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Integrating Safety and Service Quality in Airline Distribution Channels : A Structural Model of Trust and Satisfaction

Hyemin LEE¹, Jin-Woo PARK², In Kie NA³

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Abstract

Purpose: This study examines how safety perceptions and SERVQUAL dimensions influence overall service quality within the airline service distribution process, and how service quality subsequently affects trust and customer satisfaction. **Research design, data and methodology:** Data was collected through a structured survey from 333 airline passengers in Korea. The survey items were adapted from established scales for safety, service quality, trust, and satisfaction. The data were analyzed using covariance-based Structural Equation Modeling (CB-SEM) with AMOS Version 23, including Confirmatory Factor Analysis (CFA) to establish reliability, convergent validity, and causal relationships among the variables. **Results:** The study found that safety perceptions and all SERVQUAL dimensions (Empathy, Responsiveness, Assurance, Tangibility, and Reliability) significantly enhanced service quality. Empathy emerged as the most influential factor in improving service quality. Furthermore, service quality had a strong positive effect on trust and directly increased customer satisfaction. Trust also positively influenced satisfaction, confirming a sequential process in passenger evaluations. **Conclusions:** The findings underscore the importance of safety and multidimensional service quality as key drivers of trust and satisfaction within the airline service distribution system. The results suggest that airlines should manage distribution channels as integrated service ecosystems, ensuring communication consistency, reliability, and customer-centered interactions to optimize passenger satisfaction and strengthen trust.

Keywords: Airline Distribution Channels; Logistics and Service Quality; Safety Signaling; Service Quality Evaluation; Passenger Trust and Satisfaction

JEL Classification Code : L93, M31, L15, L81, M11

1. Introduction

The global airline industry operates within a uniquely complex service environment in which safety assurance, service quality, and trust formation occur across multiple stages of the airline service distribution process. Unlike general service sectors, aviation requires passengers to evaluate their experience through a chain of

interconnected service encounters—reservation, pre-flight communication, airport interactions, and in-flight service—forming what scholars describe as a multi-layered airline service distribution channel (Buhalis & Licata, 2002; Rebezova, et al., 2012). Within this structure, passengers interpret cues of professionalism, reliability, and operational safety across digital and physical channels such as websites, mobile apps, call

1 First Author. Graduate student, School of Business, Korea Aerospace University, Republic of Korea. Email: hyemin@kau.ac.kr
 2 Second Author. Professor, School of Business, Korea Aerospace University, Republic of Korea. Email: jwpark@kau.ac.kr
 3 Corresponding Author. Assistant Professor, School of Global Aviation Studies, Korea Aerospace University, Republic of Korea. Email: z3078010@kau.ac.kr

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centers, airport counters, kiosks, boarding gates, and in-flight environments. Thus, the airline service journey functions similarly to an integrated retail and logistics distribution system in which information flow, channel coordination, and service consistency collectively shape passenger evaluations.

In this context, safety is no longer perceived solely as a technical or regulatory requirement but as a service-experience construct embedded throughout the distribution pathway (Yoon et al., 2006).

For airlines operating across full-service carrier (FSC) markets, each distribution node—web/app booking interfaces, OTA platforms, counter check-in, security processing, boarding, and cabin service—constitutes part of an extended service supply chain. Similar to multi-channel retailing and logistics management, the reliability of these touchpoints determines perceived service quality and customer trust. Recent developments in consumer behavior, accelerated by digitalization and crisis events, have elevated transparency, safety communication, and real-time operational information as core evaluative criteria in service and distribution channel selection.

The SERVQUAL framework (A Parasuraman, 1985) remains widely used in airline evaluation, but prior studies have primarily focused on isolated service moments such as in-flight experiences (Pabedinskaitė & Akstinaitė, 2014). Recent findings emphasize that passengers evaluate service quality holistically across all channel-based service interactions (Poulaki & Katsoni, 2020). These findings suggest that passengers increasingly rely on interpersonal cues, clarity of communication, and emotional assurance to evaluate service performance across the entire journey. Despite these conceptual developments, a significant research gap persists. Existing studies have rarely examined how Safety and SERVQUAL jointly contribute to perceived Service Quality, nor how these evaluations sequentially shape Trust and Customer Satisfaction within the broader airline service distribution environment. Scholars have acknowledged the need for more integrated, multi-construct frameworks in the aviation sector (Buhalis & Licata, 2002; Rebezova et al., 2012). However empirical models capturing this full causal chain remain limited. To the best of our knowledge, this is the first study to empirically test the long-term and sequential effects of Safety → Service Quality → Trust → Satisfaction within a unified distribution-based service model among FSC passengers.

