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# Passengers' perception of safety and its relationship with demographics, service quality, satisfaction and loyalty in airlines sector

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**Abstract**

Our understanding on airline passengers' perception of safety and its relationship with their satisfaction and airline service quality measures is limited in literature. This study aims to conduct a systematic examination on airline passengers' perception of safety and its relationship with demographics attributes, service quality measures, overall satisfaction and loyalty.

We conducted a questionnaire survey of 436 respondents travelling on a full-service airline. Only 53.4 % of respondents feel safe while travelling in the airline while 28.9% feel neutral safe and 17.7% feel unsafe. We found that the four service quality measures of SERVQUAL model (Tangibles, Reliability, Assurance and Empathy) and airline specific measures (Flight Experience, Ground Service, Airline Employees and Flight Schedule) had significant effects on the passengers' perception of safety. In addition, respondents' differences in educational qualification, frequency of travel, ticket types and the membership of frequent flyer program had significant effect on their perception of safety. Likewise, passengers' overall satisfaction and loyalty to the airline also had significant effect on perception of safety. No effects on the perception of safety were found for differences in gender, age, nationality, income and purpose of travel.

Our findings emphasise the importance of understanding the relationship between passengers' perception of safety and their satisfaction. Along with traditional cabin safety education and security measures, improving flight experience, ground services, flight scheduling and training employees for better customer service would have a positive influence on passengers' perception of safety on airline travel; which in turn, can enhance their satisfaction and loyalty to the airlines.


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*Keywords:* Survey; Aviation; Security; Airlines; Safety

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## 1. Introduction

The global aviation industry today is witnessing aggressive competitions among traditional full-service network carriers, low-cost carriers and newly emerging airlines. In the highly competitive market, airlines have pursued different strategies to compete with their opponents. In the past, most studies have been undertaken to measure different dimensions of the service quality and customer's satisfaction in airline industry (Jiang et al., 2017). The provision of high quality service to customers is not only important for customer's satisfaction but is the core competitive advantage for an airline's profitability and sustained development (Park et al. 2004). Customer satisfaction is useful for forecasting future profitability and behavioural intentions (Chen, 2008). Several studies have shown that service quality is vital for running successful companies due to its considerable impact on customer loyalty (Roberts et al., 2003; Lin et al., 2009). Likewise, the need for operators of regular public transport aircraft to be more proactive in identifying and addressing aviation safety has been highlighted for quite a while (Edkins, 1998). It has been assumed that safety considerations play a role in passengers' airline decisions (Levine, 1991). Airline passengers consider safety as the most important criterion when choosing an airline (Atalik and Özel 2007; Gilbert and Wong 2003). Although, aviation is generally considered to be a safe industry, report from International Air Transport Association (IATA, 2014) shows that airlines vary considerably in terms of their safety outcomes. While the relationship of service quality with customers' satisfaction and loyalty is known, there is limited understanding on relationship of airline passengers' perceived feeling of airline safety with the demographics attributes, service quality, satisfaction and loyalty (Siomkos 2000; Koo et al., 2015; Ringle et al., 2011).

Therefore, the objective of this study is to conduct a systematic study on airline passengers' perception of feeling safe when travelling with the airline and its relationship with the demographic attributes, service quality, overall satisfaction and loyalty. To achieve this objective, we collected and analysed primary survey data from a questionnaire survey of passengers travelling in a major full-service airline.

The paper is organized as follows. The next section describes the review of relevant literature. It is then followed by description of methodology adopted for the study. Results from the study are presented next. Finally, we discuss our findings and recommendations for future research.

## 2. Literature Review

### *2.1. Service quality*

Service quality is considered as the critical element of competitive aspects of a business and the attention to this element allows the enterprises to obtain advantages over their opponents (Lewis 1989). Service quality is considered to have a strong effect on performance and profitability of enterprises and customers' satisfaction. Therefore, the essential role of service quality on customer's satisfaction has been investigated by many scholars in the past (Carrillat et al., 2007; Lidhari, 2009).

Some scholars attempted to conceptualise 'service quality' as a systematic construct. For example, Gronroos (1984) proposed that service quality comprises of technical quality and functional quality and clarified that service quality is the result of an assessment process of the customers expected service and perceived service. However, the most well-known and widely used service quality model is the 'SERVQUAL' constructed by Parasuraman et al. (1988). A review of twenty years of SERVQUAL research concludes that SERVQUAL remains a useful instrument for service-quality research (Lidhari, 2009).

