



Drivers and outcomes of airline passenger satisfaction: A Meta-analysis

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ABSTRACT

In the competitive environment of air transport management, airline passenger satisfaction is critical to customer loyalty, operational feedback, financial performance, and regulatory compliance and rankings. Research on airline passenger satisfaction has evolved and matured, shaped by industry dynamics and passenger expectations. However, only some studies have systematically assessed the key drivers and outcomes of airline passenger satisfaction. Consequently, this research provides a meta-analysis of the relationships between the critical drivers of passenger satisfaction and attitudinal and behavioural outcomes within the airline industry. A meta-analysis of 95 empirical studies revealed that perceived service quality and perceived value positively impact passenger satisfaction, with varying effect sizes. Passenger satisfaction had a significant direct and indirect effect on various behavioural intentions and on the willingness to recommend an airline, with gender moderating the relationship between perceived value and satisfaction. Among the perceived service quality dimensions, in-flight service had the greatest effect and was critical to passenger satisfaction. A conceptual model containing mechanisms to achieve affirmative behavioural responses through passenger satisfaction is provided for airline practitioners to formulate long-term success.

1. Introduction

The airline industry is constantly evolving, and it is essential for connecting people, facilitating national and international trade, and supporting the global economy (Andersen & Weisstein, 2019). In recent decades, airlines have undergone substantial transformations, driven by a global trend towards liberalisation, which has opened new opportunities and intensified competition (Fageda & Teixidó, 2022). Given the increasing competition in the industry, with millions of passengers who rely on air transport services daily, airlines must deliver high levels of passenger satisfaction and cultivate loyalty (Noviantoro & Huang, 2022). Consequently, passenger satisfaction and subsequent behavioural responses remain consistent areas of inquiry for researchers and practitioners (Hassan & Salem, 2022). Pabla and Soch (2023) noted that successful airlines understand the critical importance of continuously assessing the preferences of (dis)satisfied passengers.

Previous studies have sought to identify and examine critical factors that contribute to passenger satisfaction, with an emphasis on aspects such as perceived value (PV) and perceived service quality (PSQ) (e.g., Baumeister et al., 2022). PSQ is defined as a passenger's assessment of the overall superiority or excellence of airline services. Moreover, PV is the comparison between the cost (i.e., time, money, and energy)

given and the benefits received by the passengers (Zeithaml, 1988). Accordingly, PV is the overall utility received from airline services. The outcomes of passenger satisfaction, such as behavioural intentions, loyalty, and trust, are also well documented (e.g., Nyamekye et al., 2022). However, studies have yielded conflicting and often inconsistent results, posing challenges in articulating the nuances of passenger satisfaction and establishing uniformity or stability in the conclusions. For example, based on a survey of 186 participants, Andersen and Weisstein (2019) reported that the effect of PV on passenger satisfaction was statistically supported, as evidenced by a significant beta coefficient.

Conversely, in another study conducted by Singh (2021), the hypothesis was not supported. The antecedents of passenger behavioural intentions have also been an emergent area of research, with inconsistent findings. According to the theory of planned behaviour, intention is the motivation to conduct a specific behaviour in the future (Ajzen, 1991). Some studies have reported no significant impact of passenger satisfaction on behavioural intentions (e.g., Hassan & Salem, 2022), whereas others have presented contrasting findings with statistically significant differences in their results. To provide further detail, Akamavi et al. (2015) reported a beta value of 0.4 as an indicator of the satisfaction–loyalty relationship. In contrast, Shen and Yahya (2021) reported a much stronger connection, with a value of

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0.83. Considering the divergent findings reported in existing studies, there appears to be a need for a systematic approach to appraise airline passenger satisfaction.

A meta-analysis collects and combines the statistical results of empirical studies, focusing on explaining the variation in effect sizes and synthesising the disconnected pieces of the body of knowledge around a generic framework (Afshardoost & Eshaghi, 2020). By synthesising statistics from previous studies, this meta-analysis aims to empirically assess the intricate relationships between airline passenger satisfaction and its drivers and consequences. The structure of the paper reflects this aim by first providing an overview of airline satisfaction, its drivers, and outcomes in Section 2. In this section, research hypotheses are developed, and various conceptualisations of the variables, as well as possible mediators and moderators, are discussed. The research methodology is presented in Section 3. Section 4 focuses on the results of the meta-analysis procedures. The general model of airline passenger behavioural intentions, supported by the meta-analysis results, is described in Section 5. The contribution of the cumulative estimation of effect sizes is of applied relevance for practitioners, presented in Section 6. Finally, conclusions are drawn, which are expected to help airline managers implement mechanisms centred on value for price, service quality, and marketing strategies to increase passenger satisfaction.

2. Literature review and hypotheses

Passenger satisfaction has been the subject of intensive scholarly inquiry in the aviation industry, as satisfied customers ensure the long-term sustainability of airlines (Shen & Yahya, 2021). Early studies on passenger satisfaction focused on critical definitions and applications (Khudhair et al., 2019). Behavioural scientists contend that the satisfaction and dissatisfaction indices are not on the same spectrum. For example, the absence of reported negative behavioural observations (such as complaints) does not necessarily indicate passenger satisfaction (Kondo, 2001). Accordingly, researchers have postulated that relying solely on observing customer behaviour is only partially reliable and that it is crucial to consider customer intention (Tam et al., 2022). Passenger satisfaction has evolved to include cognitive, affective and, more recently, conative psychological and physiological dynamics (Tahanisaz, 2020). It has emerged as a context-based construct that can be defined as a sense of enjoyment or displeasure resulting from a comparison of the function of a product or service with customer expectations (Singh, 2021).

Considerable debate about approaches used to measure passenger satisfaction is also evident in the existing discourse, with studies focused on the efficacy of surveys, interviews, and data analysis techniques to identify service delivery shortfalls (Rita et al., 2022). Research foci have sought to examine approaches for evaluating the events and behaviours occurring during a single, discrete interaction during a service encounter (Ekinci et al., 2008). There is evident consensus that measuring passenger satisfaction immediately after a specific service encounter or interaction is highly desirable, as it focuses on evaluating a specific interaction rather than long-term satisfaction.

As passenger satisfaction has evolved and matured, multivariate models have been developed to explore its antecedents and consequences. This approach encompasses two interconnected philosophical perspectives. The first is constructivism, which posits that passenger satisfaction is socially constructed and arises from interactions between passengers and their context (Ahmadpour et al., 2014). This school of thought proposes that latent satisfaction model variables are measured through observable indicators, reflecting the underlying construct (Churchill, 1979). The second perspective is logical empiricism, or logical positivism, which views satisfaction based on empirical evidence and suggests that models should be grounded in observable and measurable phenomena (Tadajewski, 2010). In the formative approach, this perspective assumes that the latent construct is a composite of observable indicators, each contributing unique information to the construct

(Hair et al., 2011). As formative and reflective models are accepted by the scientific community (Hunt, 2003), and there are no restrictions for any multivariate models in meta-analysis procedures (Afshardoost et al., 2021), this study accepts and follows both approaches.