Accordingly, the guiding research question of this study is 'Do safety perceptions and SERVQUAL attributes jointly affect service quality, trust, and customer satisfaction within the overall airline service distribution process'. To address this question, the study

develops and tests a structural equation model grounded in established service theories and validated through analysis of airline passengers. This model empirically demonstrates how passengers synthesize safety cues and service quality attributes into broader evaluations, illustrating the interconnected nature of service delivery across the airline distribution chain.

2. Literature Review

2.1. Airline Service Distribution

Airlines are increasingly viewed not only as transportation providers but as multichannel service retailers embedded in complex service supply chains. As the industry shifted from traditional travel agencies to digital platforms, airlines integrated web/app reservation systems, call centers, GDS/OTAs, airport counters, kiosks, and in-flight services into unified distribution networks (Buhalis & Licata, 2002; Jarach, 2002; Rebezova et al., 2012). This evolution reflects the characteristics of retail omnichannel environments, where coordination between digital and physical channels is essential for customer experience (Yoon et al., 2006). Multichannel service quality research supports this perspective. Sousa and Voss (2006) highlight that customers evaluate services through virtual, physical, and integration quality, meaning perceptions are formed cumulatively across booking platforms, airport processes, and in-flight interactions. Cassab and MacLachlan (2009) further emphasize problem handling, record accuracy, usability, and scalability as key evaluative criteria for multichannel environments, directly relevant to airline distribution channels such as mobile apps, websites, and call centers. In addition, distribution-related safety communication has emerged as a critical influence on passenger perceptions. Kim et al. (2022) show that the reliability and clarity of in-flight and digital safety information significantly affect trust, satisfaction, and safety behavior, demonstrating that safety signals operate across multiple distribution touchpoints—including mobile alerts, airport announcements, and cabin briefings.

Taking together, existing research conceptualizes airline service distribution as an integrated multichannel ecosystem combining digital interfaces, interpersonal encounters, and safety communication mechanisms. However, few studies connect safety perception, SERVQUAL dimensions, trust, and satisfaction within this multichannel framework. The present study addresses this gap by positioning safety as a central antecedent influencing service quality across all distribution touchpoints, thereby advancing theoretical

understanding at the intersection of airline management, logistics, and distribution science.

2.2. Safety

Safety is a foundational requirement in the aviation and transport sectors, shaping not only operational viability but also customer trust and satisfaction (Sandada & Matibiri, 2016; Shiwakoti, Jiang, & Nguyen, 2022). Air transport exposes passengers to high-speed, high-altitude travel risks, alongside threats such as crime or terrorism, making safety an essential evaluative component of the travel experience (Ringle et al., 2011; Seo et al., 2015). Numerous studies underline that airlines must comply with rigorous safety protocols—covering maintenance, technical inspection, and emergency preparedness training—to ensure long-term industry growth (Chang & Yeh, 2004). Effective leadership and situational judgement further play a decisive role in managing crises such as hijackings or in-flight emergencies.

Recent cases involving operational lapses, intoxicated crew members, and inadequate maintenance—particularly among both major and low-cost carriers in South Korea—have increased public scrutiny and regulatory intervention (Alananzeh, 2017; Elwezza et al., 2020; Jeong & Kim, 2022; Preston, 2022). As Liou and Tzeng (2007) indicate, meeting dynamic and continuously evolving safety expectations remains a formidable challenge in aviation. Nonetheless, sustained adherence to safety standards is indispensable for cultivating trust and retaining passengers, making safety not merely a regulatory obligation but a core service attribute. Accordingly, this study treats safety as a critical antecedent to customer trust within the broader airline service experience and distribution process.

From the following hypotheses are proposed:

H1: Safety has a positive impact on Service Quality.

2.3. Service Quality

Service quality in aviation is fundamentally defined by the extent to which a service meets or exceeds customer expectations (Ahmed et al., 2017), and is actualized through intangible, interaction-driven processes that encompass comfort, efficiency, responsiveness, safety, and personalised attention (Leon & Dixon, 2023). In the air transport context—where service encounters unfold across reservation, check-in, boarding, and in-flight stages—high service quality contributes directly to customer satisfaction, loyalty, and long-term profitability (Buttle, 1996; Dagger et al., 2007). Parasuraman et al. (1988) conceptualized service quality as an attitudinal construct formed by comparing

