Mediation Analysis of Tangibles: The Influence of Service Reliability and Assurance on Airline Passenger Satisfaction

Abstract

Purpose: Passenger satisfaction is a significant challenge in the service industry, mainly in transportation services. The study was conducted to improve passenger satisfaction in the service industry.

Methodology: The study used PLS-SEM to Analyse the relationship between service quality dimensions, such as assurance, reliability, and tangibles, to explore the effects of these constructs on passenger satisfaction. Out of 300 participants, 168 females and 132 males were business or personal Travellers in the survey. A five-point Likert scale was used to evaluate various aspects of service quality and passenger satisfaction.

Findings: The results showed a significant relationship between reliability and passenger satisfaction. Assurance is not substantial in passenger satisfaction. Similarly, there is no tangible mediation effect on both relationships: reliability and passenger satisfaction and assurance and passenger satisfaction.

Originality: The research highlights the importance of prioritising tangibles and assurance in strategies to improve passenger satisfaction with an in-depth assessment.

Keywords: Assurance, Tangibles, Reliability, Satisfaction, Service Quality, Passenger Satisfaction

Paper Type: Research Paper

1. Introduction

1.1 Background of The Study

The airline industry is a vital component of the global economy and has experienced significant growth in recent years (Ganiyu, 2017). Overall, this growth positively impacts various businesses that depend on airlines, such as hotels, retail, and transportation (Ganiyu, 2017; Ishutkina and Hansman, 2008). Airlines must explore new ways to prioritize essential services and minimize the time and effort spent on less important ones (Liou et al., 2011). Numerous studies have found a strong correlation between service quality and customer satisfaction (Ali et al., 2015).

Service quality is significant, especially for service companies. However, assessing customer perceptions of quality can be challenging as services are intangible. Research has shown that providing good service quality retains existing customers and attracts new ones, enhances the corporate image, and leads to positive word-of-mouth recommendations, ultimately guaranteeing the organization's survival and profitability (Ladhari, 2009).

According to Magi & Julander (1996), the primary purpose of organizations is to focus on service quality to enhance overall performance. Saravanan & Rao, (2007) identified how crucial quality systems are for a customer and how they ensure growth, especially in the competitive airline industry.

A service is considered good quality when it meets or exceeds the customer's expectations. Parasuraman et al. (1985) studied four service settings: retail banking, credit card services, repair and maintenance of electrical appliances, and long-distance telephone services, and developed a service quality model called "SERVQUAL," which measures the difference between a customer's expectations of the service they will receive and their actual perception of it.

The dimensions of service delivery mainly focus on the human aspects of service, such as reliability, assurance, and tangibles. This was after the SERVQUAL model was initially developed with ten service quality dimensions, which included reliability, assurance, tangibles, empathy, and responsiveness. However, after further evaluation, some of

these dimensions were found to overlap, reducing the number of dimensions to three. According to Parasuraman et al. (1988), the three dimensions were tangibles, which include physical facilities, equipment, and staff appearance; reliability, which refers to the ability to perform the promised service dependably and accurately; and assurance, which emphasizes the knowledge and courtesy of employees and their ability to inspire trust and confidence.

In 1992, Cronin and Taylor developed a SERVPERF model that assessed service quality by considering the customer's overall perception of the service. Teas (1993) introduced the evaluative performance model, which aimed to measure the difference between a service provider's performance and their ideal level of service quality. In 2009, a study by Ladhari suggested that the SERVQUAL model was an appropriate scale for measuring service quality in specific industries. However, selecting the most relevant dimensions of this model that applied to the assessed service was essential to ensuring valid and reliable results. Therefore, it is regarded as the most effective method to measure service quality in the sector (Shahin, 2005).

1.2 Statement of The Research Problem

Passenger satisfaction is a significant challenge in the service industry, as multiple factors influence it and vary from passenger to passenger. Among these factors, some aspects of service quality are crucial, such as the physical appearance of facilities (tangibles), the timely departures and arrivals (reliability of services), and the courtesy and knowledge of staff (assurance provided by staff). Dissatisfaction with service quality is still common in many service-oriented industries, and meeting the expectations and requirements of consumers takes time and effort (Ali et al., 2021). Service providers need help in increasing service quality and passenger satisfaction. There is a need for more understanding of these factors, especially their interaction and their impact on passenger satisfaction.

This study utilizes an integrated approach to examine these considerations and endeavors to emphasize the independent nature of these aspects while unveiling the complexity involved in their interactions. It

also recognized the different service quality dimensions within the service framework and explored the significance of the dimensions and how they enhance passenger satisfaction. Ultimately, the study sought practical insights for service providers to tailor and enhance their services. So that travel is elevated to a more enjoyable and rewarding experience for passengers. To achieve this, the researcher will address the following research problem: What are the impacts of SERVQUAL indicators on the satisfaction of airline passengers?

1.3 Research Questions

It is crucial to understand the critical impact of service quality, such as the physical appearance of facilities (tangibles), the timely departures and arrivals (reliability of services), and the courtesy and knowledge of staff (assurance provided by staff) in airline passenger satisfaction. Hence, the researcher has developed three research questions below to assist in understanding the relationship between different dimensions of service quality and passenger satisfaction.

1. What is the impact of service reliability on passenger satisfaction?
2. What is the impact of service assurance on passenger satisfaction?
3. What role do tangibles play in mediating the relationship between service reliability and passenger satisfaction?
4. What role do tangibles play in mediating the relationship between service assurance and passenger satisfaction?

By examining these relationships, the study aimed to comprehensively understand how service quality dimensions interact, offering strategic insights for enhancing passenger experiences.