SERVQUAL stands for the term 'service quality'. It comprises 22 items distributed within five dimensions that include tangibles, reliability, responsiveness, assurance and empathy. 'Tangibles' dimension considers the degree of up-to-date equipment and physical facilities as well as the appearance of employees. 'Reliability' dimension is about commitment to providing services as promised and precisely, solving unscheduled issues properly. 'Responsiveness' dimension deals with level of willingness to help customers and the ability to respond promptly to customer's requests. 'Assurance' dimension examines the ability of employees to convey their trust and courteousness to customers. 'Empathy' dimension presents the ability to understand customer's need and individual feelings. Overall, those dimensions seek to determine evaluation of customers in term of the gap between their expectation of services and perception of actual services delivered. For example, if the service quality goes beyond customer' expectations, they

can be rated as good/excellent services; otherwise those are underrated as unacceptable services. Five dimensions of SERVQUAL have been widely used in many industries including airline service (Sultan and Simpson, 2000; Gilbert and Wong, 2002; An and Noh, 2009; Baker, 2013). Our study also applies SERVQUAL's five dimensions to investigate service quality of the airline.

Although SERVQUAL is a good model and widely used in various fields, it also has certain limitations. Despite its good organization, SERVQUAL was contended that its five dimensions were insufficient to every service industry without any modification (Carman 1990). For example, Rust and Oliver (1994) proposed a service quality model with three dimensions including service product, service delivery and service environment and stated that it is more flexible than SERVQUAL model its efficiency proved in banking and dental services. Likewise, Brady and Cronin (2001) stated that service perceptions were a combination of multi-dimension factors. Cunningham et al. (2002) based on works from Ostrowski et al., (1993) stated that the scale of SERVQUAL fails to capture industry-specific dimensions underlying the quality perceptions. Thus, Cunningham et al. (2002) suggested using additional industry-based measures in evaluating service quality of the airlines. Therefore, our study also applies airline industry-based service quality measure along with SERVQUAL measures to investigate service quality of the air carriers.

### *2.2. Customer satisfaction*

Like service quality, researchers debate on the definition of customer satisfaction. Levesque and McDougall (1996) define customer satisfaction as the general attitude of customers with respect to a service provider. Zineldin (2000) believes that customer satisfaction relates to human psychology and emotion when customer's demands are met or exceeded by provided services. Recently, Farris et al. (2010) have defined customer satisfaction as 'the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals'. Several researchers have attempted to conceptualize satisfaction as the result of the comparison between perceived service quality with customer's expectation or cognition (Parasuraman et al., 1985; Wisniewiski, 1996; Zahari Wan Yusoff et al., 2008).

Despite the ambiguous definitions of customer satisfaction, all studies recognize the important role of customer satisfaction in service operation because of the benefits it brings to service providers. In general, customer satisfaction enables service providers to get a profit improvement by extending their activities and occupying a larger market share (Shin & Elliott, 2001).

Service quality is a vital factor for sustainability of an airline as it relates to other elements like load factors, revenue and reputation. In practice, a lot of airlines have been focusing on their own service quality to improve passenger satisfaction. Gilbert and Wong (2002) stated that the precondition for survival and success in competitive business environment nowadays is the superior service quality delivery beside attractive price. Sultan and Simpson (2000) even contended that the airlines should focus on customer satisfaction rather than profit. Reviews on lessons learnt on service quality research by Gilbert and Wong (2003) on service quality research mention that the superior service enables companies to charge 8 percent more for their product and gains higher-than-normal market share growth as well as profitability. From the review, the authors also note that customer satisfaction is useful for forecasting future profitability and behavioral intentions.

### *2.3. Customer loyalty*

Customer loyalty can be defined as 'a deeply held commitment to re-buy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior.' (Oliver 1999). Ganesh et al. (2000) described customer loyalty as the actions of repeated purchase, price insensitivity, resistance to counter persuasion and recommendation to other people. Also, the frequent flyer program is said to help increase customer loyalty if it is attractive enough to passengers (Chin 2002).

Study of Fornell (1992) showed that high customer satisfaction led to the increase in customer loyalty, hence the customers were hardly drawn and persuaded to switch to competitive companies. Jones and Sasser (1995) contended that full customer satisfaction result in customer loyalty. It was also said to secure profit and growth for the companies and the driver for customer satisfaction. Mohsan et al. (2011) believed that customer satisfaction has positive impact

on customer loyalty in term of airline industry. As a result, the airlines need to find out their customer's needs and demands and attempt to satisfy them as many as possible to maintain customer loyalty.

### *2.4. Aviation safety*

While aviation is generally considered to be a safe industry, report from International Air Transport Association (IATA, 2014) shows airlines vary considerably in terms of their safety outcomes. Therefore, the need to address aviation safety has been highlighted over many years (Edkins, 1998; Koo et al., 2015). Airline passengers consider safety as the most important criterion when choosing an airline (Atalik and Özel 2007; Gilbert and Wong 2003). A survey study by Koo et al. (2015) found that young adult college students considered price and safety information as the most important factors influencing airline choices. The findings further support the position taken by some researchers that safety considerations influence passengers' airline decisions (Levine, 1991). Hence, recently researchers have considered safety/security as one of the dimension constructs in measuring the airline service quality (Hussain et al., 2015)

The role of demographic attributes on passengers perceived safety with satisfactions have been highlighted in the literature. A study by Ringle et al. (2011) concluded that perceived safety has a significantly greater impact on the overall customer satisfaction of people who travel for pleasure than on that of business travellers. Therefore, the authors suggested to emphasise safety features in advertisements aimed at leisure travellers. These observations suggest that passengers' perceived safety can be assumed to influence their satisfaction with their personal characteristics also affecting their perceptions of safety.