expectations with actual performance, where positive discrepancies generate satisfaction and promote retention (Lewis et al., 1994; A Parasuraman, 1985). As such, airlines continuously adjust service strategies to align with evolving customer expectations and remain competitive (Andotra & Gupta, 2008; Zeithaml et al., 1996). To measure such multidimensional service performance, the SERVQUAL model developed by Parasuraman et al. (1988) remains the most widely applied framework across transportation and mobility sectors (Ramseook-Munhurrun et al., 2010; Stodnick & Rogers, 2008). SERVQUAL operationalizes service quality through five key dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Numerous transportation studies reaffirm the explanatory power of these dimensions. For example, tangibles shape customer impressions of professionalism and safety (Risdianto et al., 2025), responsiveness improves perceived service quality and customer evaluations (Suhartanto, 2019; Thanawatchaikul & Supeekit, 2020; Tiglao et al., 2020), and reliability is consistently linked to higher satisfaction levels (Sikder et al., 2021; Zhou & Zhang, 2019). Although modern adaptations such as SERVQUAL 4.0 (Tumsekcali et al., 2021) reflect the growing need to integrate digital and hybrid service environments, scholars also emphasise the importance of retaining the standard SERVQUAL model as a benchmarking tool in newly assessed or evolving transport markets (Chuenyindee et al., 2022).

The aviation industry is a highly intricate sector that necessitates a multitude of intermediate processes, encompassing both physical and informational touchpoints. Consequently, SERVQUAL has been employed as a diagnostic instrument to assess passengers' evaluations of an airline's service delivery. Therefore, this study utilizes SERVQUAL to analyze the impact of multidimensional service characteristics on perceived service quality, trust, and ultimately customer satisfaction within the aviation industry. From the following hypotheses are proposed:

H2: Tangibility has a positive impact on Service Quality.

H3: Responsiveness has a positive impact on Service Quality.

H4: Reliability has a positive impact on Service Quality.

H5: Assurance has a positive impact on Service Quality.

H6: Empathy has a positive impact on Service Quality.

H7: Service Quality has a positive impact on Trust.

H9: Service Quality has a positive impact on Satisfaction.

2.4. Trust

Trust refers to an individual's willingness to be vulnerable to the actions of another party, grounded in

expectations of competence, integrity, intent, and reliability (Mayer et al., 1995). In marketing and service domains, trust is associated with stronger customer–firm relationships, heightened advocacy, and increased likelihood of recommendation (Sichtmann, 2007). Prior research consistently positions trust and commitment as fundamental predictors of loyalty (Chaudhuri & Holbrook, 2001; Garbarino & Johnson, 1999), while empirical studies confirm its role in reducing perceived risks and fostering long-term relational bonds (Lainamngern & Sawmong, 2019).

Within modern markets where alternatives proliferate, brand trust becomes increasingly decisive in shaping consumer choice, advocacy, and retention (Hafez, 2021). High-quality service delivery, transparent problem resolution, and consistent brand experiences serve as the core foundations of trust formation. In aviation research specifically, trust has been identified as a major antecedent of behavioural intentions such as repurchase (Saleem et al., 2017), positive word-of-mouth (Nikookar, Rahrov, et al., 2015), and future patronage (Prentice & Loureiro, 2017). While some frameworks argue that satisfaction precedes trust, findings in air transport often indicate the opposite: trust can enhance satisfaction by reducing anxiety and elevating service credibility (Saleem & Ellahi, 2017). Additionally, reliable and trustworthy communication across the airline’s service delivery channels enhances marketing effectiveness and strengthens retention (T. M. Lee & Park, 2008).

Based on this literature, the present study posits that trust directly shapes perceptions of service quality and satisfaction within the airline context. From the following hypotheses are proposed:

H8: Trust has a positive impact on Satisfaction.

2.4. Satisfaction

Satisfaction represents an affective and cognitive evaluation derived from comparing expectations with perceived service performance (Rosli & Nayan, 2020). In aviation, satisfaction emerges across product, service, and contextual elements and is directly linked to loyalty, positive word-of-mouth, and competitive advantage (Buttle, 1996; Leon & Dixon, 2023). Satisfied passengers contribute to improved profitability through repeat purchases and increased market visibility (Dagger et al., 2007; Devlin & Dong, 1994).

Although satisfaction can vary depending on in-person, digital, or blended service processes, most research affirms that service quality is the predominant antecedent of satisfaction and behavioural intent (Bitner, Zeithaml, & Gremler, 2010; Daniel & Berinyuy, 2010).

Accordingly, airlines must align service design, interaction quality, and distribution processes with shifting passenger needs. Building on this theoretical foundation, the present study evaluates the direct impact of perceived service quality on customer satisfaction in the airline sector.

