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September 2021

Advances in Management Accounting

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ABSTRACT

This paper examines the relationship between transportation quality, customer satisfaction and profitability. Specifically, this study examines the simultaneous and asynchronous effect of quality of transportation services on customer satisfaction and financial performance and then performs the same examination in relation to the effect of customer satisfaction on financial performance. The partial least squares approach to structural equation modelling is used to examine longitudinal data from 1995-2018 from the US airline industry. Our findings suggest that low services quality in transportation has adverse effects on customer satisfaction and financial performance, while the impact of customer satisfaction on financial performance in the US Airline transportation industry is mixed. We found that the impact of customer satisfaction on financial performance is significant in full-service airlines but not in low-cost airlines. Surprisingly, we found no significant direct relationship between transportation quality and financial performance in the US airline industry.

Keywords

Transportation quality, customer satisfaction, US airline industry and financial performance

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1. Introduction

Air travel is a unique model of transportation with few viable substitutes, given the speed, cost, and convenience of this modality (Akamavi, Mohamed, Pellmann, & Xu, 2015; Bilotkach & Hüschelrath, 2019; Klophaus & Lordan, 2018; Vieira, Câmara, Silva, & Santos, 2019). Therefore, the value of a reliable air transport system is vital to the consumers (Benezech & Coulombel, 2013; Dolnicar, Grabler, Grün, & Kulnig, 2011; Fageda, Jiménez, Perdiguero, & Marrero, 2017; Francis, Dennis, Ison, & Humphreys, 2007). Henderson, Tsui, Ngo, Gilbey, and Avis (2019) find that ten major factors, including price and quality (such as time, reliability, past experience, etc.) influence customers' decisions for selecting specific airline/s. This study extends Henderson et al. (2019) study and examines the simultaneous and asynchronous effect of quality of transportation services on customer satisfaction and financial performance and then performs the same examination in relation to the effect of customer satisfaction on financial performance. In the airline industry, flight delays, cancellations, lost baggage and involuntarily denied boarding affect the passenger's reliance on the airline that the service will be provided as promised. As suggested by Steven, Dong, and Dresner (2012), firms with higher service quality are likely to satisfy their customers, who in turn become loyal to the firms and recommend the service provider to family and friends, which ultimately increases profitability. Higher transportation quality will also improve profitability by reducing the cost incurred to address problems of service failures such as food and accommodation expense to passengers in the event of flight delays or cancellations.

Numerous studies have investigated the relationship between transportation quality and customer satisfaction (S. Anderson, Baggett, & Widener, 2009; Farooq, Salam, Fayolle, Jaafar, & Ayupp, 2018; Ling Sim, Joon Song, & Killough Larry, 2010; Stamolampros & Korfiatis, 2019; Steven et al., 2012; Suki, 2014) and 'customer satisfaction and profitability (Behn &

Riley, 1999; Ling Sim et al., 2010; Steven et al., 2012; Sun & Kim, 2013). However, the results are inconclusive, and most of these studies focus on investigating the relationship between a single nonfinancial measure and another financial measure. Furthermore, most prior studies assume a contemporaneous relationship which may not be the case. In other words, these studies have ignored the time lag between leading and lagging factors. For example, low customer satisfaction may not be fully reflected in the financial performance of a firm in the same financial year but in the future. While these studies provide valuable insights into the relationship between nonfinancial and financial performance, such studies have been criticized for failing to capture the trade-off between various performance measures, which may result in spurious conclusions (C. Ittner & Larcker, 2001).

To address the above gaps in the literature, this paper investigates the simultaneous and asynchronous effect of low service quality on customer satisfaction and the financial performance of targeted airlines. We investigate whether service quality issues such as flight delays and cancellations can have an immediate adverse effect on profitability due to the expenditures incurred by airlines to provide food and accommodation to passengers and compensations paid for lost baggage. We also investigate if such service quality issues affect customer satisfaction.

The paper further examines the simultaneous and asynchronous effect of customer satisfaction on the financial performance of targeted airlines. Most of the prior studies have assumed a contemporaneous relationship between customer satisfaction and financial performance. For example, Steven et al. (2012) investigated the moderating role of market concentration on the relationship between current period customer satisfaction and profitability in the US airline industry. Similarly, Sun and Kim (2013) examined the effect of customer satisfaction using data drawn from the hospitality sector, including airlines. Other research has suggested that customer satisfaction predicts future financial performance (Behn & Riley, 1999;

C. D. Ittner & Larcker, 1998; Sim, Song, & Killough, 2010). Based on these studies, we argue that changes in service quality can have an impact on customer satisfaction as well as on financial performance not only in the same period but also in the following periods (Farooq et al., 2018). The rationale for this argument is that customers arrive at a final decision about their future purchase intention based on their overall experience with the service provider as well as the costs of services (Olsen & Johnson, 2003).