Researches on passengers' perceptions of safety while travelling on surface transport, such as railways/trains, have shown that one in five passengers feel unsafe while traveling by train (Cox et al., 2006). Further, it has been found that passengers' perception of safety can have a significant influence on public transport ridership (Delbosc, and Currie, 2012). The authors further discuss that although the strongest influences on feelings of safety were trust in people and crime rate in neighbourhood, it is also likely that less familiarity with public transport contributes to greater fears for safety. This relationship of passenger's perception of safety with public transport ridership have been also highlighted by Jou et al. (2008) where the authors emphasised that for an airline to attract more passengers, the safety aspect of service quality, in particular, should be improved. In addition, experiences from survey of railway passengers show that understanding passengers' perception of safety and their likely behavior is important to develop robust evacuation management plan (Shiwakoti et al., 2017)

A study by Johnson et al., (2006) found that customer's perceived risk influences the satisfaction ratings. Therefore, the authors highlight that satisfaction, quality and value evaluations may be enhanced by reducing risk perceptions without necessarily improving service quality. The relevancy of this finding to airline sector is echoed by Ringle et al. (2011) by citing the declines in passenger numbers after 9/11 attacks which indicate that risk perceptions do influence consumer behaviour in air travel. Hussain et al., (2015) also note that after the events of 9/11, the issue of security and safety has become an important factor considered by passengers for their air travel.

In summary, existing studies on relationship of airline service quality with passengers' satisfaction and loyalty do not systematically consider the influence of airline passengers' perception of safety. In fact, despite few studies showing the importance of considering passengers' perception of safety in making airline choices, there appears to be little formal discussion on the merits of its inclusion in assessing airline service quality (Koo et al., 2015).

## 3. Methodology

### *3.1. Survey*

The survey was conducted with the passengers who travelled with Vietnam Airlines (VA) on the flight routes from Ho Chi Minh City (Vietnam) to Melbourne/Sydney and vice versa. The data was collected via anonymous paper-based survey during two and a half weeks from 30th April 2017 to 16th May 2017. The questionnaires were distributed in the departure hall, arrival hall and food court of international terminal (Terminal 2) at Tan Son Nhat Airport (Ho Chi Minh City) in Vietnam. The participants were randomly chosen. Participation in the survey was voluntary, and the

participants self-completed the anonymous questionnaire. If the participants had questions, research assistant would provide the appropriate clarification. The survey was conducted during both off-peak time (15:00 – 16:30) and peak time (18:00 – 20:30) from Monday to Sunday to minimise the bias coming from respondents and increase the sample size.

The structured questionnaire had different sections that captured respondents' information on demographics, service quality measures, overall satisfaction and their intention to use the airline service (i.e. loyalty). Section 1 had questions regarding respondents' demographic characteristics including age, gender, level of education, annual income and nationality. It also had questions relating to their personal profile with VA such as travel frequency during last 12 months, purposes of travel, ticket classes usually booked and membership of frequent flyer program (FFP).

SERVQUAL model was used to develop the questionnaire on service quality (Table 2) in section 2 where we considered five factors including: reliability, assurance, tangibility, empathy, and responsiveness. In section 2, we also had questions related to service quality that is specific to VA (Table 3) including ticket purchase, ground services, flight experience, airline employees and flight schedules. The service quality was measured on five-point Likert scale (strongly disagree to strongly agree). In section 2, the passengers were also asked to report on the statement "I feel safe when travelling with the airline" on a five-point Likert scale (strongly disagree to strongly agree). It is to be noted that this statement was intended to capture the passengers' general perceptions of airline safety and their relationship with service quality and satisfaction rather than providing information about levels of safety (e.g., airline options, safety features, safety rating etc.) and examining how this affects decisions. Previous theory on human behavior suggests the event-driven nature of human behavior exhibiting preference in pursing goals with short-term effects (Zarboutis and Marmaras, 2004). Therefore, passengers' general perception of airline safety is perhaps easy to capture (i.e. it does not require consideration of long-term effects) than measuring their perception about levels of safety. Ringle et al. (2011) highlights that passengers are hardly able to assess factual safety levels and that they take into consideration the proxy measures of safety, such as an airline's service quality or assess about a flight's safety based on their perceptions of an aircraft's appearance or the intensity of the security checks at the airport.