2.1. Determinants of passenger satisfaction

In the field of passenger satisfaction determinants, extensive research has been conducted on PSQ and PV as antecedents of passenger satisfaction (e.g., Koklic et al., 2017). However, according to Kondo (2001), the perception of quality has subjective and objective sides, with aspects related to what we think, feel or sense. Objective service quality (OSQ) pertains to an unbiased product or service evaluation based on predefined and quantifiable standards. In contrast, PSQ involves a comprehensive impression or overall assessment of a service, raising concerns surrounding the specific entity rating or evaluating the service (Ladhari, 2009). Parasuraman et al. identified perceptual gaps in the conceptualisation of PSQ (Table 1).

Numerous attempts have been made to develop reliable scales to measure PSQ, such as SERVQUAL, which was developed by Parasuraman et al. (e.g., 1985, 1994). Since its development and inception, questions have been raised concerning the convergent, discriminant and predictive validity of SERVQUAL due to an emphasis on the service-delivery process (Ekinci et al., 2008). As a result, airline researchers have sought to use a tailored scale, namely, AIRQUAL, arguing that existing scales are generic guidelines and have been associated with problematic issues in terms of their nature and adaptability to different cultural, industrial, and functional contexts (Farooq et al., 2018). Critics contend that SERVQUAL has psychometric application problems, with the dimensions of the scale needing to be validated across various countries and cultures (e.g., Nadiri et al., 2008). It is also a broad scale (e.g., Buttle, 1996), with a tendency to add new dimensions and neglect others (e.g., Nadiri et al., 2008). However, competing scales such as AIRQUAL have similar problems, and the validity of the SERVQUAL dimensions has been widely reported in various contexts (e.g., Climis, 2016).

PSQ is considered a unidimensional and multidimensional concept with three different conceptual schemas—a holistic view, a higher-order construct (HOC) and a lower-order construct (LOC)—evident in the existing discourse (e.g., Climis, 2016). The holistic view considers PSQ an abstract formed object, which elicits attributes that can be evaluated with minimal questions—or even sometimes one metric, such as ‘overall, the in-flight facilities in this airline are excellent’ (Hapsari et al., 2017). This approach emphasises the importance of the overall perception and evaluation of an object or concept rather than its components, suggesting that an individual’s response depends on integrating multi-sensory information (Ali et al., 2015). Measurement models also consider PSQ to be an HOC that comprises multiple dimensions, with a series of questions for each dimension (e.g., Shen & Yahya, 2021). This type of conceptualisation defines PSQ as an abstract collective object (Rossiter, 2002), providing a single statistical path (beta or coefficient correlation)—similar to the holistic view—to examine the relationship between PSQ and related variables. In contrast, the LOC approach to PSQ has been used to investigate the effects of different dimensions on passenger satisfaction (e.g., Ringle et al., 2011). In accordance with the C-OAR-SE theory, this approach defines PSQ as an abstract collective object that elicits attributes.

These various models provide comparable coefficient correlations across the literature and are applicable in meta-analysis procedures (Afshardoost & Eshaghi, 2020). Hence, this study adopts a pragmatic approach and examines various conceptualisations and aspects of PSQ. This includes dimensions of SERVQUAL, namely, reliability (ability to perform the promised service accurately), responsiveness (willingness to help passengers and provide prompt services), assurance (knowledge of employees and their ability to convey confidence), airline tangibles (e.g., appearance of physical facilities, equipment, personnel), and empathy (provision of caring, individualised attention to customers), as

Table 1
Perceptual gaps in PSQ conceptualisation

Perceptual gap	Definition
1	Between customer expectations and management's perceptions of those expectations
2	Between management's perceptions of consumer expectations and the translation of those perceptions into service-quality specifications
3	Between the service delivered by frontline personnel and the specifications set by management
4	Between service delivery and what is promised in external communications to consumers
5	Between customer expectations and their perceptions

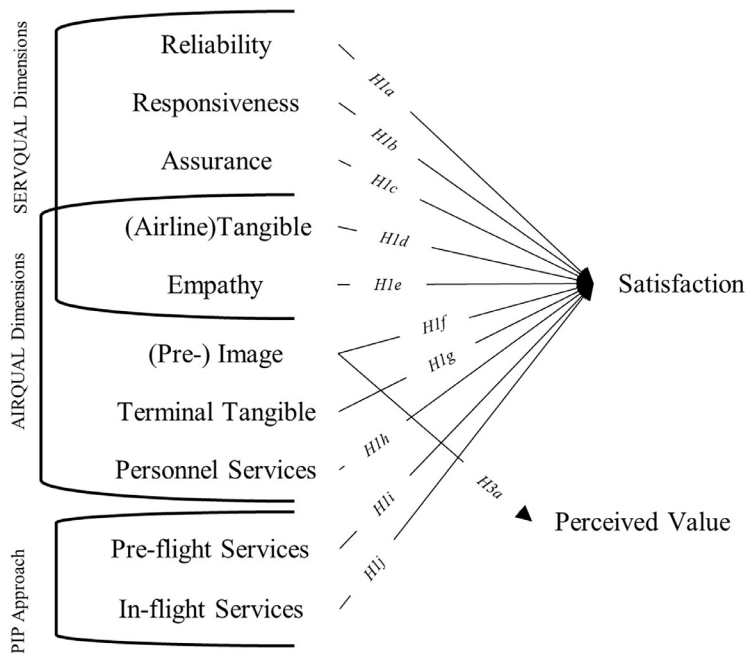


Figure 1. Variables affected by each dimension of PSQ.

well as dimensions of AIRQUAL, including airline tangibles, empathy, (Pre) image (customers' perception of the airline before the service encounter), terminal tangibles (physical facilities and equipment at the airport terminal that the airline uses), and personnel services (performance of the airline staff in delivering the service) (e.g., Nadiri et al., 2008). This study also adopts the pre, in- and postflight (PIP) model, which includes airline services in three separate stages, providing a solid foundation for achieving this review's overarching aim and hypothesis based on previous research (e.g., Ringle et al., 2011). Figure 1 depicts the relationships among the PSQ dimensions that satisfied the research protocol criteria. For this research, the image of an airline within a passenger's mind as a dimension of PSQ is the (Pre) image (see Figure 1), and the airline image as a result of passenger satisfaction is the (Post) image (see Figure 2).

This study also explores holistic and HOC approaches to PSQ and its relation to passenger satisfaction in accordance with previous studies (e.g., Rajaguru, 2016). Figure 2 shows that PSQ is defined as HOC or the holistic view.

Following the above arguments, the following hypothesis was proposed:

H1: PSQ has a positive impact on passenger satisfaction. Reliability (H1a), Responsiveness (H1b), Assurance (H1c), (Airline) Tangible (H1d), Empathy (H1e), (Airline) (Pre) image (H1f), Terminal Tangible (H1g), Personnel Services (H1h), Preflight Services (H1i), and In-flight Services (H1j) positively impact passenger satisfaction.