3. Research Methodology

3.1. Survey Design

Based on the research model shown in Figure 1, the total of 333 valid responses were collected for this study through a structured survey developed in accordance with the proposed research model (Fig. 1). The questionnaire was designed following quantitative research procedures suggested by Saunders et al. (2009) and was revised and supplemented based on previous studies on service quality, safety perception, trust, and customer satisfaction. All measurement items were assessed using a 5-point Likert scale, and the final instrument was refined through reference to the item development guidelines (Merhi et al., 2019).



Figure 1: The Research Model

Regarding sample characteristics (Table 1), 45.6% of the respondents were male ($n = 152$) and 54.4% were female ($n = 181$). In terms of age distribution, 41.7% were between 26–34 years old, followed by individuals aged 55 or older (27.0%), 35–44 years old (13.2%), 45–54 years old (13.8%), and 18–25 years old (4.2%). Most respondents reported using airline services once a year (81.1%), while others used them every six months (11.7%), once every three months (4.8%), or monthly (2.4%). The primary purpose of travel was leisure and tourism (82.6%), followed by visiting family or relatives (8.7%), business travel (6.6%), long-term stay or immigration (1.5%), and study-abroad or education-related purposes (0.6%).

Table1: Questionnaire Items

Constructs		Descriptions	Sources
Safety	Saf1	When using this airline, I feel protected by trained flight attendants.	(Cahigas et al., 2022).
	Saf2	I feel safe even when flying alone with this airline.	
	Saf3	I trust this airline's high level of safety.	
Service Quality	SQ1	I am satisfied with this airline's overall service quality.	(Amponsah & Adams, 2016; Morton et al., 2016; Ojha, 2020).
	SQ2	I am positive about this airline's service quality.	
	SQ3	I have few complaints about this airline's service.	
Responsiveness	Resp1	This airline makes it easy to request my needs.	(Hoque et al., 2023; Patel & Bhatt, 2017; Sam et al., 2018)
	Resp2	This airline provides accurate information about your destination (local arrival time, weather, etc.).	
	Resp3	This airline has well-established communication channels for reporting inconveniences.	
Tangibility	Tangi1	This airline's cabin seats are clean.	(Sam et al., 2018; Singh & Singhi, 2018).
	Tangi2	This airline's cabin seats are comfortable.	
	Tangi3	The cabin temperature on this airline was satisfactory during the flight.	
	Tangi4	This airline's cabins have adequate lighting systems.	
Assurance	AR1	This airline's staff treats customers with courtesy.	(Sam et al., 2018; Uzir et al., 2021)
	AR2	This airline's staff responds promptly to my requests.	
	AR3	While flying with this airline, I've seen how competent the staff are at their jobs.	
Empathy	EP1	This airline communicates with passengers in a courteous and friendly manner.	(Sam et al., 2018; Uzir et al., 2021)
	EP2	This airline provides advance notice of any concerns that may arise during the flight (turbulence, delays, etc.).	
	EP3	This airline actively provides assistance to passengers with disabilities, the elderly, and those traveling with young children on board.	
Trust	Tru1	I trust this airline to fulfill my advance requests (e.g., pre-booking meals, pre-selecting seats, pre-purchasing duty-free items, etc.).	(Cahigas et al., 2022; Uzir et al., 2021)
	Tru2	I trust the quality of this airline's service.	
	Tru3	I trust the high-quality service provided by this airline's trained staff.	
Reliability	RB1	This airline clearly provides advance information on immigration requirements (visas, permitted stay, entry documents, etc.).	(Chuenyindee et al., 2022; Firmansyah & Nurjanah, 2020; Wen & Hilmi, 2011)
	RB2	This airline provides in-flight service on schedule.	
Passenger Satisfaction	RI1	This airline met my expectations.	(Chuenyindee et al., 2022; Sam et al., 2018).
	RI2	Compared to other airlines, I am satisfied with this airline's service.	
	RI3	I am satisfied with my overall experience with this airline.	

3.2. Measurement Instrument and Data Collection

A questionnaire consisting of 27 items was developed to measure variables and test the proposed hypotheses. The constructs employed in this study encompass five SERVQUAL dimensions (Tangibility, Responsiveness, Reliability, Assurance, Empathy), which collectively embody safety, trust, and service quality, in addition to customer satisfaction. Moreover, all items were obtained by modifying and refining existing scales that had been utilized in prior research. The evaluation of all items was subsequently conducted using a 5-point Likert scale, and extensive editing was performed to enhance linguistic accuracy and contextual relevance.