Finally, section 3 had questions to capture customers' overall satisfaction to VA and their loyalty to the airlines. The statement 'How satisfied are you in terms of Vietnam Airlines' overall service quality?' was used to measure passengers' overall satisfaction. The overall satisfaction was measured on five-point Likert scale (strongly dissatisfied to strongly satisfied). Likewise, the statements 'Will you use Vietnam Airlines service in future?' and 'Would you recommend Vietnam Airlines to your friends and relatives?' were used to capture the passengers' loyalty. The loyalty statements were measured as 'No', 'May be' and 'Yes'.

### *2.2 Participants*

We targeted a valid sample size of 384 (with a margin of error of ±5% and confidence level of 95%). We were able to collect in total 583 responses. Only 436 respondents (out of 583) answered all questions and thus we included only 436 responses for our analysis as this sample size was sufficient and greater than the required sample size of 384. Table 1 shows demographic information of the respondents. As shown in the table, respondents aged between 21 – 30 accounted for the largest proportion (33.3%) while the 31 – 40 age group were 25.7%. The collected data has a relatively equal distribution in terms of gender (55% male and 45% female). 89% of passengers surveyed held at least a diploma or higher educational degree. The income groups were uniformly distributed. In terms of nationality, 36.2% of participants were Vietnamese followed by European (21.3%) and Australian/New Zealand (20.4%). 14.9% came from other Asian countries while only 5% were from North America. 70.9 % responded that they had flown with VA from 1 to 2 times during last 12 months. Most of the participants were for leisure/holiday (45%) followed by business (29.1%). Majority were travelling on economy class (51.8%) and only 22.2% had frequent FFP membership.

Table 1: Demographic and personal profile information of the respondents

| Socio-demographic factors | | Frequency (%) | Socio-demographic factors | | Frequency (%) |
|---|---|---|---|---|---|
| Age group | 18 - 20<br>21 - 30<br>31 - 40<br>41 - 50<br>51 - 60<br>61 or older | 14.0<br>33.3<br>25.7<br>15.8<br>8.5<br>2.8 | Travel frequency during last 12 months | 1 - 2 times<br>3 - 5 times<br>6 - 10 times<br>More than 10 times | 70.9<br>19.5<br>5.7<br>3.9 |
| Gender | Male<br>Female | 55.0<br>45.0 | Purposes of travel | Business<br>Leisure/holiday<br>Visiting<br>Friends/Relatives<br>Study<br>Others | 29.1<br>45.0<br>8.3<br>6.9<br>10.8 |
| Education | High School or below<br>Diploma/ Junior College<br>Undergraduate<br>Postgraduate | 11.0<br>24.5<br>46.8<br>17.7 | Ticket class | Economy class<br>Premium Economy class<br>Business/First class | 51.8<br>28.0<br>20.2 |
| Annual income (US$) | Under $2,000<br>$2,001- $10,000<br>$10,001 - $20,000<br>$20,001 - $40,000<br>$40,001 - $60,000<br>$60,001 or more | 14.9<br>17.4<br>18.1<br>21.6<br>19.0<br>8.9 | FFP member | No<br>Yes | 77.8<br>22.2 |
| Nationality | Vietnamese<br>Australian/New Zealander<br>North American<br>Other Asian countries<br>Europe<br>Others | 36.2<br>20.4<br>5.0<br>14.9<br>21.3<br>2.1 | | | |

### *2.3 Data analysis*

As shown in Table 1, 22 items were used to measure reliability, empathy, assurance, tangibles and responsiveness of SERVQUAL model. Likewise, as shown in Table 2, 20 items were used to measure flight experience, ground service, airline employees, ticket purchase and flight schedule for VA specific service quality measures. To check how well these items measured the concepts, the average score of the items were used as aggregate measures and their Cronbach Alphas were computed. The mean and standard deviation (S.D) of the aggregate measures were also computed. Cronbach's alpha was used to assess the reliability, with an alpha of over 0.7 considered as a good indicator (Hair et al., 2006).

To check if the passengers' perception of feeling safe in the airline had relationship with SERVQUAL measures and VA specific measure, a regression analysis was performed. The dependent variable used was "I feel safe when travelling with the airline", and the independent variables used were the aggregate score of items under reliability, empathy, assurance, tangibles and responsiveness for SERVQUAL measures while it was the aggregate score of items under flight experience, ground service, airline employees, ticket purchase and flight schedule for VA measures. A normality plot was also constructed to check the assumption of normality in the standard regression model.

To have an insight on the relationship of passengers' perception of feeling safe in the airline with socio-demographic factors, overall satisfaction and loyalty, a series of ordered response regressions were performed. For ordinal responses, the ordered logit models would yield estimates that would be consistent and efficient (Long 1997; Yasmin et al., 2012).