Furthermore, we do not expect that the impact of customer satisfaction on financial performance in full-service airlines would be the same as in low-cost airlines, as suggested by some studies. Thus, we divide our targeted airlines into two groups: full-service and low-cost airlines and allow a time lag (1year) in our model for the effect of low service quality and customer satisfaction to be reflected on financial performance. Moreover, we investigate the simultaneous and asynchronous impact of changes in service quality and customer satisfaction and financial performance to provide insights into the trade-offs or complementarity of service quality and profitability.

Following Steven et al. (2012) and Sim et al. (2010), we use the US airline industry to test our model empirically. The US airline industry data was used in this paper for two reasons. First, service quality, customer satisfaction, and operating-related performance are publicly available for airline companies over multiple years. Second, major domestic airline companies belong to a relatively homogenous industry, facing similar accounting, tax, economic, and regulatory environments. Despite efforts to differentiate airline services, airline flights remain a commodity product with most firms deriving a preponderance of their revenues from the air transport of passengers essentially.

We examine a longitudinal panel data set that contains information about service quality, customer satisfaction, and financial performance of US airlines over 20 years (1995-2018). The data is analysed using the Partial Least Square approach to Structural Equation

Modelling (PLS-SEM), which enables simultaneous assessment of the relationship between multiple constructs with several manifest variables (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014).

The remainder of this paper is organized as follows: section two provides a literature review and hypotheses development. In section three, we present the data, variables and analytical tools used in this research. In section four, results are presented and discussed. Section five presents our conclusion.

2. Literature Review and Hypotheses Development

2.1 transportation quality and customer satisfaction

The literature tends to operationalize quality in different ways. From an accounting point of view, quality is discussed in terms of its associated costs. Costs related to efforts to prevent and correct defects before products/services are delivered to customers are considered as conformance costs. Such costs are also associated with internal quality control systems designed to meet customer's needs. Non-conformance costs, on the other hand, are costs incurred to correct defects and failures after the goods are shipped or services are rendered (Carr & Ponemon, 1994). However, assessing quality solely in terms of cost of quality ignores the effect of quality on customer satisfaction and profitability.

Cognizant of the impact of quality on customer satisfaction and firm performance, scholars suggest that accounting for quality should extend beyond the associated cost of quality to incorporate the customer perspective (Ahrholdt, Gudergan, & Ringle, 2017; Minghetti & Celotto, 2014; Roslender & Hart, 2002). Consistent with scholars calling for consideration of the market perspective of quality, several studies explore the impact of quality on customer satisfaction and financial performance. For instance, Smith and Wright (2004) investigate the factors that determine customer loyalty and the subsequent effect on financial performance. Based on the concept of the value chain, they provide evidence that customer loyalty is a source

of competitive advantage as it mediates the relationship between product quality and financial performance.

Scholars often conceptualise customer satisfaction as *transaction-specific* and *cumulative* (E. F. Anderson, Claes & R. Lehmann, Donald., 1994). Both elements apply to air travel consumers. Transaction specific measures of customer satisfaction help firms to formulate corrective measures to address the cause of the specific issue that leads to customer's dissatisfaction, while cumulative customer satisfaction provides a broader view of a firm's current and future performance (E. F. Anderson, Claes & R. Lehmann, Donald., 1994). In service organizations, customer satisfaction is determined by the expectation of customers (Petrick, 2004). Failure to meet passengers' expectations of quality of services, such as on-time arrival, proper handling of luggage, and friendly treatment by employees, hurts the overall judgment of the passenger about the airline. Failure to meet these expectations hurts customer satisfaction**.** There is an abundance of evidence supporting the negative consequences of service failures on customer outcomes (García-Fernández et al., 2018). According to Farooq et al. (2018), better service quality of aircraft can lead to higher customer satisfaction. However, the findings are inconclusive as some studies report different outcomes (Lynn & Brewster, 2018; Radojevic, Stanisic, Stanic, & Davidson, 2018). For example, Ramamoorthy, Gunasekaran, Roy, Rai, and Senthilkumar (2018) found a negative relationship between the level of satisfaction and feedback to the service providers. In particular, they find that customers who do not intend to provide positive feedback are likely to remain silent. Service failures issues may have greater influences on travellers who fly with full-service airlines and in business class compared with those who fly with low-cost airlines and in economy class. Balaji, Jha, Sengupta, and Krishnan (2018) find that highly cynical customers seem to less favourably evaluate customer satisfaction than less cynical customers. To contribute to the above inconclusive findings, we propose the following hypothesis:

Hypothesis 1. Low service quality has a negative effect on current and future customer satisfaction of full-service airlines but not on those of low-cost airlines.