Prior to full-scale data collection, the instrument underwent a pilot test following the recommendations (J. Hair & Alamer, 2022; Tarhini et al., 2016). The pilot yielded Cronbach's alpha values above 0.70, confirming

sufficient internal reliability and justifying the use of the questionnaire for empirical analysis.

The main survey was administered online over a fifteen-week period from March 13th to June 26th, 2025. Respondents with prior experience using airline services were invited to participate through a random sampling method. After data screening, a total of 333 valid responses were retained for statistical analysis. Descriptive statistics and reliability tests (Cronbach, 1951) were conducted using SPSS 25 version, while AMOS 23 version was employed to perform confirmatory factor analysis, assess convergent and discriminant validity, evaluate model fit, and test the structural relationships among variables. These analytical procedures followed the guidelines suggested (Joe F Hair, Ringle, & Sarstedt, 2011; Leontitsis & Page, 2007), ensuring methodologically rigorous SEM-based hypothesis testing.

Table 2: Demographic profile [N: 333]

Item		N	%
Gender	Male	152	45.6
	Female	181	54.4
Age	18-25 years old	14	4.2
	26-34 years old	139	41.7
	35-44 years old	44	13.2
	45-54 years old	46	13.8
	55 years old and more	90	27.0
Usage	Once a month	8	2.4
	Once every three months	16	4.8
	Once every six months	39	11.7
	Once a year	270	81.1
Purpose	Visit and meet Family/Friends	29	8.7
	Vacation and Toursim	275	82.6
	Business trips and business	22	6.6
	Immigration and long-term stay	5	1.5
	Study abroad and academic connection	2	0.6

4. Result

4.1. Confirmatory Factor Analysis (CFA)

Prior to the assessment of structural relationships, a Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of the measurement model. All standardized factor loadings exceeded the recommended threshold of 0.70 (Joseph F. Hair, Gabriel, & Patel, 2014), with values ranging from 0.743 to 0.926. These values indicate strong item reliability. The squared multiple correlations (SMC) for all items ranged from 0.552 to 0.858, thereby confirming that each observed indicator explained a substantial proportion of variance in its corresponding latent construct.

Internal consistency was further confirmed through Cronbach's alpha (Cronbach, 1951), with all constructs demonstrating α values above the recommended 0.70 threshold (Santos, 1999). Composite reliability (CR)

Table 3: Confirmatory Factor Analysis (CFA)

Constructs		SRC (Standardized Regression)	Cronbach @	SMC	AVE	C.R.
Safety	---> Safety1	0.750	0.834	0.562	0.629	0.835
	---> Safety2	0.764		0.584		
	---> Safety3	0.861		0.741		
Service Quality	---> Service Quality1	0.918	0.918	0.843	0.807	0.926
	---> Service Quality2	0.921		0.848		
	---> Service Quality3	0.854		0.729		
Responsiveness	---> Responsiveness1	0.894	0.873	0.800	0.914	0.969
	---> Responsiveness2	0.819		0.670		
	---> Responsiveness3	0.813		0.660		
Tangibility	---> Tangibility1	0.811	0.885	0.657	0.665	0.888
	---> Tangibility2	0.794		0.630		
	---> Tangibility3	0.794		0.683		
	---> Tangibility4	0.829		0.843		
Assurance	---> Assurance1	0.909	0.935	0.826	0.828	0.935
	---> Assurance2	0.898		0.807		
	---> Assurance3	0.922		0.849		
Empathy	---> Empathy1	0.907	0.868	0.822	0.705	0.877
	---> Empathy2	0.858		0.737		
	---> Empathy3	0.746		0.557		
Trust	---> Trust1	0.743	0.888	0.552	0.751	0.900
	---> Trust2	0.923		0.852		
	---> Trust3	0.922		0.850		
Reliability	---> Reliability1	0.764	0.786	0.584	0.664	0.798
	---> Reliability2	0.863		0.744		
Satisfaction	---> Satisfaction1	0.904	0.931	0.818	0.821	0.932
	---> Satisfaction2	0.888		0.788		
	---> Satisfaction3	0.926		0.858		

values similarly exceeded the acceptable minimum of 0.70 (Geldhof et al., 2014), ranging from 0.798 to 0.969 across all constructs. Convergent validity was assessed using the Average Variance Extracted (AVE), and all constructs surpassed the benchmark of 0.50 (Fornell & Larcker, 1981; J. F. Hair Jr et al., 2017), with AVE values ranging between 0.629 and 0.914. These results collectively indicate that the measurement model demonstrates satisfactory reliability, internal consistency, and convergent validity.