1.4 Statement of The Research Objectives

This research Analysed the connections between assurance, reliability, tangibles, and passenger satisfaction in the service sector to identify the service quality dimensions that have significantly impacted passenger satisfaction by understanding these relationships.

The study aimed to link the service quality dimensions, including reliability, assurance, and passenger satisfaction. The most important act

at this point is to build a framework to serve as a reference point in service quality improvement efforts. Thus, the general research objective is to determine the impacts of SERVQUAL indicators on the satisfaction of airline passengers.

Specifically, by addressing:

1. To determine the relationship between service reliability and passenger satisfaction.
2. To determine how assurance elements like the presence of courteous, competent, and trustworthy staff - contribute to the satisfaction of service recipients.
3. To determine the role of tangible factors in the link between service reliability and passenger satisfaction.
4. To determine the role of tangible factors in the link between assurance and passenger satisfaction.

2. Literature Review

This research factored in several variables, namely, passenger satisfaction, reliability, assurance, and the role of facilities in delivering satisfying travel services to passengers.

Passenger Satisfaction

Passenger satisfaction depends on their expectations and service quality. Satisfaction directly and significantly impacts the profitability of the service providers, hence the high need to ensure that the passengers are well satisfied. Service providers primarily focus on enhancing reliability and assurance (Chen et al., 2021).

Service Reliability

Service reliability refers to the probability that passengers can move comfortably from one point to their preferred destinations without significant challenges. This service quality dimension considers passenger choice Behaviours, seat availability, travel time, transport infrastructures, traveling conditions, and other relevant factors (Gu et al., 2020).

Passengers show loyalty to transport services that are consistently available, perform as expected, and meet their needs satisfactorily. There exists a positive relationship between service reliability and passenger satisfaction. Passengers prefer highly reliable services because they decrease travel times and eliminate unnecessary travel costs, making the travel times more predictable, hence planning appropriately for their movements (Gu et al., 2020). In a similar study, Widiyanto et al. (2021) found that passengers' satisfaction is enhanced by increased punctuality through timely departures and arrivals in the delivery of transport services. Passengers find it convenient and satisfying, with guaranteed access to dependable and timely travel services, having fully met all minimum requirements.

Reliable Services

It eliminates customer inconveniences, making them highly dependable for passengers and increasing their satisfaction and consumption rates. Passengers become more satisfied with services upon consistently receiving whatever they want (Vicente et al., 2020). According to Hasrawati et al. (2023), unplanned services disrupt the delivery process, hence dissatisfying the passengers. The consequences are fatal, leading to losing customers to competitors and lowering the company's economic returns. Service reliability enhances customer journeys, resulting in positive experiences and increased satisfaction levels (Widiyanto et al., 2021). To create high service reliability and customer satisfaction, travel service providers should consider investing in appropriate infrastructures, ensuring proactive maintenance, enhancing the efficiency of their processes, training and developing their staff appropriately to develop the necessary competencies, and establishing responsive customer support.

Service Assurance

In the transport context, passengers must constantly interact with the service providers, directly influencing their satisfaction levels. Passengers find satisfaction when interacting with courteous, competent, and trustworthy staff (Bisui et al., 2022). According to Sakti et al. (2021),

passengers derive satisfaction from courteous and trustworthy staff. Such staff acts honestly and politely towards the service recipients, creating a positive and supportive service delivery environment. Passengers feel safe and relaxed in such interactions, as they are sure that their dignity and property are well protected and secured. There is a positive relationship between staff competency and passenger satisfaction. Highly competent staff understand exactly what the passengers need and the most appropriate and effective ways to interact with them during service delivery. Such competency guarantees fast and accurate service delivery without engaging the passengers in unnecessary activities, which may waste their time (Batouei et al., 2020). Service providers must train and develop their staff regularly in various aspects such as communication, analytical thinking, negotiation skills, courtesy, integrity, and job-specific skills and competencies to create all-round individuals who satisfactorily meet customer wants and demands, needs, tastes, and preferences (Batouei et al., 2020).

Tangibles

A positive relationship exists between customer satisfaction and various tangible factors in transport service delivery, such as service planning, cleanliness, aesthetic appeal of the transport facilities, and comfort (Wang et al., 2020). Passenger comfort is primarily evaluated concerning the vehicle's physical design, appeal, specificity, vehicle motion, and physiological state, such as pleasure, peace of mind, and physical health. In most cases, passengers do not define traveling comfort timely and precisely due to its complexity, an incidence that results in delays in comfort experience improvement amongst the service providers (Wang et al., 2020).

It is also essential to plan the services properly. This ensures timely departures and arrivals, which eliminates any passenger inconvenience. As a result, passengers can stick to their schedules, leading to higher satisfaction levels (Sarabi & Darestani, 2021).

Drivers should handle the vehicles with care and consider all passenger feedback, both positive and negative. It is important to conduct

regular interviews with passengers to gather up-to-date and accurate information and use it to improve the general design, appearance, facilities, and other related elements of the vehicles, which are crucial for enhancing customer satisfaction. The physical and physiological needs of passengers should also be taken into consideration to avoid disappointing them (Mohajer et al., 2020).

3. Theoretical Contribution

3.1 Significance of the Study

The outcome of this study is critical for raising passenger satisfaction in the travel industry. Based on the link between passenger satisfaction and service dependability, the paper will research the contribution of punctuality and accuracy of services to the level of customer satisfaction with the help of reliability. The research will emphasize the significance of interpersonal interactions and how they are perceived regarding safety and competence, which fosters a satisfying service experience. Lastly, by determining the role of tangible factors in the link between service reliability and passenger satisfaction and between assurance and passenger satisfaction, the study explored whether the service environment's physical aspects, such as cleanliness, comfort, and the aesthetic appeal of facilities, play a significant role in enhancing the impact of service reliability and assurance on passenger satisfaction.