2.2 Service quality and financial performance

There are many factors which can influence the financial performance of airlines (Cho & Dresner, 2018; Cho, Windle, & Dresner, 2017; Fageda et al., 2017; Francis et al., 2007; Ling Sim et al., 2010; Migacz, Zou, & Petrick, 2018; Narangajavana, Garrigos-Simon, García, & Forgas-Coll, 2014). The literature has suggested that improvement in service quality can influence customers' decisions in selecting their preferred service providers (such as specific airline(s)) and lead to better financial performance as a result of less rework, warranty claims, and compensation (Dolnicar et al., 2011; Henderson et al., 2019; Kurt & Feng, 2019; Tsikriktsis, 2007). Furthermore, customers who have a bad experience with an airline (for example, flight delays, lost or mishandled baggage, or unfriendly employees) may decide not to use the same airline in their future travel. This is consistent with the findings of Suzuki, Tyworth, and A. Novack (2001) that passengers experience in relation to on-time arrival is one of the critical factors in selecting an airline. Similarly, Sim, Koh, and Shetty (2006) find that on-time arrivals affect future financial performance due to the increase in sales from repeat purchases of existing customers. Therefore, poor service quality can have a direct and adverse effect on future period financial performance. Based on the above argument, we hypothesise as follows:

Hypothesis 2. Low Service quality has a negative effect on the current and future financial performance of both full-service airlines and low-cost airlines.

2.3. Customer satisfaction and financial performance

Financial performance is still one of the most popular ways of assessing organisations' performances (Dunk, 2005; Pacharn, 2008; Schmidt, 2017). However, the literature on examining the relationship between customer satisfaction and financial performance is inconclusive too. Some scholars argue that customer satisfaction has a positive and immediate

impact on financial performance (Behn & Riley, 1999; Chi & Gursoy, 2009; Sun & Kim, 2013). Other studies suggest moderating factors, such as competition, to have an impact on the relationship between customer satisfaction and a firm's financial performance (Banker & Mashruwala, 2007; Steven et al., 2012). These studies assume the contemporaneous relationship between the variables. However, some studies argue that changes in customer satisfaction have a robust positive effect on the future financial performance of the firms rather than on the current financial performance (Behn & Riley, 1999; C. D. Ittner & Larcker, 1998; Sim et al., 2010) suggesting that it takes time for financial performance to react to changes in customer satisfaction. Yagil and Medler-Liraz (2019) report that the negative impact of customer dissatisfaction on performance is more substantial for high-status customers compared to low-status customers. According to Mayer, Johnson, Hu, and Chen (1998), customer satisfaction may hold the key to long-term financial success.

When customers are not satisfied, it has become a customary practice that the terms of sales include language that allows customers to return to the producer for replacement or rework. However, the production and utilization of service is concurrent (E. W. Anderson, Fornell, & Rust, 1997). Thus, dissatisfied customers cannot return the services; the most they can do is to seek compensation for their perceived loss. Therefore, the effect of customer satisfaction on financial performance is not instantaneous.

Dissatisfied customers have the potential to negatively impact future performance by choosing not to use the same service again (from the same vendor), and they may influence others. The combined effect across a large number of customers can have a significant negative impact on the financial performance of a firm via a reduction in sales revenue and increased customer acquisition costs (Sim et al., 2006). However, the impact may not be the same for full-service airlines versus low-cost airlines (Xu, Liu, & Gursoy, 2018). Xu et al. (2018) report that low customer satisfaction issues may have greater influences on travellers who fly with full-service

airlines and in business class compared with travellers who fly with low-cost airlines and in economy class. Therefore, we predict that changes in customer satisfaction can impact the financial performance of the airlines, but the effects may not be the same for full-service airlines as it is with low-cost airlines. In particular, the impact of satisfaction on performance for low-cost airlines will likely be weaker than for full-service airlines since low-cost airline customers may care more about low fares than about high-quality service. Therefore, we propose the following hypothesis:

Hypothesis 3. Customer satisfaction has a positive effect on the current and future financial performance of full-service airlines but not low-cost airlines.

Our model is based on the argument that there is a direct and indirect relationship between service quality and financial performance and that increased service quality leads to increased customer satisfaction and financial performance. Following prior studies in the US airline industry (Sun & Kim, 2013), we incorporate leverage, liquidity, capital intensity, firm size and business model as control variables.

[Insert Figure 1]

3. Model Development and Data

Data and Sample

The sample consists of all airlines listed in the Department of Transportation's "Air Travel Consumer Report" from 1995-2018. The Service Quality and customer satisfaction data was obtained from the Airline Quality Rating published by Wichita State University and paired with similar data from the Air Travel Consumer Report from the US Department of Transpiration. Finally, all financial performance information has been collected from COMPUSTAT. The annual data used in the sample represents 209 firm years. Table 1 contains details of the sample used in this study.