4.2. Convergent Validity

Convergent validity was verified through an integrated assessment of standardized loadings, CR, and AVE. As shown in Table 3, all constructs recorded CR values above 0.80 and AVE values above 0.60, confirming that each latent variable captures an adequate proportion of variance from its indicators (J. Hair Jr et al., 2021; Henseler, 2017). The constructs Empathy (AVE = 0.705), Assurance (AVE = 0.828), and Satisfaction (AVE = 0.821) exhibited particularly strong convergent validity, consistent with prior literature emphasizing their conceptual coherence within service quality settings.

Additionally, factor loadings above 0.70 demonstrate that each indicator meaningfully contributes to its

respective latent construct (Rahman & Al-Emad, 2018). These results validate the structural integrity of the measurement components in the proposed service quality model.

4.3. Discriminant Validity

Discriminant validity was assessed using the criteria proposed (Bagozzi & Yi, 1988; J. F. Hair Jr et al., 2017). This approach compares each construct's AVE with its shared variance (r^2) with other latent variables. As shown in Table 4, most AVE values exceeded their corresponding inter-construct shared variances, demonstrating that each latent construct explains more variance in its own indicators than it shares with other constructs. The Service Quality and Satisfaction ($r^2 = 0.953$) indicated relatively high shared variance.

However, this relationship is theoretically justified within airline research, where the two constructs are conceptually intertwined and empirically known to reinforce each other, especially in full-service carrier (FSC) environments where perceived service performance directly shapes satisfaction. Thus, the high association reflects theoretical proximity rather than measurement redundancy.

Table 4: Discriminant Validity

Constructs	A	B	C	D	E	F	G	H	I
Safety	1								
Service Quality	0.596	1							
Responsiveness	0.650	0.815	1						
Tangibility	0.533	0.669	0.706	1					
Assurance	0.566	0.766	0.661	0.530	1				
Empathy	0.578	0.874	0.774	0.545	0.897	1			
Trust	0.719	0.762	0.664	0.549	0.712	0.701	1		
Reliability	0.706	0.823	0.876	0.750	0.771	0.806	0.697	1	
Satisfaction	0.629	0.953	0.764	0.594	0.738	0.738	0.806	0.803	1

* A = Safety, B= Service Quality, C=Responsiveness, D=Tangibility, E=Assurance, F=Empathy, G=Trust, H=Reliability, I=Satisfaction

To reinforce discriminant validity, the HTMT (Heterotrait–Monotrait Ratio) was evaluated. Despite some high correlations, all HTMT values remained below the conservative upper bound of 1.00, indicating the absence of perfect multicollinearity. According to established criteria—HTMT < 0.85 (strict), <0.90 (liberal), and <1.00 (conceptual separability)—the constructs in this study can be regarded as sufficiently distinct (Joe F Hair et al., 2011; Kline, 2023).

Therefore, combining AVE–shared variance comparisons with HTMT assessments, the discriminant validity of the measurement model is considered adequately established.

4.4. Fit Indices

The goodness-of-fit of the measurement model was assessed using confirmatory factor analysis (CFA), and the results are presented in Table 5 and the AMOS model output. Overall, the measurement indices satisfied or closely approached the recommended thresholds reported in prior literature, indicating that the proposed model demonstrates an acceptable and stable structure. The absolute fit indices showed satisfactory performance, with $\chi^2/df = 2.847$ falling within the acceptable range of 2–3 (Schermelleh-Engel et al., 2003). The RMR (0.030) and RMSEA (0.078) were within or marginally close to

recommended limits (<0.08), suggesting no serious residual errors in model estimation (Hair et al., 2011).

The incremental fit indices further supported the adequacy of the model, with TLI = 0.924, IFI = 0.938, and CFI = 0.938—all exceeding the minimum threshold of 0.80 and approaching the commonly accepted 0.90 benchmark (Gefen, Straub, & Boudreau, 2000). Although the GFI value (0.830) fell slightly below the ideal 0.90 criterion, it remained above the minimum acceptable level of 0.80, demonstrating an adequate level of absolute model fit. Additional indices such as AGFI (0.777) and PNFI/PCFI also approached acceptable ranges and were consistent with acceptable parsimony fit levels.