The second approach to enhancing passenger satisfaction involves the direct impact of the PV system on passenger satisfaction. However, following expectation-disconfirmation theory, Park et al. (2020) assert that airline price is the primary competitive advantage that shapes pas-

senger expectations, shaping consumer emotions in decision-making, which is to say that the term has evolved from utilitarian and psychological perspectives (Gallarza & Gil Saura, 2006). Nevertheless, the overall perspective in aviation studies is the classical utilitarian view using concrete terms such as money or price (e.g., Rajaguru, 2016). By accepting both views, it can be assumed that:

H2: PV has a positive impact on passenger satisfaction.

In addition, the indirect effect of PSQ through PV may contribute to increased passenger satisfaction. Andersen and Weisstein (2019) noted that passengers are more likely to feel satisfied when they perceive airline services as valuable and preferable. Conversely, when services are perceived as low in value, prior studies have demonstrated that passengers may become dissatisfied or angry, suggesting that consumer perceptions of service quality and its dimensions can influence passenger responses through their impact on PV (e.g., Hapsari et al., 2017). It can subsequently be assumed that:

H3: PSQ has a positive impact on PV. (Pre) image has a positive impact on the PV (H3a).

2.2. Consequences of passenger satisfaction

Behavioural scientists consider behavioural intentions a crucial post-consumption construct (Williams & Soutar, 2009). Nevertheless, scholars contend that the connotation of intention should include pre-intention variables such as conation to explain the attainment of behavioural goals (Perugini & Bagozzi, 2001). Passenger intentions to recommend, visit and revisit have emerged as the most researched behavioural intentions (Afshardoost & Eshaghi, 2020). Scholars argue

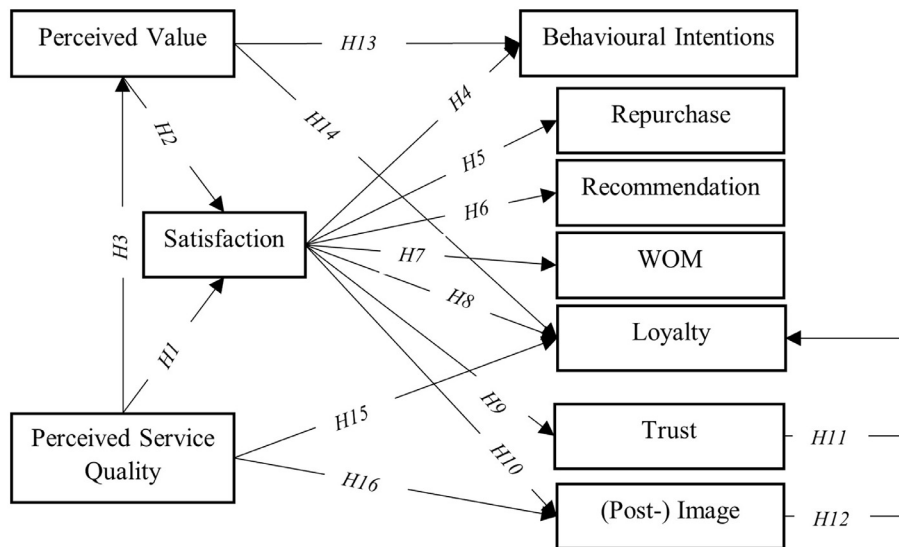


Figure 2. Comprehensive research framework.

that behavioural intention and loyalty are similar, encompassing behaviours such as repurchasing and recommending a product or service (Chonsalasin et al., 2022; Munoz et al., 2020). Behavioural intention represents a predisposition to purchase from the same company and involves affective and behavioural dimensions (Eshghi et al., 2007). The affective dimension reflects the psychological reaction, whereas the behavioural aspect represents the simple manifestation of that affective state (Ladhari, 2009). However, in line with previous research, we acknowledge and follow the differentiation between these concepts in this study (e.g., Chonsalasin et al., 2022). Nevertheless, we emphasise the adaptation of the metrics of behavioural intentions as indicators of passenger loyalty.

In the aviation literature, passenger behavioural intention has been considered a strategic dependent variable, measured both *evaluatively* and *descriptively*. Precisely, intentions are measured through passengers' evaluations (Baumeister et al., 2022) or through evaluations conducted by researchers who seek to describe passengers' intentions (Xu et al., 2019). Such studies have focused on describing passengers' intentions to predict future behaviours (Singh, 2021), with a tendency to examine an airline's ability to retain customers (e.g., Climis, 2016).

Studies of behavioural intentions can be classified according to the predictors and dimensions, variables, or metrics assessed. In the aviation sector, satisfaction has widely been identified as the primary predictor of passengers' behavioural intentions, with those intentions impacting the profitability of airlines (Tam et al., 2022). Studies contend that a passenger's intention to repurchase, recommend or engage in positive word-of-mouth (WOM) communication can impact revenue and market share by influencing customer loyalty (e.g., Rajaguru, 2016). Nadiri et al. (2008) reported that greater customer satisfaction is strongly associated with a greater likelihood of repurchasing, recommending to other customers, and spreading WOM. Akamavi et al. (2015) reported a positive statistical relationship between satisfaction and loyalty. Other studies have also reported the positive impact of passenger satisfaction, including all its metrics, on behavioural intentions, as shown in Figure 2 (e.g., Tam et al., 2022; Park et al., 2004). Thus, it is reasonable to assume the following:

- H4: Passenger satisfaction has a positive impact on behavioural intentions.
- H5: Passenger satisfaction has a positive impact on passenger repurchase.
- H6: Passenger satisfaction has a positive impact on passenger recommendation.
- H7: Passenger satisfaction has a positive impact on positive WOM.
- H8: Passenger satisfaction has a positive impact on passenger loyalty.

In addition, two attitudinal or pre-intentional variables have frequently been considered in studies focused on the consequences of passenger satisfaction (Akamavi et al., 2015). For instance, Chanpariyavatevong et al. (2021) reported a positive relationship between passenger satisfaction and trust. Studies have also reported a positive effect of satisfaction on airline (Post) image (e.g., Park et al., 2006) and that passenger trust and airline (Post) image can also be considered factors with the propensity to influence passenger behavioural intentions, specifically loyalty (e.g., Hassan & Salem, 2022). Consequently, the following can be assumed:

- H9: Passenger satisfaction has a positive impact on passenger trust.
- H10: Passenger satisfaction has a positive impact on airline (Post) image.
- H11: Passenger trust has a positive impact on passenger loyalty.
- H12: Airline (Post) image has a positive impact on passenger loyalty.

2.3. Other common relationships and hypotheses

The literature demonstrates that various mediating and moderating relationships prevalent in aviation studies meet the requirements for meta-analysis procedures. Researchers have reported that passenger satisfaction can mediate the relationship between PV and behavioural intentions. The findings demonstrate that behavioural intention could be considered either a higher-order or lower-order construct or a universal variable without any dimensions. Andersen and Weisstein (2019) documented PV as one of the significant antecedents of behavioural intentions. Studies have also revealed that passenger satisfaction can mediate the influence of PV and PSQ on passenger loyalty, with loyalty being viewed as a separate variable or a dimension of behavioural intention. Several studies have also established that PV and PSQ are among the strongest predictors of passenger loyalty (Singh, 2021). Underscoring this concept, Nghiêm-Phú (2019) reports the influence of PV and PSQ on passenger loyalty.