Table I: Research Limitation

Authors +Year	Constructs	Context setting	Methods	Sample Size
		Outside of Phils.	Low level of conclusion	
Mahmut Bakır et al., 2022	Airport service attributes, Passenger satisfaction	Yes	Yes	No
Somtochukwu Emmanuel Dike et al., 2023	Passengers' expectations, Satisfaction	Yes	Yes	No
Beni Agus Setiono et al., 2022	Service quality dimensions, Customer satisfaction	Yes	Yes	Yes
Jessica Santos, 2002	Service quality perceptions	Yes	Yes	No

All the studies mentioned above were conducted outside the Philippines, and even though they covered various topics, the Philippines itself remained unexplored. Further analysis of similar research papers is presented.

Mahmut Bakır et al., 2022*:* They focuses on airport service attributes and passenger satisfaction using regression and necessary condition analyses in Europe. The data set selected was large at 1463. However, it was limited to only online reviews. While our study addresses these limitations by offering a detailed analysis of the relationships between service quality and passenger satisfaction using Partial Least Squares Structural Equation Modelling (PLS-SEM).

Somtochukwu Emmanuel Dike et al., 2023: The authors assessed passenger expectations and satisfaction using a similar model, the SERVQUAL framework. The study had a large sample size of 17,726; however, the diverse sample of business and personal Travellers' perspectives is missing, which will be addressed in this paper.

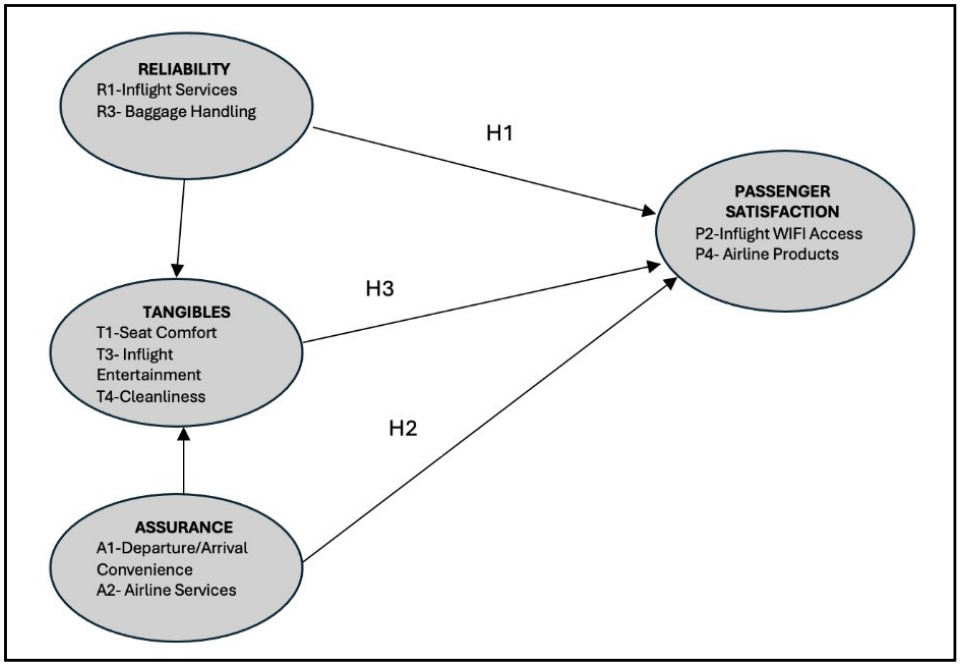
Beni Agus Setiono et al., 2022: Focused on service quality dimensions and customer satisfaction in Indonesia. The sample size selected was small (86 people). It utilized a multiple regression model to Analyse the effect of the independent service quality variable on the dependent variable of customer satisfaction. This research addresses the limitation by using a larger sample size for a detailed analysis and concentrating on the transportation industry.

Jessica Santos, 2002: The study explored service quality perceptions outside the Philippines through telephone interviews. The sample size selected was large enough, with 400 interviews. This research improves Jessica Santos's methodology by utilizing a more comprehensive data collection process and systematically capturing service quality perceptions.

This paper will enhance existing knowledge using PLS-SEM while exploring business and personal travels. The structured survey methods will assist in detailed data collection.

4. Conceptual Framework

Figure I. The Influence of Service Reliability, Assurance, & Tangibles on Airline Passenger Satisfaction



Source (s): Own elaboration

The study of passenger satisfaction within the context of transportation services is based on a complex conceptual framework that includes various latent variables.

Reliability is a crucial factor that represents the ability of a service provider to perform the promised service dependably and accurately. It holds great significance in transportation, where passengers expect services to adhere to schedules and reach destinations within the stipulated time frames in their development of the SERVQUAL model, Zeithaml, Berry, and Parasuraman (1988) identified reliability as a critical dimension of service quality, underscoring its importance in fulfilling customer expectations and fostering satisfaction.

Assurance refers to the ability of employees to inspire trust and confidence in passengers by possessing knowledge, courtesy, and technical competence. Security covers the staff's communicative skills and professionalism, and the courtesy, therefore, contributes to the passenger's experience of safety and reliability of service. Studies show that assurance is one of the most critical factors affecting passenger satisfaction since it is related to the quality of services and staff communication (Brady & Cronin, 2001).