[Insert Table 1 here]

Variable Measurement

Service quality: Following prior research (Choi, Lee, & Olson, 2015; Liedtka, 2002; Riley Jr, Pearson, & Trompeter, 2003; Steven et al., 2012), we employ the airline quality data published by Wichita State University. This data contains on-time arrival, the number of lost baggage reports, and the number of involuntarily denied boarding. With the exception of on-time arrival, the two measures show poor/negative aspects of service quality. On-time arrival, however, shows a positive aspect of service quality. Following prior research in constructing measures of service quality, this research uses these measures to assess the service quality of the airlines (Choi et al., 2015; Liedtka, 2002; Riley Jr et al., 2003; Steven et al., 2012). To make the measures consistent, on-time arrival has been converted to show the percentage of flights that fail to arrive on time (flight delays). For example, American Airlines on-time arrival in 1995 was 0.78; this shows that 78% of the flights arrived on time in 1995. Correspondingly, the percentage of flights that did not arrive on time is calculated at 1-0.78 = 0.22. Late arrivals or flight delays are calculated using 'on-time arrivals. In other words, on-time arrival for all the airlines covered by this study has been converted to a percentage of flight delays (as shown above).

Customer satisfaction: Our study utilizes the number of complaints to measure customer satisfaction. Using the number of complaints as a proxy for customer satisfaction has been widely used in prior studies investigating the link between nonfinancial and financial performance (Dresner & Xu, 1995; Sim et al., 2006; Sim et al., 2010; Steven et al., 2012).

Financial performance: The accounting principles applied by different firms pose a challenge to the evaluation of financial performance using secondary information to evaluate performance. One way to address this limitation is to use relative measures instead of absolute amounts (Tsikriktsis, 2007). Following prior research, we use the operating margin as a

measure of financial performance (Steven et al., 2012). Additional measures of financial performance are used based on prior studies (Tsikriktsis, 2007). Thus, Return on Assets and Return on Sales (Sun & Kim, 2013) and Return on Investment (E. W. Anderson et al., 1997) are also used.

Control variables: Business model, leverage, liquidity, capital intensity, firm size are incorporated into the model as control variables. Airlines are often categorized as *network and low* cost (Tsikriktsis, 2007) based on their business model. In this study, American Airlines, United Airlines, Delta Airlines, Continental Airlines, Northwest Airlines, and US Airways are *network* airlines (full-service airlines). At the same time, Southwest Airlines, Spirit, Allegiant, Frontier, America West and JetBlue Airways are *low-cost* airlines. To control the effect of different business models among these airlines, a dummy variable is included to categorize the airlines into the *network* and *low-cost* airlines. Leverage and liquidity ratios are included to control for the difference in capital structure and capacity to pay short term obligations, respectively. Capital intensity controls any other confounding factor that affects financial performance. Firm size is controlled using total assets (Sun & Kim, 2013). Fuel expense per available seat miles is also included to control the effect of fuel expense on the profitability of airlines. Table 2 provides definitions of the measures and control variables used in this study.

[Insert Table 2 here]

PLS-SEM has been used to test the hypothesized relationships among service quality, customer satisfaction and financial performance. Our model (see Figure 2) contains three latent variables: service quality, customer satisfaction and financial performance. All constructs are reflective. Based on prior research into the links between non-financial and financial performance measures, we ran the structural model incorporating two different time effects, no time lag and one-year time lag. The measurement model was assessed to ensure the reliability, convergent, and discriminant validity of the indicators.

One way to examine the reliability of indicators is assessing the loadings that show the correlation between the latent variable and its related indicators. Loadings of 0.7 and above suggest that the indicator has strong explanatory power of the latent variable it measures (Hair et al., 2014). As seen in Table 3, out of the eight original indicators used, three of the indicators have loadings of less than 0.7. One is an indicator of financial performance; Return on Investment (0.322), and the other two are indicators of service quality; Involuntary denied boarding (-0228) and mishandled baggage (0.598). Involuntary Denied Boarding and Return on Investment were removed from the model because lower loadings indicated lower explanatory power (Hair et al., 2014). The rest of the indicators were used because they had loadings higher or slightly lower than 0.7 at a significant level of $p < 0.001$. Table 3 shows the list of indicators used in this study.

[Insert Table 3 here]

Convergent validity refers to the degree that two measures of constructs are related. It is assessed by looking at the average variance extracted (AVE). The results of the PLS estimation show that the AVE of each construct used in this study is above the cut-off value of 0.5, demonstrating the existence of convergent validity (Hair et al., 2014) (see Table 4).

Further, the reliability of each construct has been assessed by looking at the composite reliabilities of the constructs. As indicated in Table 4, the results show that the composite reliability of each construct is well above the minimum value of 0.7; service quality 0.819 and financial performance 0.976, confirming the reliability of the constructs. Customer satisfaction is a single item construct for which the requirement of composite reliability is not applicable that does not require construct.