Soomro et al. (2022) argue that airline (Post) image can be positively or negatively affected by PSQ. This is because PSQ allows consumers to assess the value and experience of an airline based on various aspects of the airline stored in their minds, influencing their ability to recognise and recall airline brands under different conditions. Concomitantly, Hapsari et al. (2017) mention that PSQ is the most critical variable influencing passenger perceptions of airline (Post) image.

Accordingly, similar to previous studies, we assume the following:

- H13: PV has a positive impact on behavioural intentions.
- H14: PV positively impacts passenger loyalty.

Table 2
Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Study type	Peer-reviewed journal articles	Book, book chapters, theses, and conference papers
Language	English	Non-English papers
Research design	Quantitative papers	Qualitative papers
	Reporting required statistical results and sample size	Not reporting the required statistical results
Focus of study	Airline satisfaction	Airline recovery satisfaction, Employee satisfaction

H15: PV positively impacts PSQ.

H16: PSQ has a positive impact on airline (Pos-) image.

Research suggests that gender differences may be pivotal in influencing passengers' behavioural intentions and overall satisfaction. Accordingly, [Huang and Benyoucef \(2017\)](#) stated that gender differences can be explained at the cognitive and behavioural levels. However, a literature review reveals a discrepancy among demographic-related studies in aviation. Authors consistently propose future research agendas, yet more research needs to be undertaken to address this gap (e.g., [Clemes et al., 2008](#)). Even the limited existing studies focus on peripheral subjects and are sporadic. For example, [Hassan and Salem \(2022\)](#) claim that males are more loyal to airlines than females are, whereas [Baumeister et al. \(2022\)](#) report no significant differences between genders.

Studies have also highlighted the important role of airline type (full-service carrier (FSC) and low-cost carrier (LCC)) and passenger type (business and leisure) in shaping passenger satisfaction. For example, [Ahn and Lee \(2011\)](#) reported that FSC airline passengers have significantly higher PSQ and customer satisfaction than LCC airline passengers do. Similarly, [Kusumawardani and Aruan \(2019\)](#) reported that PSQ is important in affecting the behavioural intentions of full-service airline passengers, whereas for low-cost airline passengers, PV is more important. It is important to draw distinctions between leisure and business travellers when studying the determinants of customer satisfaction and customer loyalty ([Jiang & Zhang, 2016](#)). [Chonsalasin et al. \(2022\)](#) argued that there is a significant difference in airline satisfaction among travel groups, suggesting the development of a separate model in relation to travel purposes, including a business-objective group and a leisure-objective group. Taken together, this discussion suggests the following hypotheses:

H17: Gender has a moderating effect on all the relationships.

H18: Airline type has a moderating effect on all the relationships.

H19: The passenger type has a moderating effect on all relationships.

3. Research methods

Following the procedure of [Afshardoost et al. \(2021\)](#), a comprehensive meta-analysis (CMA) 3.0 was employed to compute the effect sizes of the hypothesised relationships.

3.1. Search and inclusion of literature

Following the approach outlined by [Paul et al. \(2021\)](#), two major academic databases—Scopus and Web of Science (WoS)—were searched to identify relevant studies on airline passenger satisfaction, and keywords were selected through a combination of (1) collaborative brainstorming of the author team, (2) search terms used in conceptually related studies (e.g., [Ladhari, 2009](#)), and (3) evaluating the outcomes of various search queries. The selected search queries, namely, '(TITLE (airline* OR aviation* OR airway*)) AND TITLE-ABS-KEY (satisfaction))' for Scopus and '(airline* OR aviation* OR airway* (Title) AND satisfaction (Topic))' for WoS, were applied to identify a list of relevant articles for preliminary screening. The search was limited to journal publications and English-language peer-reviewed articles, with no implicit time restrictions imposed for the publication dates of the articles. Initially, 707

and 585 articles were identified from Scopus and WoS, respectively, with the initial screening designed to remove 375 duplicates and assess the remaining articles for eligibility. According to [Paul et al. \(2021\)](#), the relevance of an article can be determined by reviewing the title, abstract and full text to identify whether the article is genuinely related to the topic of interest. Consequently, in this instance, the selected publications needed to focus on passenger satisfaction rather than tangentially related areas such as employee satisfaction or service recovery, with 202 studies excluded because the focus on passenger satisfaction was only peripheral. A second major criterion for inclusion in the meta-analysis was whether the article had a quantitative aspect, with 370 purely qualitative articles being excluded. Ultimately, the articles included in the final dataset needed to report the required statistical results, such as correlation coefficients or sample sizes ([Table 2](#)), with 250 publications removed because of inadequate or inaccurate documentation of the statistical findings. Following [Afshardoost et al. \(2020; 2021\)](#), only relationships reported at least three times (in one study or in separate studies) were included to ensure accurate correlation calculations.

After this process, 95 articles were considered eligible for inclusion in the meta-analysis. After the authorship team cross-checked the final list of publications, descriptive data (e.g., author/s' name, title, journal, country of the study sample) and significant relationships with airline passenger satisfaction (antecedents and consequences) were identified and entered into MS Excel. The studies were subsequently categorised based on the relationships they presented.

3.2. Analysis

For the 95 empirical studies included in the meta-analysis, the cumulative sample size was 162,390 respondents. To analyse the sample size, Pearson correlation and significance of the relationships from the studies were utilised to calculate the cumulative correlation coefficient (average r), confidence interval levels (95% lower and upper), Z value, and p -value ([Table 3](#)). The strengths of the cumulative correlation coefficients > 0.10 = small, > 0.30 = moderate, and > 0.50 = strong have been interpreted ([Cohen, 1988](#)). The heterogeneity of the studies was measured by the Q -test I^2 statistic (the ratio of between-group variance) ([Hedges & Olkin, 1984](#)). The significant results of heterogeneity tests for the relationships ([Table 4](#) below) indicated significant variabilities between studies. As such, a random-effects model was applied for the meta-analysis ([Pollock, 2016](#)). The fail-safe N (FSN) was also calculated to determine the stability of the results. The FSN computes the number of studies required to nullify the effect size, calculating the number of additional "null" studies that would need to be added to bring the overall effect size to a non-significant level ([Rosenthal, 1979](#)). The results show that all the FSN numbers surpassed the recommended threshold of $5N + 10$, with a significance level of 0.05 used as the criterion ([Duval & Tweedie, 2000](#)), indicating that publication bias was not an issue in this study.

4. Results

The dataset encompasses a range of studies on airline types, passenger types, and flight types across various regions and countries from 2003 to early 2023. The descriptive analysis revealed that the year with the highest number of studies was 2022, with 12 studies,

Table 3
Analysis of the direct effects.