The general specification for ordinal logistic regression is given by:

$$y_i^* = \boldsymbol{X}_i \boldsymbol{\beta} + \varepsilon_i \quad [1]$$

where $y_i^*$ is a latent variable measuring the $i^{th}$ participant's feeling of safety while on airline
$\boldsymbol{X}_i$ is a vector of explanatory variables
$\boldsymbol{\beta}$ is a vector of unknown parameters
$\varepsilon_i$ is the error term

If the error term is assumed to follow an extreme value distribution, then the estimated probability that participant i will select a likelihood of level j (j = 1,…, n) is equal to the probability that the unobserved likelihood, y*, will take a value within the appropriate ranges can be computed as follows:

$$\Pr(y_i > j) = \frac{\exp(\mathbf{X_i}\ \boldsymbol{\beta}' - \mu_j)}{1 + \exp(\mathbf{X_i}\ \boldsymbol{\beta}' - \mu_j)}, j = 1 \ldots, 5 \quad [2]$$

The parameters of the model (β) and the cut-points ($\mu_j$) were estimated by the method of maximum likelihood (Long 1997; Yasmin et al., 2012). The test of parallel lines assumption was also conducted to verify that the slope coefficients did not vary over different alternatives.

## 4. Results

Only 53.4 % of respondents feel safe while travelling in the airline while 28.9% feel neutral safe and 17.7% feel unsafe. A substantial respondents remaining neutral suggests there are some barriers that prevent them perceiving the airlines travel as a safe experience. Therefore, it is important to understand the factors affecting their perception of safety.

In terms of overall satisfaction of the airline's service quality, only 43.2% respondents were satisfied while 31.4% were neutral and 25.4 % were dissatisfied. This had bearing on their intention to use the service in future with 53.4% agreeing to use the service while 25% reported 'may be' and 21.6% reported 'No'. Also, 44% respondents agreed that they will recommend the airline to their relatives/friends, 31% mentioned 'may be' and the rest 25% stated 'No'.

Tables 2 and 3 shows the average score (out of 5; 1 - 'strongly disagree' to 5- 'strongly agree') for each item under SERVQUAL model and VA specific service quality measures respectively. The tables also show the average score of the items as aggregate measures and their Cronbach Alphas. The average score for each of the five variables for SERVQUAL and VA specific measures respectively are above 3 suggesting majority of the respondents tend to agree with the items presented to the respondents. The Cronbach alpha for the variables are also above 0.7 suggesting an acceptable measure for reliability. Based on the aggregate score of items for SERVQUAL measures, Tangibles is ranked at top (3.41) followed by Assurance (3.24), Responsiveness (3.20), Reliability (3.19) and Empathy (3.06). Likewise, for VA specific measures, Ticket Purchase is the top ranked variable (3.25) followed by Ground Service (3.22), Airline Employee (3.21), Flight Experience (3.18) and Flight Schedule (3.18).

The results of regression model on passengers' perception of safety with SERVQUAL measures and VA specific measures are reported in Table 4 and 5 respectively. The model fits the data well, with a moderately large R-square value (0.59 for SERVQUAL and 0.71 for VA measures) and F-statistic (125.61 for SERVQUAL and 210.23 for VA measures), and a very small p-value of (<0.0001 for both SERVQUAL and VA measures). For SERVQUAL measures,

except 'Responsiveness', all the other variables estimated coefficients are positive and statistically significant at 95% confidence interval, indicating that the more the passengers perceive those service qualities, the more likely they are to feel safe in the airline. Likewise, for VA specific measures, except for 'Ticket Purchase', all the other variables estimated coefficients are positive and statistically significant. The variables 'Flight Experience' and 'Airline Employee' were statistically significant at 95% confidence interval while the variables 'Ground Service' and 'Flight Schedule' were statistically significant at 90% confidence interval.

The normality plot, also known as P-P plot, of the regression residues for both SERVQUAL and VA specific measures is shown in Figure 1. The plot is very close to the diagonal line suggesting that the observed cumulative distribution matches the expected cumulative distribution under the normality assumption very well. Therefore, the result indicates that the standard regression is an appropriate method to analyze the data.