[Insert Table 4 here]

Discriminant validity assesses whether a given construct is different from another construct in the model (Hair et al., 2014). As shown in Table 5, the AVE values of all constructs

are higher than the squared value of the correlation between the constructs suggesting the requirement of discriminant validity is met (and are shown on the diagonal). The second way of ensuring discriminant validity is that loadings of each indicator should be higher on the latent variable it measures than its loadings on any other latent variable, and this is shown by the results in the lower triangle. The results show that the loadings of all indicators are higher on the latent variable they measure than those of any other latent variable. These results, taken together, demonstrate that the measurement model meets the requirements of reliability and validity. Based on our convergent and discriminant validity tests, we are confident that the measures we are using in this study are appropriate for the constructs they represent.

[Insert Table 5 here]

The structural model was evaluated for its ability to predict the hypothesized relationship among the latent variables. The coefficient of determination (R^2) was examined to assess the predictive ability of the model. The R^2 of customer satisfaction is 0.57, while the R^2 of financial performance is 0.47, providing evidence that the structural model fulfils the requirement of predictive power.

The structural model was further assessed by estimating the structural model path coefficients showing the hypothesized relationship among the latent variables. The significance of a path coefficient is determined by the p-value obtained through bootstrapping. Two sets of tests have been performed for all three proposed hypotheses (for two groups of airlines separately): the first set of tests examines the relationship between all dependent and independent variables at the same period, the second test measures the relationship between independent variables at time t with dependent variables at time t + 1 (allowing one-year time lag). Results from the sets of tests confirm that the measurement model meets the requirements of internal consistency validity, convergent reliability, and discriminant reliability.

The results of the PLS-SEM estimation suggest that the structural model meets the requirements of predictive relevance as the coefficient of determination and the predictive relevance are above the minimum requirements of 0.1 and 0, respectively. Results of the structural model provide support for hypothesis H1 in relation to both airlines (with no time lag as well as one-year time lag[1]). It means that service quality affects customer satisfaction in all airlines both in the short term and long term. However, the results provide no support for H2 for any airline (both in the short term and long term), suggesting that low-quality service has no significant direct impact on the financial performance of selected airlines. One interpretation could be that savings resulted from providing low-quality services may be a trade-off by additional costs that airlines have to pay for compensating the affected customers. Another interpretation could be that additional revenue resulted from improved service quality (reflected in financial performance) is offset by additional costs for improving the service quality. Alternatively, any additional money saved by lowering the service quality is offset by revenue lost via loss of customers and paying for additional costs as compensation. The results further suggest that customer satisfaction affects the financial performance of full-service airlines (both in the short term and long term) but not low-cost airlines. So, the findings reveal that the link between customer satisfaction and financial performance (H3) is mixed for different airlines (it is significant for full-service airlines but not for low-cost airlines. This is an interesting finding which deserves further studies. Table 6 presents the results of the PLS-SEM analyses.

[Insert Table 6 here]

[1] It should be noted that a double lagged model by lagging the operational performance variables by an additional time period was also run as a robustness check, and found the results to be structurally similar, and therefore the detailed results are not presented.

Overall, the evaluation of the structural model supports the hypothesis that airline service quality has a direct impact on customer satisfaction as well as on the current and future financial performance of full-service airlines (but not on the financial performance of low-cost airlines). Consistent with our prediction, findings provide evidence that low service quality, such as flight delays and lost baggage, have a strong negative effect on current and future customer satisfaction. These findings hold in both the short-term (without time lags) and the long-term (with one-year and two-year time lags) for all airlines.

4. Discussions and Implications

In the US airline industry, service quality and customer satisfaction are important factors to maintain competitiveness (Baker, 2013). As a result, airline service quality is stated as a central strategic objective for many US airlines (Sim et al., 2006). This finding is consistent with prior literature, such as the findings of Steven et al. (2012), who find that flight delays, cancellations, and involuntarily denied boarding all have a negative impact on customer satisfaction.

Our results find that the link between customer satisfaction and financial performance is statistically significant for both current and future financial performance in full-service airlines but not in low-cost airlines, suggesting that customer satisfaction is not a driver of financial performance in the US low-cost airline industry. This is quite an interesting result. Finding no significant link between customer satisfaction and financial performance in low-cost airlines could be related to the business model of low-cost airlines. Airlines are categorized into two based on their business model: network and low cost (Tsikriktsis, 2007). The prior study suggests that airlines business model determines their competitive strategy (Collins, Román, & Chan, 2011). We run an additional test to see the effect of the business model on the link between customer satisfaction and financial performance. We categorised our sample

into two based on their business model — American, United, Delta, Continental, Northwest and US Airways in one group as the network or full-service airlines. The second group contains Southwest, Spirit, Allegiant, Frontier, America West and JetBlue Airways as a low-cost airline. Our results show that there is a significant positive relationship between customer satisfaction of network airlines and their financial performance. However, this relationship does not hold for low-cost airlines, suggesting that the business model is one of the intervening variables influencing the relationship between customer satisfaction and financial performance. One interpretation is that customers of low-cost airlines do not have high expectations and usually select the low-cost airlines for cost-saving though they may not be satisfied with the quality of the provided services. However, further studies are recommended to seek other possible factors which may affect such relationships. Further research in this area would shed more light in this regard. An area for further research is to empirically test the theoretical model developed in this study in a highly competitive industry.