H	From	To	N	Sample size	Effect size and 95% interval		Test of null (2-Tail)	
					Average r	95% CI	Z-value	P-value
1	PSQ	Satisfaction	26	10523	0.512	(0.410,0.601)	8.553	0.000
1a	Reliability		8	2684	0.382	(0.032,0.648)	2.130	0.033
1b	Responsiveness		8	2528	0.240	(0.125,0.348)	4.042	0.000
1c	Assurance		7	2117	0.109	(0.062,0.155)	4.549	0.000
1d	(Airline) Tangible		15	6480	0.137	(0.113,0.161)	11.051	0.000
1e	Empathy		12	4158	0.150	(0.084,0.215)	4.414	0.000
1f	(Pre) Image		15	6391	0.339	(0.223,0.446)	5.479	0.000
1g	Terminal Tangible		5	2041	0.289	(0.128,0.435)	3.453	0.001
1h	Personnel Services		6	3007	0.319	(0.132,0.485)	3.277	0.001
1i	Pre-flight Services		3	729	0.292	(0.185,0.393)	5.159	0.000
1j	In-flight Services		10	5791	0.384	(0.216,0.530)	4.282	0.000
2	PV		28	24547	0.511	(0.370,0.628)	6.309	0.000
3	PSQ	PV	11	6046	0.591	(0.226,0.810)	2.967	0.003
3a	(Pre) Image		5	2956	0.341	(0.142,0.513)	3.280	0.001
4	Satisfaction	Behavioural intentions	10	4031	0.614	(0.245,0.827)	3.016	0.003
5		Repurchase	15	8651	0.539	(0.428,0.634)	8.131	0.000
6		Recommendation	4	17162	0.799	(0.675,0.880)	7.759	0.000
7		WOM	9	5456	0.724	(0.551,0.838)	6.050	0.000
8		Loyalty	32	15340	0.540	(0.423,0.639)	7.747	0.000
9		Trust	7	4187	0.745	(-0.003,0.958)	1.964	0.002
10		(Post) Image	5	2789	0.483	(0.312,0.624)	5.057	0.000
11	Trust	Loyalty	6	3066	0.199	(0.090,0.302)	3.552	0.000
12	(Post) Image		9	4488	0.166	(0.058,0.270)	3.000	0.003
13	PV	Behavioural intentions	11	4310	0.331	(0.210,0.442)	5.164	0.000
14	PV	Loyalty	7	6619	0.134	(0.032,0.234)	2.560	0.010
15	PSQ		9	3060	0.463	(0.161,0.686)	2.903	0.004
16	PSQ	(Post) Image	8	3233	0.473	(0.088,0.735)	2.364	0.018

Table 4
Heterogeneity analyses.

From	To	Q-value	df (Q)	P-Value	I-Squared	FSN
PSQ	Satisfaction	1108.648	25	0.000	97.745	10474
Reliability		644.221	7	0.000	98.913	942
Responsiveness		61.976	7	0.000	88.705	287
Assurance		7.088	6	0.313	15.352	43
(Airline) Tangible		12.521	14	0.565	0.000	455
Empathy		51.123	11	0.000	78.483	275
(Pre) Image		356.796	14	0.000	96.076	2901
Terminal Tangible		57.728	4	0.000	93.071	260
Personnel Services		148.828	5	0.000	96.640	514
Pre-flight Services		4.439	2	0.109	54.948	46
In-flight Services		439.384	9	0.000	97.952	2066
PV		4419.664	27	0.000	99.389	10078
PSQ	PV	2991.211	10	0.000	99.666	9396
(Pre) Image		126.606	4	0.000	96.841	518
Satisfaction	Behavioural intentions	1990.532	9	0.000	99.548	5546
	Repurchase	649.238	14	0.000	97.844	1020
	Recommendation	731.854	3	0.000	99.590	9870
	WOM	1174.357	8	0.000	99.319	2357
	Loyalty	2723.471	31	0.000	98.862	5079
	Trust	5538.209	6	0.000	99.892	9088
	(Post) Image	114.434	4	0.000	96.505	1002
Trust	Loyalty	38.499	5	0.000	87.013	175
(Post) Image		99.932	8	0.000	91.995	187
PV	Behavioural intentions	182.777	10	0.000	94.529	1286
PV	Loyalty	84.159	6	0.000	92.871	136
PSQ		709.269	8	0.000	98.872	1628
PSQ	(Post) Image	1041.591	7	0.000	99.328	2042

followed by 2020, with eleven studies. Studies have been conducted in various regions, with significant contributions from Malaysia (ten studies), the USA (seven studies), South Korea (seven studies), Thailand (seven studies), Indonesia (five studies), and Taiwan (five studies). Eighteen studies focused on FSC, whereas ten studies focused on LCC. Additionally, 18 studies compared FSC and LCC, but the rest did not mention an airline type. Passenger types were specified in 23 studies, with 14 addressing leisure and business passengers, six addressing only leisure, and one focusing only on business passengers.

Flight types were less frequently specified, with four studies examining long-haul flights, three addressing short-haul flights, and one covering both.

The results of the meta-analysis support that PSQ and PV positively affect passenger satisfaction. Table 3 presents each of the hypotheses in the left column, including the number of studies, the sample size, the average *r*, the confidence interval, the *z*-value, and the *p*-value. As depicted in Table 3, Hypotheses 1 and 2 were supported by strong and similar correlations, with PSQ at 0.512 and PV at 0.511.

Table 5
Mediation results

Relations	Mediator	VAF	Result
(Pre) Image on Satisfaction	PV	0.336	Partial Mediation
PSQ on Satisfaction	PV	0.371	Partial Mediation
PV on Behavioural Intentions	Satisfaction	0.486	Partial Mediation
PV on Loyalty	Satisfaction	0.67	Partial Mediation
PSQ on Loyalty	Satisfaction	0.407	Partial Mediation
PSQ on (Post) Image	Satisfaction	0.343	Partial Mediation
Satisfaction on Loyalty	Trust	0.215	Partial Mediation
Satisfaction on Loyalty	(Post) Image	0.129	No Mediation

As displayed in Table 3, the results demonstrate a positive correlation between the dimensions of PSQ and satisfaction. Moderate correlations were found between satisfaction and in-flight services ($r = 0.384$), reliability ($r = 0.382$), (Pre) image (as a dimension of PSQ, see Figure 1) ($r = 0.339$) and personnel services ($r = 0.319$). Other dimensions had minor effects on satisfaction, with an r of approximately 0.109 to 0.292, with Hypotheses 1a–j supported. The results revealed that two factors, PSQ and (Pre) image, affected the PV, with PSQ having a greater effect on the PV ($r = 0.591$) than on the (Post) image (airline image after flight; please see Figure 2) ($r = 0.341$). The relationship between PSQ and PV was also examined the most, with 11 observations. Consequently, H3 and H3a are supported.

The meta-analysis of five hypotheses (H4 to H8), with a total sample size of 57,616, demonstrated that satisfaction had a significant effect on behavioural outcomes, namely, recommendation ($r = 0.799$), trust ($r = 0.745$), WOM ($r = 0.724$), behavioural intentions ($r = 0.614$), loyalty ($r = 0.540$), and repurchase intentions ($r = 0.539$). Recommendations were highly influenced by satisfaction, with four observations. Although satisfaction moderately affected loyalty, this relationship was the most frequently studied effect in the selected publications, with 32 observations. The effect of satisfaction on trust was strong ($r = 0.745$), and the effect on (Post) image was moderate ($r = 0.483$), thus supporting H9 and H10. Trust and (Post) image had a weak effect on loyalty, with correlations of $r = 0.199$ and $r = 0.166$, respectively.