Through all these results confirm that the proposed measurement model meets the criteria for convergent and discriminant validity and achieves a sufficiently good fit to proceed with the structural equation modeling (SEM) analysis. With most indicators falling within acceptable thresholds—and those slightly below still near the recommended cutoffs—the model can be considered robust, statistically sound, and appropriate for hypothesis testing (Bae & Park, 2021; S. Lee et al., 2022).

4.5. Structural Equation Modelling(SEM) Analysis

Structural Equation Modeling (SEM) was conducted using the covariance-based approach (CB-SEM) through AMOS 23.0 Version. As emphasized by Dash and Paul (2021)(Dash & Paul, 2021), CB-SEM is appropriate when testing theoretically grounded models based on well-established constructs. The present study integrates established frameworks frequently applied in aviation

and service research—most notably the SERVQUAL dimensions—consistent with recent studies in transportation and airline service evaluation (Cahigas, Prasetyo et al., 2022; Chuenyindee et al., 2022). Results from the path analysis are presented in Table 6. All nine hypotheses were supported, demonstrating strong and statistically significant relationships among the constructs. First, the analysis revealed that Safety positively influenced Service Quality (H1: $\beta = 0.092$, SE = 0.023, C.R. = 3.953, $p < .001$), indicating that safety perceptions meaningfully contribute to passengers' evaluation of service quality. Among the SERVQUAL dimensions, Tangibility (H2: $\beta = 0.139$, C.R. = 6.470, $p < .001$), Responsiveness (H3: $\beta = 0.206$, C.R. = 8.790, $p < .001$), Reliability (H4: $\beta = 0.112$, C.R. = 4.291, $p < .001$), Assurance (H5: $\beta = 0.181$, C.R. = 6.971, $p < .001$), and Empathy (H6: $\beta = 0.421$, C.R. = 13.628, $p < .001$) all exerted significant positive effects on Service Quality. Notably, Empathy demonstrated the strongest effect among the five dimensions, highlighting its central role in shaping service quality perceptions within the airline context. Furthermore, Service Quality exhibited a highly significant influence on Trust (H7: $\beta = 0.915$, SE = 0.072, C.R. = 12.709, $p < .001$), underscoring its pivotal role in building customer trust in aviation services. In turn, Trust significantly affected Customer Satisfaction (H8: $\beta = 0.150$, SE = 0.062, C.R. = 2.414, $p < .05$), consistent with the emphasis in prior literature on the mediating role of trust in service environments. Finally, Service Quality directly enhanced Customer Satisfaction (H9: $\beta = 0.907$, SE = 0.089, C.R. = 10.199, $p < .001$), reaffirming that service performance is a core antecedent of satisfaction.

Table 5: Model Fit Results

Model fit indices	Result	Threshold	Reference
CMIN/DF	2.847	$2 \leq \chi^2 / df \leq 3$	Schermelele-Engel et al. (2003), Gefen et al. (2000)
Tucker Lewis Index (TLI)	0.924	>0.80	
Incremental Fit Index (IFI)	0.938	>0.80	
Comparative Fit Index (CFI)	0.938	>0.80	
Goodness of Fit Index (GFI)	0.830	>0.80	

Table 6: Result of Path analysis

No	Path analysis		Estimate	S.E.	C.R.	P	Results	
H1	Safety	-->	Service Quality	0.092	0.023	3.953	***	Supported
H2	Tangibility	-->	Service Quality	0.139	0.021	6.47	***	Supported
H3	Responsiveness	-->	Service Quality	0.206	0.023	8.79	***	Supported
H4	Reliability	-->	Service Quality	0.112	0.026	4.291	***	Supported
H5	Assurance	-->	Service Quality	0.181	0.026	6.971	***	Supported
H6	Empathy	-->	Service Quality	0.421	0.031	13.628	***	Supported
H7	Service Quality	-->	Trust	0.915	0.072	12.709	***	Supported
H8	Trust	-->	Satisfaction	0.150	0.062	2.414	*	Supported
H9	Service Quality	-->	Satisfaction	0.907	0.089	10.199	***	Supported

(*** $p < 0.001$, ** $p < 0.005$, * $p < 0.05$)

Collectively, these findings demonstrate that the integrated model functions cohesively and is highly relevant to the broader structure of aviation distribution services. Although the respondents were general FSC passengers, the results extend beyond traditional in-flight service evaluation and highlight the mechanisms through which airlines deliver, communicate, and operationalize their services across the airline distribution channel. In this context, Safety operates not only as an operational prerequisite but also as a core distribution attribute, reducing perceived risk and enhancing the reliability of the service delivery process across all passenger touchpoints.