Another possible explanation for the lack of linkage between customer satisfaction and financial performance in low-cost airlines could be the influence of switching costs (e.g. cheaper ticket costs of low-cost airlines versus higher ticket costs of full-service airlines). In a business environment with few service providers, such as the current US airline industry, customers have limited choices, and thus the switching cost is relatively high. Under such circumstances, dissatisfied customers will continue to use the service provider, and thus, customer satisfaction will not have a substantial impact on firms' financial performance. This situation becomes more apparent within the airline industry because of frequent flyer programs (as another example of switching costs), which many scholars believe have limited the level of competition and increased the switching costs for airline customers (Carlsson & Löfgren, 2006). Future research that considers the role of switching costs may shed more light on the links between service quality, customer satisfaction, and financial performance. Additionally, the

incorporation of financial soundness as a consequence of the nonfinancial performance measures examined in this study. As such, the incorporation of financial soundness is an important area that future research could examine.

Findings in this study have important implications. Several authors note that firms' financial success results from management capability to manage and satisfy their customers (Ittner & Larcker, 1998; Behn & Riley, 1999; Sun & Kim, 2013). However, our findings suggest that changes in customer satisfaction may not be reflected in the financial performance of low-cost airlines, underscoring the role of intervening variables such as the business model in the relationship between the constructs. Our study also contributes to the literature by applying PLS-SEM that is suitable for testing the simultaneous relationship among multiple latent variables (Farooq et al., 2018; Hair et al., 2014).

Our findings have implications for practice too. The current business environment of the US airline industry is characterized by fierce competition and rapid technological changes. As a result, airlines are under a continued pressure to identify and sustain the source of their competitive advantage to survive. Our findings suggest that offering low-cost flights is one option to improve an airline's financial performance without being overly concerned about customers' satisfaction. However, the following factors should be considered in generalising the findings of the current study:

Data from the US Department of Transportation[2]shows that out of 10 major US carriers, Southwest airline, one of the Low-Cost Carriers, has the highest number of

[2] https://www.bts.dot.gov/table-7-top-10-airlines-ranked-2018-domestic-scheduled-enplanements

passengers flying 25% of the domestic passengers in 2018, while American Airlines ranked 3rd by transporting 19% of total domestic passengers.

Looking at the routes each carrier flew, data compiled by UPGRADE[3] reveals that headquarter of airlines has contributed to the number of passengers flying from that specific location. For instance, 71% of passengers from Georgia used Delta airline, which is headquartered in Atlanta, suggesting that geography has contributed to the market share. On the other hand, whilst both American Airlines and Southwest Airlines are headquartered in Texas, American airlines flew over 30% of passengers departing from Texas, slightly higher than Southwest Airlines. The above data shows mixed evidence regarding the role of route control on the overall performance of airlines.

Prior studies applied varying time lags depending on the nature of the industry. For instance, Ittner and Larcker (1998) used one year lag to measure the effect of customer satisfaction on financial performance in a telecommunications industry. Behn and Riley (1999) used a quarter to assess the impact of customer complaints on future period financial performance. Banker and Mashruwala (2007) used six months to examine the effect of customer satisfaction on the profitability of a retail business. A high seasonality characterises the airline industry; for example, demand for air travel peaks in the summer and Christmas seasons. We applied one year lag to address the effect of these demand fluctuations on the profitability of airlines.

This paper focuses on examining the impact of service quality on customer satisfaction and financial performance. Thus, following prior studies (Liedtka,2002),

[3] https://upgradedpoints.com/travel/airlines/us-airlines-marketshare-north-america/

we used on-time arrival, number of lost baggage, number of complaints and number of involuntarily denied boarding indicators of service quality. These variables are reported by the US Department of Transportation- Consumer Travel Report as measures of airline service quality. This can be an area that requires further investigation in future studies.

5. Conclusion

This paper examines the relationship between service quality, customer satisfaction and profitability. The findings suggest that service quality has a direct impact on customer satisfaction of all targeted airlines. These findings hold in both full-service airlines and low-cost airlines.

However, the findings indicate the impact of customer satisfaction on financial performance is significant in full-service airlines but not in low-cost airlines. The findings imply that the financial performance of full-service airlines but not those of low-cost airlines. Further studies are suggested to explore other contextual factors that may explain the financial performance of low-cost airlines. Surprisingly, we found no significant direct relationship between service quality and financial performance in the US airline industry. One interpretation could be that savings resulted from providing low-quality services may be a trade-off by additional costs that airlines have to pay for compensating the affected customers.