Tangibles are the physical elements of the service, including the facilities, technology, communication materials, and the people who deliver the service. The sight of vehicles, the novelty of modern equipment, and staff competence are all part of service delivery. The study of (Gilbert & Wong, 2003) indicates that intangibles profoundly impact customer satisfaction by providing more perceived value and quality of service.

5. Hypotheses Development

5.1 Reliability and Passenger Satisfaction

The study by Punel et al. (2019) emphasizes the validity and reputation of the Skytrax ranking system, which has been recognized within the aviation sector. In their evaluation, they assess all the aspects seen in the airlines and seating and lounge facilities. Bakır et al. (2022) and Lin, Androshchuk, et al. (2020) validate this assumption by stating that providing trustworthy service will be the key to passenger satisfaction and stability in the next phase of aviation growth. Based on this, the following hypothesis has been developed:

H1: Reliability of service significantly predicts passenger satisfaction.

5.2 Assurance and Passenger Satisfaction

Airline passengers' satisfaction mainly depends on their judgment of assurance linked to such elements as aviation safety management, security, and the capacity of airline staff to offer passengers pleasant ground service. This research emphasizes greatly that the presence of such a high degree of reliability in the aviation circle indicates flyers take very much comfort

in feeling secure, being that the environment is completely safe and the workers are great professionals. The study by Punel et al. (2019), Bakır et al., Lucas-Mangas et al. (2022), Androshchuk et al. (2020), and Pham and Phan (2021) substantiate the point that prioritizing assurance in passenger satisfaction is paramount. Based on this, the following hypothesis has been developed:

H2: Assurance significantly predicts passenger satisfaction.

5.3.1 Tangibles, Reliability, Assurance, and Passenger Satisfaction

Harto & Man (2019) discuss in their article the impact of service quality attributes, e.g., tangibility, responsiveness, and reliability, on customers' satisfaction. The conclusions taken from the study confirms the assumption that tangibles are key components of the interaction between customers' beliefs, satisfaction, and service quality. This is also mirrored in studies by Bakır et al. (2022) [1], Bartkowiak et al. (2022)[7], Vital-López et al. (2022)[1], Liu et al. (2023)[7], and others on how customers with these orientations perceive interactions in various Man & Harto (2019) through their research paper critically reviewed the service quality parameters including response time, dependability, and physical facilities' impact on customer's satisfaction in service provision. Our investigation can be summed up as saying that the speed of the services and the reliability are the two sides of one coin. Still, their tangible aspects have a significant role in customer contentment.

Wang et al. (2020) research reported that the tangible aspects of urban rail transit, such as the modernity of equipment and comfort of the seating, heavily enhanced passenger satisfaction when the services were reliable, this indicated that tangibles could improve the perception of reliability. In the airline industry, there is a direct influence of physical conditions of transportation facilities on customer satisfaction which improves the perceived reliability of services especially timely departures and arrivals as stated by (Gu et al.,2020). Other factors that contribute to passenger satisfaction as highlighted by Bisui et al. (2022) are the

professional appearance of staff and the aesthetic appeal of airport facilities which reinforce the assurance provided by the service personnel.

Batouei et al. (2020) highlight those tangible elements like the design and cleanliness of airline facilities play an important role in refereeing the impact of staff assurance on passenger satisfaction. From their findings, we decipher that when passengers notice high levels of assurance from staff, the positive effect on satisfaction is intensified by high-quality tangible attributes. Based on this, the following hypothesis has been developed:

H3A: Tangibles mediate the relationship between service reliability and passenger satisfaction in the airline industry.

5.3.2 Mediation of Tangibles between Assurance and Passenger Satisfaction.

The emphasis is on understanding how tangibles can increase or weaken the influence of assurance (e.g., staff Behaviour, safety measures) on passenger satisfaction. It looks at the role of tangible features in making the service feel enjoyable, secure, and comfortable. Based on this, the following hypothesis has been developed:

H3B: Tangibles mediate the relationship between assurance and passenger satisfaction in the airline industry.

6. Methodology

The study utilized the Partial Least Squares Structural Equation Modelling (PLS-SEM) to Analyse the relationship between service quality dimensions (assurance, reliability, and tangibles). PLS-SEM is the most preferred model for estimating structural equation models, especially when formative constructs are included (Hair et al. 2014). It is also noted to be a helpful approach for models with many constructs and items, especially with small-sized samples, as evidenced by Fornell and Bookstein (1982), Willaby et al. (2015), and Hair et al. (2017b). Hair et al. (2017a), also state that if the bootstrap distribution of the indicator

weights is skewed, it is recommended to use BCa bootstrap confidence intervals for significance testing.

The study aimed to understand how different aspects of airline service quality influences passenger satisfaction. From the respondents, no personal identifiers or sensitive information has been collected. All responses kept strictly confidential, anonymised, and used solely for academic purposes. This survey fully complies with the ethical standards and privacy regulations of research.

The study participants were selected using a systematic random technique, considering arriving and departing passengers at the travel facility. Every fifth passenger at the travel facility was chosen until the desired sample size was realized. A sample of 300 respondents: 168 females and 132 males. This sampling technique was highly preferred because it was easier to administer and minimized respondent selection bias, as the samples were evenly distributed.

The data was collected through online surveys. Closed-end questionnaires were emailed to the selected respondents and guided on recording their responses. The survey utilized a five-point Likert scale, with "1" indicating strong disagreement, “2” representing disagreement, "3" representing a neutral stance, “4 representing agreement, and “5" reflecting strong agreement. Smart PLS4 was used to Analyse the statistical data. Passenger satisfaction was assessed, particularly concerning inflight WIFI services, product quality, and considerable discontent. Other models were utilized to ensure consistency, reliability free from multicollinearity, and distinguishing constructs in the study to support the findings and credibility of conclusions. According to Fornell and Larcker (1981) and Hair et al. (2017), in structural equation Modelling, every variable measures a unique aspect of the study, and the discriminant validity tests assist in distinguishing the constructs in this study.