Table 2: Summary of variables for SERVQUAL measures

| **Variable** | **Items** | **Mean Score** | **S.D** | ***Cronbach Alpha*** | ***Mean*** | ***S.D*** |
|---|---|---|---|---|---|---|
| Reliability | The airline meets their promised time-frames for response | 3.17 | 1.07 | 0.92 | 3.19 | 0.91 |
| | The airline is sympathetic and reassuring | 3.13 | 1.03 | | | |
| | The airline is dependable | 3.22 | 1.03 | | | |
| | The airline provides its services at the time it promises to do so | 3.16 | 1.08 | | | |
| | The airline keeps records accurately | 3.29 | 1.00 | | | |
| Empathy | The airline gives you individual attention | 3.13 | 1.12 | 0.93 | 3.06 | 0.97 |
| | Employees give you personal attention | 3.03 | 1.13 | | | |
| | Employees know what your needs are | 2.97 | 1.11 | | | |
| | The airline has your best interest | 3.02 | 1.08 | | | |
| | The airline has convenient operating hours | 3.18 | 1.01 | | | |
| Assurance | You can trust employees | 3.29 | 1.11 | 0.93 | 3.24 | 1.00 |
| | You feel safe in your transactions with the employees | 3.20 | 1.10 | | | |
| | Employees are polite | 3.25 | 1.13 | | | |
| | Employees get adequate support from the airline to do their job well | 3.25 | 1.05 | | | |
| Tangibles | The airline has up-to-date equipment | 3.50 | 1.05 | 0.90 | 3.41 | 0.90 |
| | The airline's physical facilities are visually appealing | 3.36 | 0.99 | | | |
| | Employees are well dressed and neat | 3.49 | 1.01 | | | |
| | Physical facilities are well maintained | 3.31 | 1.04 | | | |
| Responsiveness | Informs passengers exactly when services will be performed | 3.33 | 1.06 | 0.90 | 3.20 | 0.95 |
| | The airline delivers prompt service | 3.17 | 1.05 | | | |
| | Employees willingly assist passengers | 3.16 | 1.11 | | | |
| | Employees respond to passengers' requests promptly | 3.18 | 1.09 | | | |

Table 3: Summary of variables for VA specific service quality measures

| **Variable** | **Items** | **Mean Score** | **S.D** | ***Cronbach Alpha*** | ***Mean*** | ***S.D*** |
|---|---|---|---|---|---|---|
| Flight experience | Efficient boarding/alighting of aircraft | 3.32 | 1.05 | 0.89 | 3.18 | 0.93 |
| | In-flight entertainment is plentiful and up-to-date | 2.83 | 1.12 | | | |
| | The airline provides quality food & beverages | 3.20 | 1.16 | | | |
| | The cabin interior is clean, neat and visually appealing | 3.24 | 1.10 | | | |
| | The seat and legroom are comfortable | 3.33 | 1.11 | | | |
| Ground Service | Check-in queue time is acceptable | 3.28 | 1.11 | 0.94 | 3.22 | 0.99 |
| | Check-in/baggage handling is efficient | 3.20 | 1.08 | | | |
| | The waiting /transfer lounge are clean and comfortable | 3.18 | 1.09 | | | |
| | Useful and timely information are provided clearly | 3.22 | 1.09 | | | |
| | Punctuality and accuracy of baggage delivery | 3.24 | 1.10 | | | |
| Airline Employees | Employees are professional | 3.32 | 1.20 | 0.96 | 3.21 | 1.13 |
| | Employees are courteous, friendly and helpful | 3.21 | 1.19 | | | |
| | Employees value me as a customer | 3.18 | 1.19 | | | |
| | Employees understand my specific needs | 3.14 | 1.18 | | | |
| Ticket Purchase | Airline website is easily accessible | 3.37 | 0.99 | 0.91 | 3.25 | 0.87 |
| | Airline website interface is user-friendly | 3.22 | 0.99 | | | |
| | Ease, convenience and speed of seat reservation and ticketing | 3.25 | 0.97 | | | |
| | Ease, convenience and speed of changing flight/booking | 3.18 | 0.96 | | | |
| Flight Schedule | The airline provides suitable flight schedules | 3.27 | 0.93 | 0.84 | 3.18 | 0.90 |
| | The airline provides consistent on-time departures and arrivals | 3.11 | 1.00 | | | |

The results of ordinal logistic regression model on passengers' perceptions of safety with socio-demographic attributes are presented in Table 6. As can be seen from the table 6, the variables 'Education', 'Travel Frequency', 'FFP member' and 'Ticket class' were statistically significant at 95% confidence interval with positive coefficients. It is to be noted that other socio-demographic variables like 'Age', 'Gender', 'Annual Income', 'Nationality', and 'Purpose of Travel', were not statistically significant and thus excluded in our model.

Separate logistic regression models on passengers' perception of safety with overall satisfaction and loyalty were developed. The overall satisfaction had significant positive relationship with passengers' perception of safety (coefficient $\beta = 1.864$; $p < 0.0001$). Likewise, loyalty also had significant positive relationship with passengers' perception of safety with $\beta = 0.676$; $p < 0.001$ for the variable 'using Vietnam Airlines service in future' and $\beta = 1.295$; $p < 0.0001$ for the variable 'recommending Vietnam Airlines to friends and relatives.