Table 4 summarises the heterogeneity analyses of the studies. The fail-safe numbers exceeded the suggested thresholds of $5N + 10$, reflecting that the treatment effects were not nil, as shown in Table 4. The meta-analysis results suggest that PV has a statistically moderate effect on behavioural intentions, with an average effect size of 0.331. The fail-safe N reflects that it would take 1,286 studies to nullify the result, supporting H13. The correlation between PSQ and loyalty ($r = 0.463$) was more robust than that between PV and loyalty ($r = 0.143$), supporting Hypotheses 14 and 15. PSQ had a combined effect size of 0.473 on the (Post) image, representing a moderate effect. Eight observations were included, with a total sample of 3,233 in the analysis. The fail-safe N shows that retrieving this effect would require more than 2,042 studies supporting H16.

Given the support for all the hypotheses, as recommended by Sarstedt et al. (2014), we proceeded to analyse the mediation effect. Table 5 shows the mediation results of the study. Accordingly, the variance accounted for (VAF) was calculated from 0 to 1, with values below 0.2 indicating no mediation, values between 0.2 and 0.8 indicating partial mediation, and values above 0.8 indicating full mediation.

The results of the Q -value and I^2 tests, displayed in Table 4, indicate heterogeneity in the effect sizes of the sample studies. This suggests the potential influence of moderating variables on the observed relationships. To investigate this, we examined the moderating role of gender, airline type (FSC vs. LCC) and passenger type (business vs. leisure) in relationships, with at least three associations reporting the sample size (see Appendixes I, II & III). Gender had no significant moderating effect on most relationships, except for that between PV and satisfaction, which was stronger for men ($r = 0.510$) than for women ($r = 0.249$). In addition, the results revealed no significant moderating effect for airline and passenger types.

5. Discussion

This review revealed that existing studies have yielded inconsistent and often conflicting statistical findings, making it difficult for researchers and practitioners to draw conclusions. For example, Andersen and Weisstein (2019) demonstrated the effect of PV on passenger satisfaction with a significant beta coefficient of 0.76, a t -value of 15.99, and a p -value of less than 0.01. Conversely, the hypothesis was not statistically supported by Singh (2021), with a non-significant beta coefficient of -0.105 , a t -value of -1.981 , and a p -value greater than 0.05. A transparent framework emerged from a meta-analytical method to integrate theories, observations and statistical findings on key drivers and outcomes of airline passenger satisfaction. This method has been applied across diverse fields to create a comprehensive statistical framework, identify prevailing trends and inform future research directions and practical implications (Fan et al., 2022). The findings support the significant impacts of PV, PSQ and their dimensions on passenger satisfaction with different effect sizes, with passenger satisfaction found to have significant direct and indirect effects on behavioural intentions and attitudinal responses, as illustrated in Figure 3.

This framework emerged from an analysis of 95 empirical studies conducted in diverse contexts. It encompasses research conducted across various nations, cultures, religions, and airlines, as reported by academic journal articles. As demonstrated in the results section, the findings confirm all the hypothesised relationships, a common occurrence in conceptually related meta-analysis studies (e.g., Desveaud et al., 2024, Fang et al., 2024). This indicates that discourse on passenger satisfaction, despite inconsistent and conflicting results, has reached a level of maturity suitable for conducting a meta-analysis to generate a reliable effect size, thereby enhancing the reliability and transparency of the framework offered in this article (Bai et al., 2024).

Since the early conceptualisation of PSQ and PV, each factor has been regarded as an outcome of the evaluation process or a type of attitude in which customers perceive a higher value when the quality of service surpasses their expectations (Hapsari et al., 2017). This leads to increased customer satisfaction (Andersen & Weisstein, 2019), with PV mediating between PSQ and its dimensions and overall satisfaction (Baumeister et al., 2022). Based on 11 studies of different magnitudes, the findings of this meta-analysis revealed that the impact of PSQ (when measured as an overall evaluation or HOC) on PV was the most decisive factor contributing to passenger satisfaction. There is a well-documented relationship in the literature regarding the influence of the image of a service provider in a passenger's mind on assessing its value and its role in enhancing satisfaction. This notion has recently been conceptualised in the service industry, highlighting that the concept of image involves comparing different entities (Eshaghi et al., 2022). Notions such as 'consistency of ticket prices with given service' (Ali et al., 2015), 'confers prestige upon its passengers' (Hussain, 2016), and 'This airline is unique' (Singh, 2021) that have been applied to measure airline image justify the comparative nature of the image in terms of a conceptual and operational definition in aviation studies. This stream of research with $VAF = 0.336$ (see Table 4) considers PV to be a mediator between (Pre-) image and satisfaction (see Figure 4).

With respect to the direct predictors of passenger satisfaction, 26 studies reported the impact of PSQ on passenger satisfaction. Similarly, the rival predictor (PV), reported by 28 studies, demonstrated a nearly equal average beta. However, contradictory findings indicate that PV has an insignificant effect on satisfaction or that PSQ is a superior predictor of satisfaction (e.g., Hussain, 2016; Singh, 2021). However, opposing results have also been reported (e.g., Chanpariyavatevong et al., 2021), leading to a debate about whether PV or PSQ is a better predictor of passenger satisfaction, with the results of this meta-analysis suggesting that the effects are nearly identical and robust. These findings suggest that neither PV nor PSQ alone is a better predictor of satisfaction, with similar average correlation coefficients for PV and PSQ. Considering the high statistical power (see Table 4) and the strong relationship

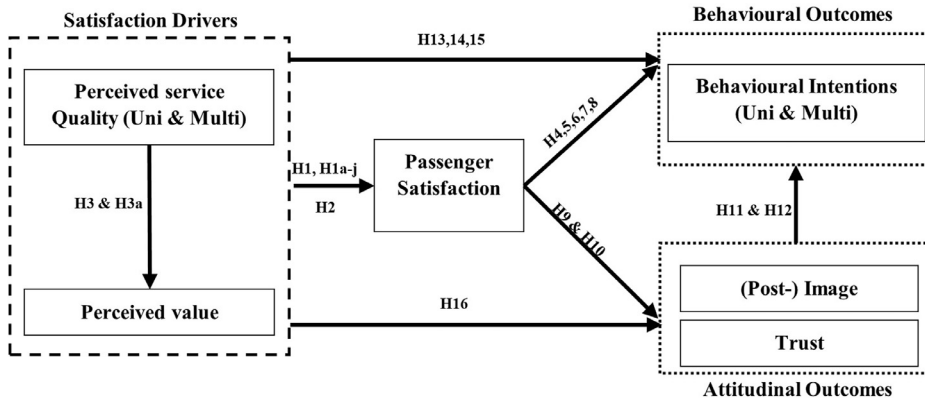


Figure 3. The general model of airline passenger behavioural intentions.