For consistency of the measurement items guided by Nunnally (1978) and DeVellis (2016), the study utilized Cronbach Alpha to assess each construct. Other variable measurements, such as composite reliability

and Variance Inflation Factor, were used for variability and detect multicollinearity among the variables as per Bagozzi and Yi (1988), Gefen et al. (2000), and Hair et al. (2017) and Kline (2015), respectively. The study also utilized SmartPLS4 output findings, including path coefficients, t-values, p-values, and standard errors, according to Ramayah et al. (2018), to determine whether the hypothesis was supported.

Table II: Operational Measurement of Constructs

Constructs		**Measurement Items**
Reliability (2 Items)	R1	Inflight services are better (meals, movies, flight attendants, etc.)
	R2	Ground services are better (ticketing, baggage handling, check-in, etc.)
Tangibles (3 Items)	T1	Comfort of Seating
	T2	In-Flight Entertainment
	T3	Cleanliness of Aircraft
Assurance (2 Items)	A1	Departure and/or arrival time was more convenient
	A2	Airline Services (Passenger Handling & Ground Handling)
Passenger Satisfaction (2 Items)	PS1	Inflight WIFI Access
	PS2	Airline Products (Baggage Allowance, Advance booking, Frequent flyer Programme, Service Recovery)

7. Results and Discussion

7.1 Demography

As shared in the methodology, 300 participants were selected. Of the 300, business Travellers accounted for 69.33% of the respondents, while the remaining 30.67% traveled for personal reasons. A confidence level of 97.5% was utilized.

Regarding inflight services, 31% of the survey participants strongly agreed with the quality provided, while 22.67% strongly agreed with the convenience of departures and arrivals. Regarding airport services, 57% of participants remained neutral, while only 6% strongly disagreed with the efficacy of baggage handling processes. When evaluating tangible elements such as seat comfort, inflight entertainment, and cleanliness, each attribute was endorsed by 25% of the survey participants. 44% and 45% of respondents strongly disagreed with inflight WIFI services and product quality.

7.2 Reliability

The reliability of a measure is defined as the stability and consistency of the instrument in measuring the concept (Sekaran & Bougie, 2013). Although both Cronbach's alpha and composite reliability can be used to measure internal consistency, Gefen et al. (2000) and McNeish (2017) recommended that composite reliability rather than Cronbach's alpha should be adopted as the reliability measure. Hence, it is claimed that convergence and internal consistency are sufficient when the composite reliability is more significant than 0.70 or above.

Table III: *Cronbach alpha, Composite reliability, and AVE*

Constructs	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	AVE
Assurance	0.970	0.972	0.985	0.971
Passenger Satisfaction	0.751	0.766	0.889	0.800
Reliability	0.807	0.814	0.912	0.838
Tangibles	0.845	2.266	0.870	0.695

Cronbach's Alpha for Assurance is 0.970, emphasizing excellent internal reliability. The evidence of passengers is highly reliable, as seen in the Passenger Satisfaction score of 0.751. The Alpha of Reliability is also 0.807. Tangibles have an Alpha of 0.845, so it can be concluded that this subscale is very reliable.

Composite Reliability (rho_a) is another measure of internal consistency. Assurance has a rho_a of 0.972, reinforcing its excellent internal consistency. Passenger Satisfaction has a rho_a of 0.766, supporting its good consistency. Reliability's rho_a is 0.814, indicating good consistency. However, Tangibles presents a rho_a of 2.266, a typographical error since composite reliability values should fall between 0 and 1.

In terms of Composite Reliability (rho_c), Assurance scores are 0.985, suggesting exceptionally high reliability. Passenger Satisfaction has very high reliability with 0.889. The Reliability score, and Tangibles are showing very high reliability with 0.912, and 0.870 respectively.

Assurance has an AVE of 0.971, which means it explains most of the variance in its items. Passenger Satisfaction has an AVE of 0.800, explains significant variance in its items. Reliability's AVE is 0.838, which suggests that it also accounts for a substantial variance in its items. Tangibles have an AVE of 0.695, which implies that it explains a significant amount of the variance but less than the other constructs.

7.3 Descriptive Statistics

The descriptive statistics in Table 4 paint a nuanced picture of passenger perceptions across various service dimensions in the airline industry.

Departure/Arrival Convenience (A1)

With a mean of 3.04 and a median of 3.00, passengers generally perceive the timing of departures and arrivals as just average. The relatively high standard deviation of 1.515 indicates a significant variability in passenger experiences, suggesting that while some find the timing convenient, others likely encounter issues with scheduling or delays.

Service Quality (A2)

Scoring slightly higher, the service quality has a mean of 3.10 and a median of 3.00. The lower standard deviation of 1.467 compared to departure/arrival convenience suggests that passengers' perceptions of service quality are slightly more consistent but only moderately positive. This could point to an overall adequate but not exceptional level of service provided.

Inflight Wi-Fi (P2)

This service aspect has one of the lowest scores with a mean of 2.79 and a median of 3.00, accompanied by a standard deviation of 1.293. The scores indicate that passengers are generally dissatisfied with inflight WIFI, with experiences likely varying from poor connectivity to complete dissatisfaction.

Products (P4)

Similar to in-flight WIFI, the quality of products offered has a mean of 2.80 and a median of 3.00. The slightly lower standard deviation of 1.257 suggests a somewhat consistent experience among passengers, though it leans towards the lower end of satisfaction.