Despite the academic and practical contributions discussed above, our study suffers from a few limitations as follows: The findings are based on data collected from one country - the United States of America. This may limit the generalizability of the findings. However, it provides confidence that the results are not confounded by industry characteristics. The literature suggests that studies that focus on one industry provide an opportunity to obtain a thorough understanding of the factors and better control the effect of industry-related factors on the relationship among the variables (Amir & Lev, 1996; Behn & Riley, 1999). Future research may replicate this study using firms that have different characteristics or operate in different economic or social environments. Finally, while this research estimates a panel dataset, we do not account for error correlations within a firm's set of observations or within time periods. This could result in potentially inflated standard errors.

Risk is an important control variable due to the risk-return relationship in the finance literature. However, we have not been able to gather the necessary information to capture the risk factor for all targeted airlines in our study. So, this could be considered as another limitation in this study.

Our findings of the mixed results (for different airlines) in terms of the linkage between customer satisfaction and financial performance in the airline's industry warrants future research. There are two other areas that may also be directions for future research. Work combining archival data and survey (or interview) data could enhance the validity of the links between service quality and customer satisfaction and their impact on financial performance.

As cultural factors can influence customers' perception of service quality (Tsoukatos & Rand, 2007), one possible area for future research could be conducting a comparative study of the U.S. and non-U.S. airlines. Similarly, future research that examines the effects of the Covid-19 pandemic and the resulting effect of flight delays and cancellations on airline performance may provide additional insights. Further, as this study focuses on the macro-level factors that impact transportation quality, customer satisfaction, and financial performance, an additional fruitful area for future research would be to delve into micro-level factors such as average stage length, amount of international operations, route control, and environmental factors (such as air traffic congestion, airport slot allocation, and rerouting algorithms).

Funding
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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Appendix: List of Tables and Figures

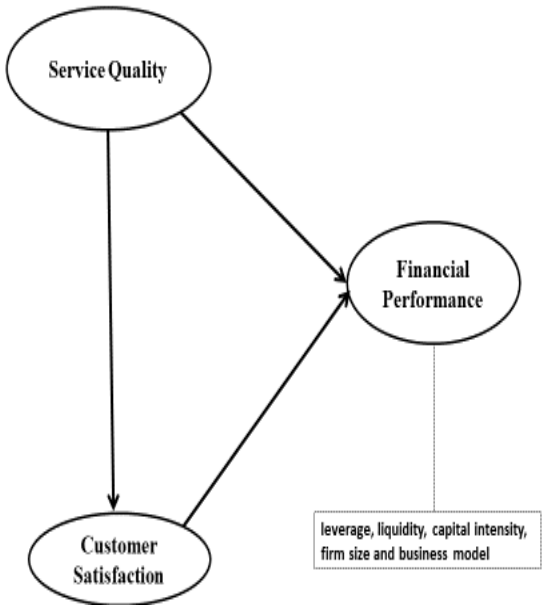

Figure 1: Theoretical model

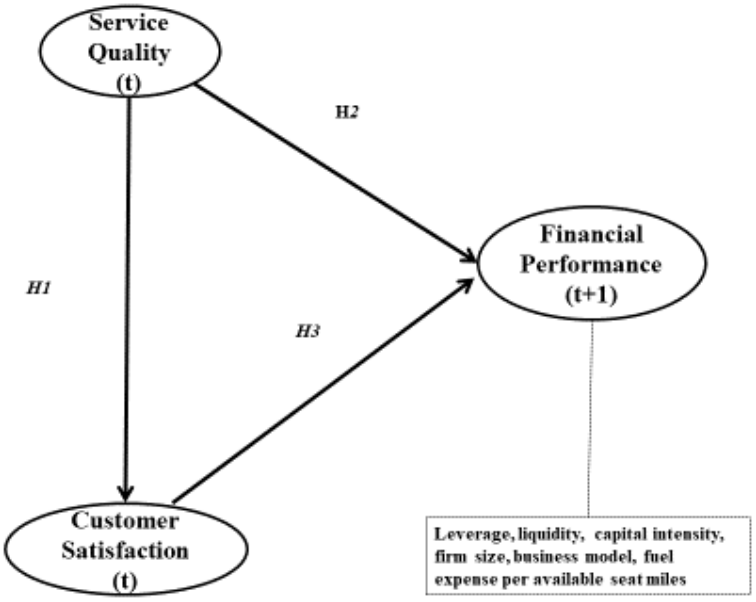

Figure 2: Theoretical model with hypotheses

Table 1: Sample Airlines

Names of Airlines	Classification	Sample Years	Number of firm-year observations
American	Full-service airlines	1995-2018	24
Continental	Full-service airlines	1995-2009	15
Delta	Full-service airlines	1995-2018	24
Northwest	Full-service airlines	1995-2008	14
US Airways	Full-service airlines	1995-2013	19
United	Full-service airlines	1995-2009	15
Spirit Airlines	Low-cost airlines	2006-2018	13
Southwest	Low-cost airlines	1995-2018	24
Allegiant	Low-cost airlines	2003-2018	16
Frontier	Low-cost airlines	1995-2009	15
America West	Low-cost airlines	1995-2004	10
JetBlue Airways	Low-cost airlines	1999-2018	20
Total			209