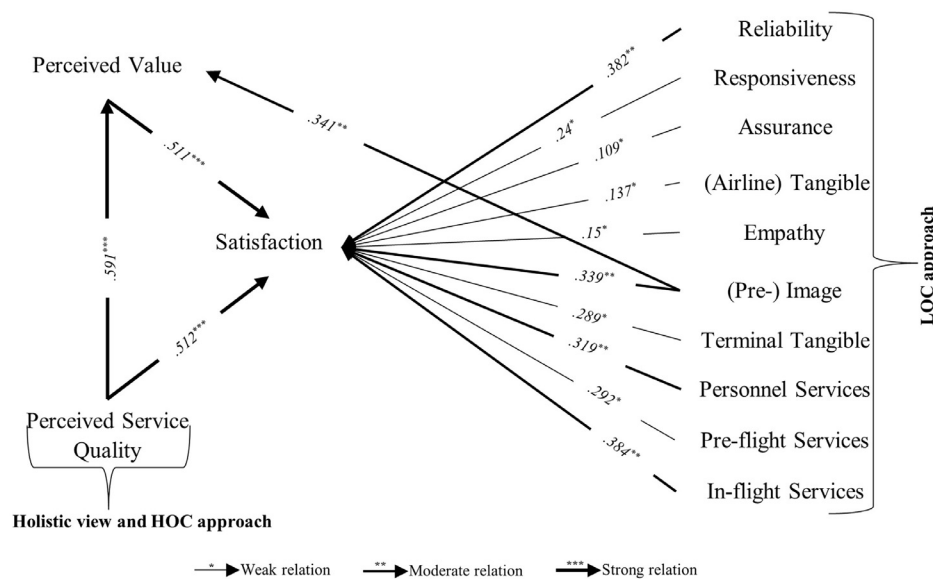


Figure 4. Factors affecting passenger satisfaction.

between PSQ and PV, both factors have comparable predictive power for passenger satisfaction across the examined studies. This highlights the importance of considering both factors to understand passenger satisfaction. While PV represents the value that passengers derive from the airline's services (Hussain, 2016), PSQ reflects different aspects that affect passengers' evaluation of the quality of services (Law et al., 2022). The convergence of these factors supports the notion that a holistic approach, encompassing PV and PSQ, is essential for understanding passenger satisfaction (Koklic et al., 2017).

According to Wang et al. (2021), identifying passenger satisfaction with service measures is a critical service management function. From the 25 quantitative studies that employed the LOC conceptualisation of PSQ and investigated the impact of each PSQ dimension on satisfaction, varying magnitudes of effects were revealed. The strongest predictor of satisfaction was *in-flight service* based on the PIP approach. The *reliability* of the SERVQUAL scale closely followed. In-flight indicators such as food and beverages, entertainment, cabin crews, onboard shops, aircraft cleanliness, and seated comfort have commonly been utilised in the literature as formative or reflective measures (e.g., Park et al., 2006; Ringle et al., 2011). As shown in Figure 5 and on the basis of Cohen's (1988) classification of the cumulative correlation coefficient, the average coefficients of the PIP dimensions were greater than those of the other approaches, followed by the estimated AIRQUAL betas.

The concept of behavioural intention in aviation studies combines post consumption intentions in connotation. The findings revealed that the literature on passenger intention is characterised by inconsistent la-

bels and operational definitions, making it challenging to navigate and comprehend the content. Zhang et al. (2014) propose that loyalty can be conceptualised in three ways: attitudinal loyalty (measured by the intention to recommend), behavioural loyalty (measured by visit and revisit intentions), and composite loyalty, which equates to behavioural intention. Chonsalasin et al. (2022) suggest a behavioural model that conveys passengers' loyalty, including repurchase intention and WOM dimensions. Similar metrics have been applied to operationalise labels such as behavioural intentions, repurchases, recommendations, WOM, and loyalty (e.g., Akamavi et al., 2015). This indicates a commonality in the measurement approach employed across these various constructs. Despite the ambiguity of the terminology used, the studies tended to apply similar metrics for different constructs, highlighting the crucial interdisciplinary role of this research stream. To ensure clarity and transparency, this study reports the applied labels separately, considering that each research study has unique research questions and objectives. The focus of this study is not on developing scales but rather on providing a comprehensive analysis and understanding of the statistical relationships among the variables of interest. As shown in Figure 6, the results indicate a strong relationship between satisfaction and all the aspects of behavioural intentions. This finding implies that passenger satisfaction is the strongest predictor, followed by PSQ.

According to gender socialisation theory, men and women develop different values, leading to different preferences (Okazaki & Mendez, 2013). Consequently, gender may influence the information used in the evaluation process or exhibit different behaviours (Huang

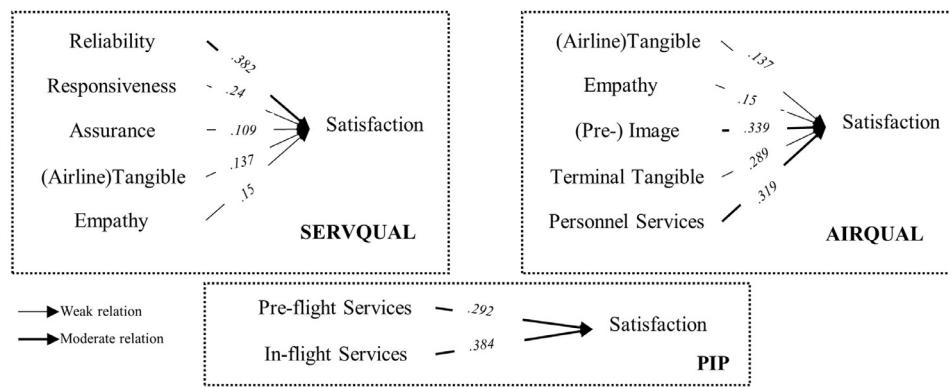


Figure 5. Results of different PSQ scales

& Benyoucef, 2017). According to Kwun (2011), different genders rely on distinct cues in decision-making. For example, females are more risk averse than men are (Croson & Gneezy, 2009), leading them to consider factors other than price, such as safety and convenience, when purchasing airline tickets. The results indicate that gender moderates the effect of PV on passenger satisfaction, considering that PV in aviation studies is often measured by concrete metrics such as money and price (e.g., Rajaguru, 2016). This finding aligns with Joung et al.'s (2016) claim that males are more sensitive to ticket prices, with this meta-analysis indicating that this relationship is twice as strong for males as it is for females. According to the agentic-communal dichotomy, males are more utilitarian, driven by agentic goals (that is, instrumental, task-oriented or goal-oriented), and focus more on functional aspects such as price than females, who are more hedonistic and socially oriented (that is, communal and relationship-oriented) (Mohammad Shafiee & Eshaghi, 2017). This utilitarian approach leads males to exhibit a low-price-seeking trait, making them more sensitive to ticket prices (Bakewell & Mitchell, 2006).