Inflight Service (R1)
This aspect receives a higher rating with a mean of 3.77 and a median of 4.00, showing that passengers generally see an in-flight service positively. The standard deviation of 1.128 indicates less variability in perceptions, suggesting a relatively consistent quality of inflight service.

Baggage Handling (R3)
Baggage handling is rated positively with a mean of 3.67 and a median of 4.00. The standard deviation of 1.161, while lower than some other aspects, still points to some variation in satisfaction, possibly depending on different experiences at various airports or with different airlines.

Seat Comfort (T1), Inflight Entertainment (T3), And Cleanliness (T4)
These tangibles are crucial in shaping passenger satisfaction. Seat comfort and in-flight entertainment score around the mid-3s for means and medians, indicating moderate satisfaction. Cleanliness, with a mean slightly below 3.3 and a median of 3.00, shows some dissatisfaction. The standard deviations (around 1.34 to 1.375) highlight considerable variability, suggesting room for significant improvements in these areas. These statistics reveal a critical insight into the airline service quality dimensions, indicating areas of strength (like inflight service and baggage handling) and opportunities for improvement (such as WIFI, seat comfort, and cleanliness). This variability in passenger satisfaction levels emphasizes the need for airlines to focus on enhancing consistency and addressing the lower-rated aspects to boost overall passenger experience.Top of Form

The research used descriptive statistics to show high reliability, as shown in the table below.

Table IV: Descriptive Statistics

Constructs	Mean	Median	STDVED
A1(Departure/Arrival Convenient)	3.04	3.00	1.515
A2 (Service)	3.10	3.00	1.467
P2 (Inflight WIFI)	2.79	3.00	1.293
P4 (Products)	2.80	3.00	1.257
R1 (Inflight Service)	3.77	4.00	1.128
R3 (Baggage Handling)	3.67	4.00	1.161
T1 (Seat Comfort)	3.43	4.00	1.339
T3 (Inflight Entertainment)	3.39	4.00	1.341
T4 (Cleanliness)	3.29	3.00	1.375

Note: A- Assurance; PS-Passenger Satisfaction; R-Service Reliability; T-Tangibles

7.4 Convergent Validity

The concept of convergent validity concerns the extent to which different construct indicators share a significant proportion of common variance. Experts in the field, such as Hair et al. (2010), recommend using outer loadings and the average variance extracted (AVE) to evaluate convergent validity. A rule of thumb for standardized loading estimates is that they should be greater than 0.708 (Hair et al., 2017) or 0.70 (Hair et al., 2014) approximately. Convergent validity is achieved when outer loadings are significantly loaded on the measured factor but lower on other factors.

According to Ramayah, Lee, and Boey (2011), cross-loadings become significant when an item has a loading of more than 0.70 on two or more factors. It is recommended to remove loadings with less than 0.40 (Hulland, 1999; Hair et al., 2014). However, loadings between 0.40 and

0.70 should only be removed if doing so leads to an increase in composite reliability or AVE exceeds the required threshold (Hair et al., 2014).

Table V: Cross Loadings

Loadings	A	P	R	T
A1	**0.986**	0.446	0.134	0.102
A2	**0.984**	0.429	0.116	0.049
P1	0.352	**0.875**	0.114	0.173
P2	0.437	**0.913**	-0.017	0.019
R1	0.109	0.048	**0.925**	0.400
R2	0.125	0.039	**0.905**	**0.357**
T1	0.144	0.113	0.095	**0.773**
T2	0.047	0.088	0.499	**0.976**
T3	0.099	0.071	0.058	**0.730**

Legend: A – Assurance, P- Passenger Satisfaction, R-Reliability and T-Tangibles

Table 5 presents the cross-loadings for the unique items between the constructs, with all values above 0.7.

7.5 Discriminant Validity

Construct validity requires discriminant validity, which measures how distinct a construct is from other constructs in a model. The lack of a strong correlation with different constructs typically assesses this. The table below displays the results.

Table VI: Discriminant Validity

Constructs	**A**	**P**	**R**	**T**
Assurance				
Passenger Satisfaction	**0.516**			
Reliability	0.144	**0.093**		
Tangibles	0.122	0.138	**0.301**	

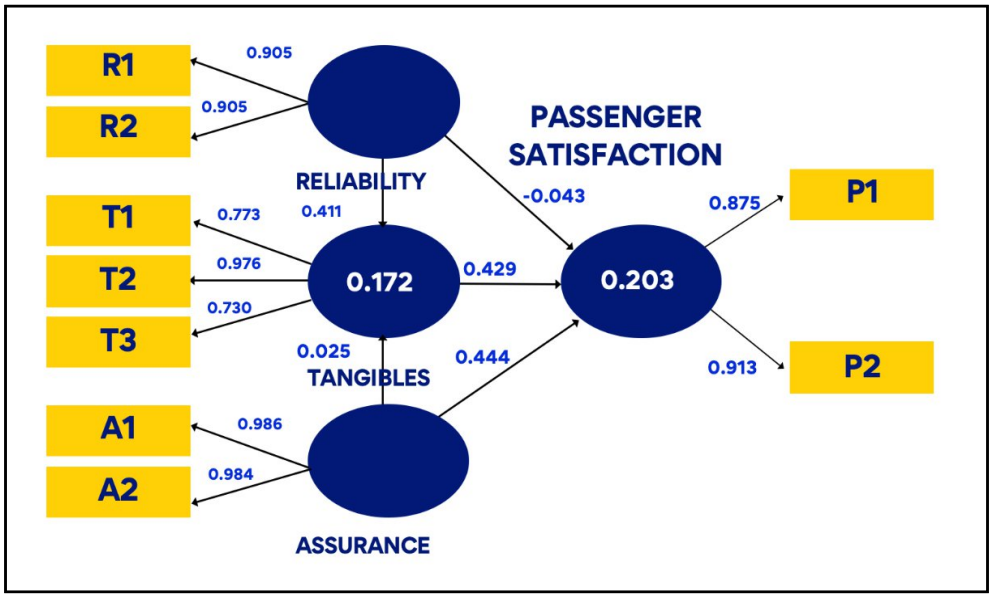
Legend: A – Assurance, P- Passenger Satisfaction, R-Reliability and T-Tangibles