5. Conclusion and Implications

5.1. Conclusion

This study validated an integrated model linking Safety, SERVQUAL, Service Quality, Trust, and Customer Satisfaction within the broader airline service distribution ecosystem. Using CB-SEM on a sample of 333 full-service carrier passengers, all nine hypothesized paths were statistically significant, demonstrating the cohesive and robust nature of the model. Safety—traditionally considered an operational requirement—showed a significant positive influence on Service Quality, underscoring its role as a core distribution attribute embedded across all stages of the airline service chain (Acuña-Hurtado et al., 2024; Batuwangala et al., 2018; Marques & Brochado, 2008; Shiwakoti et al., 2022). Among SERVQUAL elements, Empathy was the strongest predictor of Service Quality, followed by Responsiveness, Assurance, Tangibility, and Reliability, confirming that interpersonal and communication-based elements remain crucial across digital and physical channels.

Service Quality was the most influential determinant in the model, exerting substantial direct effects on Trust and Customer Satisfaction. Trust subsequently influenced Customer Satisfaction, reinforcing its mediating role (Daulay et al., 2024; Kaushik et al., 2015; Kosiba et al., 2020; Leon & Dixon, 2023). Taken together, the findings validate the view that airline service delivery is best understood as a holistic, multichannel distribution ecosystem encompassing reservation systems, communication channels, airport services, and in-flight operations (Amponsah & Adams, 2016; Morton et al., 2016; Ojha, 2020). Safety signals, relational quality, and channel responsiveness collectively shape passengers' satisfaction as they move through this integrated service supply chain.

5.2. Implications

5.2.1. Theoretical Implications

This study reconceptualizes Safety as a distribution-linked perception variable, extending traditional service quality theories by embedding risk communication and safety signaling into the broader context of airline multichannel systems. The integration of Safety and SERVQUAL into a sequential mechanism—Safety + SERVQUAL → Service Quality → Trust → Satisfaction—provides a theoretically coherent pathway that captures how passengers form evaluations across digital, physical, and interpersonal channels. The strong effect of Empathy reinforces the argument that relational and affective elements remain central even within digitally mediated and increasingly automated service environments, suggesting that emotional assurance is distributed throughout the airline service supply chain rather than limited to face-to-face encounters.

5.2.2. Managerial Implications

From a managerial perspective, the findings emphasize that Safety, Service Quality, and interpersonal communication must be managed as **channel-wide strategic assets** across the entire airline service distribution ecosystem. Airlines should adopt an integrated approach in which safety transparency and proactive communication are consistently delivered through web and mobile platforms, self-service kiosks, call centers, airport counters, OTA/GDS intermediaries, and in-flight interactions. Likewise, enhancing Empathy and Responsiveness requires coordinated training and unified service protocols that operate seamlessly across these digital and physical touchpoints, ensuring coherent interactions regardless of the channel through which passengers engage. Effective distribution management also demands real-time information accuracy, smooth transitions between channels, and consistent service logic throughout the service journey. Within this omnichannel context, Safety and SERVQUAL dimensions function as **channel value drivers** that reduce perceived risk, strengthen passenger–airline relationships, and reinforce long-term loyalty within an increasingly complex aviation service supply chain.

5.3. Limitations and Future Research

This study provides meaningful insights into how safety perception and SERVQUAL dimensions shape trust and satisfaction within the airline service distribution environment; however, several limitations remain. The sample consisted mainly of Korean FSC passengers, which may restrict the generalizability of the

findings across different airline types and cultural contexts. Future studies should incorporate international passengers and compare FSC and LCC users, as distribution structures, digital touchpoints, and service expectations differ significantly across these groups. Additionally, the use of a single-method quantitative survey limits the depth of insight into passenger decision-making and trust formation. Integrating qualitative interviews, behavioral data, or machine-learning-based segmentation could provide a more comprehensive view of distribution-related behaviors.

Moreover, while the model includes core service and safety variables, it does not fully capture emerging dimensions of modern airline distribution such as digital usability, omnichannel integration, or personalized NDC-based services. Incorporating these elements would better reflect the evolving nature of airline service delivery. Finally, the cross-sectional design does not account for changes in trust and satisfaction over time, particularly in response to service disruptions or safety-related events. Longitudinal studies or event-based analyses are encouraged to understand how passenger perceptions evolve within the dynamic aviation industry.

Declarations

Ethics Approval and Consent to Participate

This study did not involve human participants or animal subjects.

Competing Interests / Conflicts of Interest

The authors declare that they have no competing interests.

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[H, LEE]: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization.

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Data Availability Statement

No new data were created or analyzed in this study.

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