Table 4: Results of regression on passengers' perception of safety - SERVQUAL measures

| | |
|---|---|
| R Square | 0.59 |
| Adjusted R Square | 0.58 |
| F-Statistic | 125.61 |
| p-value | <0.0001 |
| Observations | 436 |

| | *Coefficients* | *Standard Error* | *t-Stat* | *P-value* |
|---|---|---|---|---|
| Intercept | 0.368 | 0.130 | 2.834 | 0.005* |
| Reliability | 0.186 | 0.073 | 2.533 | 0.012* |
| Empathy | 0.173 | 0.077 | 2.241 | 0.026* |
| Assurance | 0.258 | 0.074 | 3.493 | 0.001* |
| Tangible | 0.240 | 0.055 | 4.366 | <0.0001* |
| Responsiveness | 0.075 | 0.081 | 0.920 | 0.358 |

*Significant at 95% confidence interval

Table 5: Results of regression on passengers' perceptions of safety – VA specific measures

| | |
|---|---|
| R Square | 0.71 |
| Adjusted R Square | 0.70 |
| F-Statistic | 210.23 |
| p-value | <0.0001 |
| Observations | 436 |

| | *Coefficients* | *Standard Error* | *t-Stat* | *P-value* |
|---|---|---|---|---|
| Intercept | 0.207 | 0.113 | 1.826 | 0.069** |
| Flight Experience | 0.639 | 0.054 | 11.926 | <0.0001* |
| Ground Service | 0.087 | 0.045 | 1.920 | 0.056** |
| Airline Employee | 0.124 | 0.039 | 3.183 | 0.002* |
| Ticket Purchase | 0.061 | 0.043 | 1.432 | 0.153 |
| Flight Schedule | 0.084 | 0.045 | 1.851 | 0.065** |

*Significant at 95% confidence interval
** Significant at 90% confidence interval

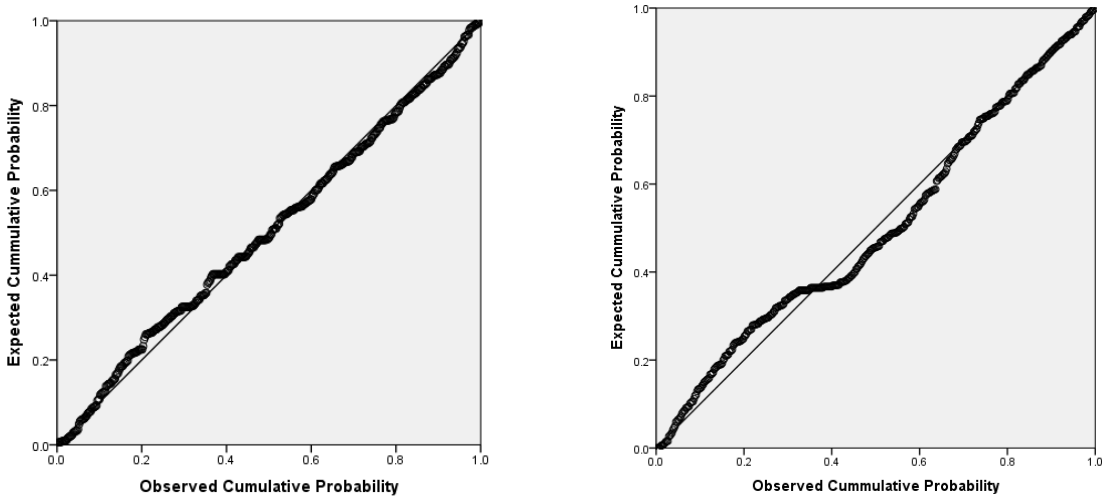


Figure 1: Normal P-P plot of regression standardized residual (a) SERVQUAL measures and (b)VA specific measures

Table 6: Outputs from Ordinal Logistic Regression model

| **Dependent variable: I feel safe when travelling with the airline**<br>Number of observations: 436<br>Restricted log-likelihood: 428.56<br>Log-Likelihood: 383.63<br>Chi-square statistic: 44.93<br>p-value: < 0.0001 | | | |
|---|---|---|---|
| **Variable** | **Coefficient** | **Standard Error** | **p-value** |
| Education | 0.273 | 0.101 | 0.007 |
| Travel frequency | 0.340 | 0.139 | 0.015 |
| FFP member | 0.554 | 0.258 | 0.032 |
| Ticket class | 0.302 | 0.118 | 0.011 |

## 5. Discussions and Conclusions

Previous studies have highlighted that safety considerations play an important role in passengers' airline choices and therefore, need to be communicated to passengers (Levine, 1991; Koo et al., 2015). As the global airline rankings become widely accessible to the passengers, examining passengers' perception of safety and its influence in airline decision is important to discover (Koo et al., 2015). Our findings that passengers' perceived safety while traveling in airlines has significant relationship with service quality, overall satisfaction and loyalty suggest that safety/security should be given prominence in terms of improving service quality indicators in airline sectors. The SERVQUAL model

for assessing the service quality of airlines does not specifically take into account the safety/security measures of the airline (Ringle et al., 2011; Hussain et al., 2015). Therefore, in future SERVQUAL model or other airline specific service quality measures that is intended to measure the service quality in airline sectors need to be adapted to examine the passengers' perception of safety/security in air travel. Further, previously it has been hypothesized that safety aspects never have a significant impact and that it only acts as a "hygiene" factor which can only influence satisfaction when absent (Herzberg et al., 1959 cited in Ringle et al., 2011). Our results are contrary to those findings and agree with the researchers who have highlighted the important role of passengers' perceptions of safety on their satisfactions (Ringle et al., 2011; Koo et al., 2015; Hussain et al., 2015).