It is essential to note that direct correlation values are not provided under Assurance and Other Constructs. However, it does reveal a moderate positive relationship (0.516 correlation value) between Assurance and Passenger Satisfaction. As the level of assurance (regarding safety, security, or staff knowledge) increases, passenger satisfaction also tends to increase. Regarding reliability and other constructs, the correlation with assurance is weak (0.144 correlation value). Furthermore, the correlation value between Passenger Satisfaction and Assurance is lower than the previous one, at 0.093.

Regarding Tangibles and Other Constructs, there is a weak correlation of 0.122 with Assurance, indicates they are distinctly different. The correlation with Passenger Satisfaction is also weak at 0.138, suggesting that while tangibles and passenger satisfaction are related, they are not strongly correlated. The correlation value of 0.301 for tangible and reliability indicated a moderate relationship.

7.6 Research Model and Path Analysis

Figure II: *PLS Algorithm*



Source (s): Own elaboration

7.7 Descriptive Power and Model Fitness

According to Hair et al. (2011), the coefficient of determination represents the variance in endogenous constructs caused by external constructs. R^2 is the value assigned to the coefficient of determination, which ranges from zero to one. Chin (1998) recommended that an R^2 of 0.13 is weak, 0.33 is moderate, and 0.67 is strong.

Table VII: Assessment of R^2

	R^2	**R^2 Adjusted**
Passenger Satisfaction	0.203	0.195
Tangibles	0.172	0.167

In the case of Passenger Satisfaction, the R-square (R^2) is 0.203, which implies that about 20.3% of the variation in passenger satisfaction can be accounted for by the independent variables considered in the model. This suggests that the factors Analysed in the study moderately influence how content passengers are with the service. The Adjusted R-square is slightly lower, at 0.195, considering the number of predictors in the model.

The R-square (R^2) value for Tangibles is 0.172, which means that

the predictors used in the model explained 17.2% of the variation in Tangibles. This shows that the model used to explain the variances is a good fit and does not overstate the explained variance by involving multiple variables.

Table VIII: Model Fit Data

	Saturated Model	Estimated Model
SRMR	0.091	0.091
d_ULS	0.374	0.374
d_G	0.256	0.256
Chi-Square	513.533	513.533
NFI	0.682	0.682

Note: SRMR, standardized root means square residual; d_ULS, unweighted least square discrepancy; d_G, geodesic discrepancy; Chi-square; NFI, normed fit index

The SRMR quantifies the difference between observed and predicted correlations. Both saturated and estimated models have an SRMR value of 0.091. Values closer to 0.08 or lower are more desirable, suggesting room for improvement. The d_ULS and d_G determine the difference between observed and predicted covariance matrices.

The resemblance between the two models suggests that the differences, whether saturated or estimated, are identical. Model Fit Model fit is evaluated by the Chi-Square test. A bad fit is represented by the Chi-Square value of 513.533 in the two models. Larger estimates are expected for large sample size as Chi-Square test is sample sized dependent. The NFI compares the estimated model with a null model. The NFI in both these cases equals 0.682, well below the 0.9 threshold for good fit.

7.8 Hypotheses Testing

The PLS-SEM approach enabled a thorough evaluation of the proposed model, making it possible to identify significant predictors and mediators in the context of the research objectives. A confidence level of 97.5% was utilized, with a marginal error of 2.5%.

H1: Reliability of service significantly predicts passenger satisfaction.

The p-value, which is 0.456, is higher than the significance level (p=0.05). Additionally, the T-test statistic is 0.746, which indicates that there is no significant evidence to conclude any relationship between reliability and passenger satisfaction.

H2. Assurance significantly predicts passenger satisfaction.

The path coefficient between the variables shows a positive relationship with a value of 0.444. The results of our analysis indicate a relationship between assurance and passenger satisfaction. The p-value of 0.00, which is less than the significance level of 0.05, and the high T-test value of 7.372 provide strong evidence to reject the null hypothesis. This means that passenger satisfaction is positively influenced by factors such as distance and arrival convenience.

H3A. Tangibles significantly mediate the interaction between service reliability and passenger satisfaction.

The null hypothesis was rejected with a p-value of 0.000, which is lower than the accepted threshold of 0.05, and a high T-test statistic value of 7.372. This suggests that the mediator effect of tangibles on both reliability and passenger satisfaction is significant. When passengers have a relaxed environment, they are more likely to perceive the overall flight experience positively, even if minor inconveniences or delays occur.

H3B. Tangibles significantly mediate the interaction between assurance and passenger satisfaction.

The path coefficient is 0.010, indicating a positive relationship between the variables. However, despite the importance of tangible factors such as

seating comfort, in-flight entertainment, or aircraft cleanliness in shaping the passenger experience, they do not significantly strengthen the relationship between assurance factors and passenger satisfaction.

