class, and the facility layout in business class can be improved. In addition, more optimized operations processes such as online check-in and printing boarding passes and luggage tags at home can decrease economy class customers' check-in waiting times and address the seat assignments issues

to relieve economy class customers' dissatisfactions.

Furthermore, improved crew behavior and customer service always play important roles in relieving customer dissatisfaction. Keeping positive, smiling, and providing more friendly and helpful services assist in decreasing customer dissatisfaction. In addition, timely communication and efficient interaction with customers can even decrease customer dissatisfaction with flight delays (Anderson et al., 2009).

Finally, airlines should note that the determinants of customer satisfaction may be different from customer dissatisfaction (Xu and Li, 2014). Therefore, efforts toward alleviating customer dissatisfaction, such as implementing a service recovery strategy, may not necessarily increase customer satisfaction. Airlines may need to pay the same attention to the determinants and the corresponding efforts to increase customer satisfaction, which can significantly increase a hospitality company's financial performance (Chi and Gursoy, 2009).

7.4. Limitations and Extensions

Despite its significant theoretical and practical contributions, our study also has some limitations. First, our study only discusses the determinants of customer dissatisfaction with U.S. airline service failures. Future studies can include airlines from other countries; such a comparative study would be interesting. Second, our study explores customer dissatisfaction through their own reviews. While word of mouth is one of the major ways for customers to show their dissatisfaction (Zeelenberg and Pieters, 2004), other ways, such as complaining when customers

communicate their discontent explicitly to the company or a third-party company, also show customers' dissatisfaction (Lapre and Tsikritsis, 2006). Exploring the content of customers' complaints and learning the core reasons for their dissatisfaction is another arena for study. Finally, identifying and comparing dissatisfaction with service failures among customers in more countries and in more demographic groups differentiated by age, gender, education, and other factors could provide even more arenas for study.

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