Table 2: Definition of Measures

Constructs	Measures	Definition
Low Service Quality	Lost baggage	Number of lost baggage reports per 1000 passengers
	Flight delays	Percentage of flights delayed
	Involuntarily denied boarding	The number of passengers per 100,000 passengers denied boarding
Customer Satisfaction	Number of complaints	Number of complaints per 100,000 passengers.
Financial Performance	Operating margin	Operating revenue divided by operating cost
	Return on investment	Net Income divided by invested capital
	Return on assets	Net Income divided by total assets
	Return on sales	Net Income divided by operating revenue
Control Variables	Leverage	Total liabilities divided by total assets
	Liquidity	Current assets divided by current liabilities
	Capital intensity	Total assets divided by total sales
	Size	Total assets
	Business model	Dummy variable of 1 for network airlines and 0 for focused airlines
	Fuel expense per available seat miles	Total fuel expense divided by total available seat miles

Table 3: Assessment of Measurement Model – Indicator Loadings with all the indicators and with the retained indicators

Constructs	Latent Variables	Indicators	Indicator loadings (with all the indicators)	P-value	Indicator loadings (with the retained indicators)	P-value
Low Service Quality		Flight delays	0.786	p<0.001	0.814	p<0.001
		Mishandled baggage	0.598	p<0.001	0.642	p<0.001
		Involuntarily denied boarding	-0.228	(0.311)	Removed	
Customer satisfaction		Number of complaints	NA	NA	NA	NA
Financial performance		Operating margin	0.952	p<0.001	0.951	p<0.001
		Return on assets	0.967	p<0.005	0.966	p<0.001
		Return on sales	0.978	p<0.001	0.978	p<0.001
		Return on investment	0.322	(0.082)	Removed	

Note: This table shows the loadings and p-values of the measurement model with all the indicators and with the indicators retained. Involuntarily denied boarding and (-0.228) and Return on investment (0.322) are removed because of their lower loadings. Customer satisfaction is a single item construct, and, hence, it is not applicable (NA) to report its loading and p-value.

Table 4: Assessment of Measurement Model - Internal Consistency

Constructs	Composite Reliability	Convergent Validity (AVE)
Customer Satisfaction	NA	NA
Low Service Quality	0.819	0.616
Financial Performance	0.976	0.927

Note: This table shows the composite reliability and convergent validity of the constructs. Customer satisfaction is a single item construct, and, hence, it is not applicable (NA) to report its composite reliably and convergent validity.

Table 5: Assessment of Measurement Model – Inter-correlation of Latent Variables

Latent variable	LSQ	CSAT	FP
Low Service Quality (LSQ)	**0.763**		
Customer satisfaction (CSAT)	0.572	**NA**	
Financial Performance (FP)	-0.189	-0.472	**0.942**

Note: This table presents the inter-correlation of the latent variables. Numbers in bold on the diagonal represent the square root of AVE value. Customer satisfaction is a single item construct that does not require reporting the correlation value, and, hence, NA is reported.

Table 6. Assessment of Structural Model - PLS path coefficients

	Hypothesis	**Path coefficient**	**P value**	**T value**	
Full-service airlines (No lag)	H1. Service Quality affects Customer satisfaction	0.372	0.000	3.477	Supported
	H2. Service Quality affects Financial performance	0.061	0.513	0.662	Not supported
	H3. Customer satisfaction affects Financial performance	-0.121	0.021	3.219	Supported
Full-service airlines (lagged by one year)	H1. Service Quality affects Customer satisfaction	0.353	0.000	3.620	Supported
	H2. Service Quality affects Financial performance	-0.072	0.141	1.269	Not supported
	H3. Customer satisfaction affects Financial performance	-0.132	0.019	2.123	Supported
Low-cost airlines (no lag)	H1. Service Quality affects Customer satisfaction	0.534	0.000	3.201	Supported
	H2. Service Quality affects Financial performance	0.452	0.082	1.921	Not supported
	H3. Customer satisfaction affects Financial performance	0.132	0.652	1.201	Not supported
Low-cost airlines (lag by one year)	H1. Service Quality affects Customer satisfaction	0.421	0.000	3.12	Supported
	H2. Service Quality affects Financial performance	0.217	0.027	2.110	Not supported
	H3. Customer satisfaction affects Financial performance	0.311	0.314	1.273	Not supported