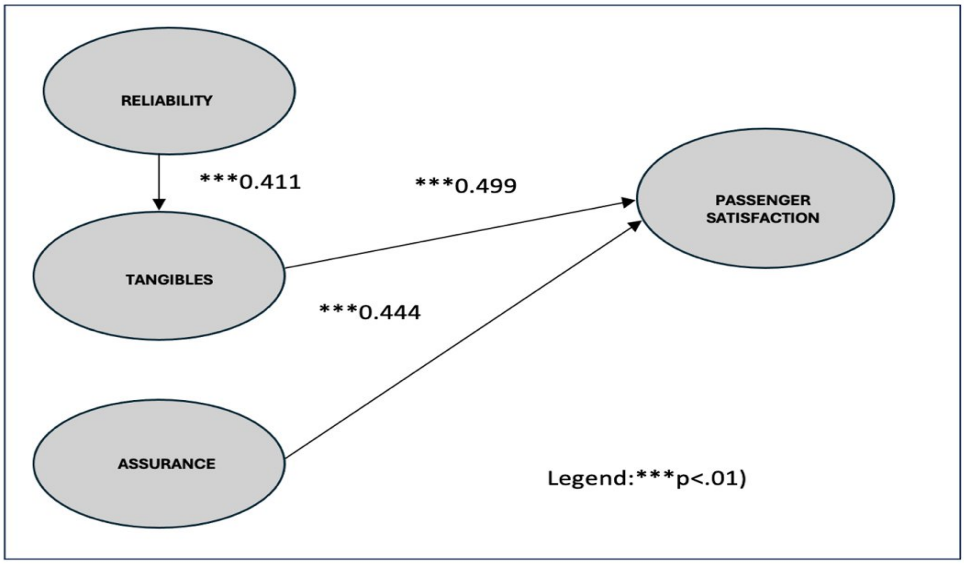
The mediator (tangibles) has a p-value of 0.703, which is higher than the significance level of 0.05. Additionally, it has a low T-test statistic value of 0.383. Therefore, we cannot reject the null hypothesis, indicating that there is no effect of the mediator on assurance and passenger satisfaction. In summary, mediator impact exists on reliability and passenger satisfaction, but not on assurance and passenger satisfaction.

Table IX: Hypothesis Testing

Path coefficient		Constructs	B-value	Sample mean	Standard deviation	T-Value	p-value	Decision
Direct	H1	R →PS	-0.043	-0.043	0.058	0.746	0.456	Insignificant
Direct	H2	A→ PS	0.444	0.447	0.060	7.372	0.000	Significant
Indirect	H3A	R→ T → PS	0.176 (0.411 x 0.429)	0.178	0.003	7.196	0.000	Significant
Indirect	H3B	A → T→ PS	0.010 (0.025 x 0.429)	0.01	0.004	0.383	0.703	Insignificant

Note: A- Assurance; PS-Passenger Satisfaction; R-Service Reliability; T-Tangibles.

Figure III. Research Model



Source (s): Own elaboration

8. Limitations And Future Implications

The study had several limitations, including time, sample size, study focus, limited prior research, data collection measures, and self-reported data. The fieldwork and data collection period lasted only one month; however, the respondents were appropriately engaged throughout the research to enhance data reliability.

The chosen sample size impacted the research results' internal and external validity. Considering that the travel industry has a large population, a sample size larger than 300 would have guaranteed more accurate research results with higher generalizability.

It's important to note that the cross-sectional data used in this analysis cannot establish causation-and-correlation connections. Researching the interplay of numerous factors during the process could complicate the analysis and lead to methodological challenges.

Managers should focus on helping employees improve their competencies and Behaviour. This suggests that companies' leadership must invest their funds purposefully in multi-skilled training and development processes. By equipping employees with the necessary

competencies and soft skills, managers can significantly increase the passengers' certainty, increasing overall satisfaction.

Managers need to establish effective feedback systems to meet the consistently increasing demands of passengers. They can gain valuable insights into their perceptions and needs by continuously collecting, evaluating, and reviewing passenger feedback. This proactive approach to gathering feedback demonstrates a commitment to providing excellent service and using data-driven insights to make informed decisions.

9. Conclusion

According to recent research, there is a negative correlation between reliability and passenger satisfaction. Additionally, there is a positive relationship between assurance and passenger satisfaction, with on-time departure and arrival times significantly impacting customer satisfaction.

The study also found that tangible aspects of the service environment in the airline industry play a significant role in shaping how service reliability affects passenger satisfaction. This means that the impact of service reliability on passenger satisfaction is partially or wholly transmitted through tangible aspects of service, such as seating comfort, in-flight entertainment, and aircraft cleanliness.

However, there is no mediator effect on assurance and passenger satisfaction. The physical and observable aspects of the service environment influence passengers' sensory experiences during the flight. Despite the importance of tangible aspects in shaping the passenger experience, they do not strengthen the relationship between assurance factors and passenger satisfaction.

While tangibles like cleanliness, equipment, and aesthetics are important, they do not directly influence how assurance impacts passenger satisfaction. However, tangibles do play a positive mediating role in the relationship between service reliability and satisfaction. The study highlights the importance of considering both tangible and intangible aspects of service delivery in achieving passenger satisfaction. The feeling of assurance is key in making passengers feel good about the flight. This means that airlines should focus on ensuring their airline crew comes

across as knowledgeable, friendly, and trustworthy to enhance passenger happiness. It's like the tangibles set the stage for reliability to shine.

The study calls for re-evaluating various service quality dimensions' roles in achieving passenger satisfaction. In conclusion, a smooth ride is about the whole package. Passengers want to feel safe, comfortable, and taken care of. Therefore, airlines should focus on service delivery's tangible and intangible aspects to enhance passenger satisfaction.

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