Our findings that demographic differences affect passengers' perception of safety provide an opportunity to the airlines industry on developing some targeted strategies based on socio-demographic characteristics to improve their service quality measures. It is found that there is positive association with qualification and therefore, travellers with higher qualification are likely to feel air travel safer. Although it is difficult to provide reasons behind it, one of the possible reasons could be the likelihood of more frequent travel by people with higher education level for their job. Also, as seen from the positive relationship with travel frequency, people who travelled frequently feel airlines travel safer. It is to be noted that those passengers who travel frequently will also likely to have a FFP membership. Therefore, as found in our study, passengers' who had the FFP membership feel airline travel safer than those who did not have FFP membership. Also, people who travel frequently are more likely to use higher ticket class; and as seen from Table 6, those who travel on higher class seat feel air travel safer than other ticket class. Although previous study has concluded that passengers' perceived safety has a significant effect on the overall customer satisfaction of people who travel for pleasure than on that of business travelers (Ringle et al., 2011), our study did not find any significant relationship with purpose of travel. Therefore, it is suggested to examine this relationship in future.

No effect of gender or age differences on airline passengers' perception of safety as found in our study. This is in contrast with the study by Koo et al. (2015) where it was observed that safety and price are important factors influencing flight choice in young travellers. Our findings are also in contrast with the findings from the studies on railway/train passengers' perception of safety where gender and age-related effects have been observed (Currie et al., 2013; Mahmoud and Currie, 2010). Women felt insecure while travelling on night where there were insufficient lights and less people in train carriages. This contrasts with airline travel where there are many people as well as security guards in the airport and the airline cabin is generally secure and full of people. Therefore, it shows that passengers' perception of safety differs with the differences in physical and operational aspects of a particular transport mode.

There are some limitations of our study. We only focused on the passengers travelling in one full-service airline. A study attempting to find factors influencing the choice in low-cost carriers in two countries have observed that safety was ranked 7$^{th}$ and 8$^{th}$ behind other factors (O'Connell and Williams, 2005 cited in Koo et al., 2015). Therefore, passengers may perceive safety differently for low-cost carriers and full-service airlines. In future, comparison of passengers' perception of safety on different flight carriers needs to be conducted. Particularly, a comparative study among full service carrier, low cost carrier, traditional carrier and emerging airlines would yield more comprehensive insights on passengers' perception of safety. Further, more safety and security related questionnaires could be explored. In addition, an open-ended question on passengers' perception of safety on airline would provide detailed insights on the link of safety with passengers' satisfaction.

Nevertheless, our findings emphasize the importance of understanding the relationship between passengers' perception of safety and their satisfaction. There is opportunity for airline operator to gain an advantage in market share of air travel by improving service quality measures that can influence passengers' perception of safety. Along with traditional cabin safety education and security measures, improving flight experience, ground services, flight scheduling and training employees for better customer service would have a positive influence on passengers' perception of safety on airline travel; which in turn, can enhance their satisfaction and loyalty to the airlines.

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## Response statement to reviewers' comments

Dear editor,

In the revised manuscript, we have fully addressed the reviewers' comments. We have made following changes in response to reviewers' comments as follow:

1. To address clarity on our contributions, literature review has been updated and fully developed with addition of separate sub-sections on service quality, customer satisfaction, customer loyalty and aviation safety. In addition, we have extensively revised our discussions and conclusions section to clearly articulate our contributions. These amendments will provide more clarity on the state-of-art in the topic and our contributions.

2. To address the comments on the data analysis, we conducted a thorough and detailed data analysis in the revised manuscript. We reported a sum score of the relevant scales or concepts of items. To check how well these items measured the concepts, the average score of the items were used as aggregate measures and their Cronbach Alphas were computed. The mean and standard deviation of the aggregate measures were also computed. Cronbach's alpha was used to assess the reliability. To check if the passengers' perception of feeling safe in the airline had relationship with SERVQUAL measures and airline specific measure, a regression analysis was performed. The dependent variable used was "I feel safe when travelling with the airline", and the independent variables used were the aggregate score of items under reliability, empathy, assurance, tangibles and responsiveness for SERVQUAL measures while it was the aggregate score of items under flight experience, ground service, airline employees, ticket purchase and flight schedule for airline specific measures. A normality plot was also constructed to check the assumption of normality in the standard regression model. We believe with this thorough data analysis, we have addressed all the shortcomings and comments raised by the reviewers in terms of data analysis.

3. We have corrected the grammatical/typo mistakes as outlined by the reviewers. Also, we have been through the whole paper and have tried to correct every instance where there were grammatical/typo issues.