6. Insights for practitioners

Scholars have emphasised that behavioural intentions are critical for airlines to define competitive advantage (Akamavi et al., 2015). According to Chonsalasin et al. (2020), airline market share is closely tied to airlines' capacity to attract and retain passengers, which is vital to ensuring airlines' long-term success and resilience. Consequently, passengers' behavioural responses are regarded as critical targets for managers, with researchers focused on dependent variables (Tam et al., 2022). The results show that all behavioural connotations are strongly affected by passenger satisfaction. Figure 7 illustrates a mechanism to reach affirmative behavioural responses through passenger satisfaction. According to Park et al. (2004), satisfied passengers are more likely to consider flying with the airline and exhibit positive behaviours. The significant relationships between satisfaction and attitudinal outcomes on loyalty

suggest that airline managers should continue to prioritise efforts to establish a strong reputation for reliability, safety, and passenger focus (Chanpariyavatevong et al., 2021). The results suggest that mechanisms centred on value for price and service quality can be employed to increase passenger satisfaction.

Airline managers should pay particular attention to the direct effect of PV, which can positively influence passenger satisfaction as a combination of tangible and intangible resources that provide value for customers (Andersen & Weisstein, 2019). Passengers tend to assess the service by weighing its pros and cons against the associated costs and benefits (Chonsalasin et al., 2020) and evaluating passenger satisfaction based on monetary and nonmonetary criteria, such as price, punctuality, safety, and reliability (Akamavi et al., 2015). This notion is supported by the argument that there is an ongoing value flow between airlines and customers and that airlines must continue to systematically reinforce the value proposition that customers require to attain high satisfaction levels (Hussain, 2016). This value flow is determined by the presented value propositions in pre, in- and postflight services and those perceived by the passenger, with the direct and indirect effects of PSQ on critical satisfaction. Sun et al. (2024) suggest that airlines can offer additional competitive services such as priority boarding, ancillary services, and baggage fees to generate additional revenue and attract customers. This

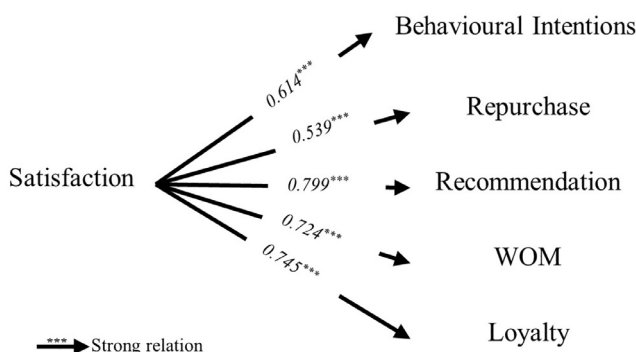


Figure 6. Behavioural connotations affected by satisfaction.

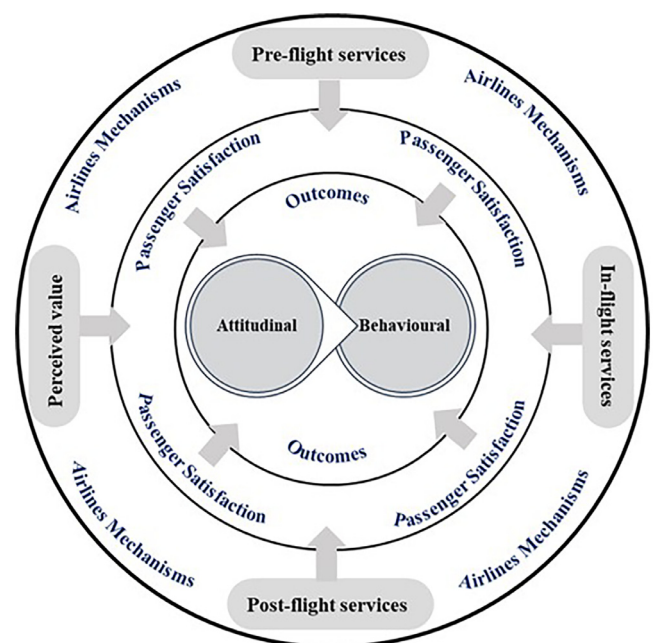


Figure 7. The centric role of passenger behavioural responses.

could also involve introducing new cabin classes, innovative onboard features, or unique amenities to attract customers who value these offerings (Heiets et al., 2024).

Researchers have suggested that enhancing passenger satisfaction through the indirect effect of PSQ is a realistic approach, as passengers tend to evaluate services based on their perceived market value (e.g., Park et al., 2006). Based on price theory, Andersen and Weisstein (2019) argue that meeting or exceeding customers' expectations for service quality can lead to a perception of higher value in airline services. Conversely, according to expectation disconfirmation theory, passengers may perceive lower value when service quality falls below expectations. This notion implies that to enhance passenger satisfaction, airlines should create value by offering quality service that exceeds customers' perceptions (Hapsari et al., 2017).

Following the concept of brand association, Baumeister et al. (2022) argue that passengers' direct and indirect experiences with an airline, through actual interactions and communications, shape their expectations. Passengers then apply for associations related to the airline to assess the benefits of the service received compared with what is provided. Researchers indicate that airlines with a strong image can establish a competitive edge by leveraging their brand elements to reduce uncertainty and increase passenger confidence (Hussain, 2016). As a result, airlines should proactively manage their brand image and increase their brand awareness through effective marketing and communication strategies (Zhang et al., 2023). Finally, passenger satisfaction is significantly influenced by a holistic evaluation of various service attributes across different stages of service delivery. Airlines should embrace innovative technologies to enhance customer experience, such as self-service check-in kiosks, mobile apps for seamless travel management, and entertainment streaming (Zhang et al., 2023). Among these attributes, the perceived quality of in-flight service, including the aircraft cabin's condition and the cabin crew's behaviour, has emerged as an essential driver of passenger satisfaction (Park et al., 2006; Ringle et al., 2011). Practitioners should implement periodic monitoring of passenger satisfaction levels and gather feedback to identify areas for improvement, regularly assessing the quality of in-flight services, the behaviour of the cabin crew and the overall customer experience.

7. Conclusion

This study presents a meta-analysis of previous statistical findings on passenger satisfaction, with an emphasis on drivers and outcomes. This research identified and reviewed 917 peer-reviewed papers published since 1963. After applying the inclusion criteria, 95 empirical articles were selected and analysed. The results revealed that PV and PSQ are the most frequently studied drivers of passenger satisfaction. Additionally, four behavioural outcomes were identified. Importantly, all the main hypotheses received support. Furthermore, the partial mediating role of PV in the relationship between satisfaction and trust was revealed. Notably, the research documented the moderating role of gender in the relationship between PV and satisfaction.

This study contributes to theoretical and practical outcomes. This study addresses the contradictory results of the literature regarding the relationships between PV and PSQ and passenger satisfaction, suggesting that neither is a superior predictor of passenger satisfaction. These findings suggest that both PV and PSQ interact in complex ways to shape overall satisfaction, highlighting the need for a holistic approach in evaluating customer experiences. Accordingly, airline operators should develop more comprehensive strategies to enhance customer experiences.

This meta-analysis also emphasises the importance of attitudinal responses as prerequisites for observable passenger behaviours, underscoring that relying solely on observable behaviours is only partially reliable. This finding highlights the crucial role of uncovering hidden motivations and perceptions that drive observable behaviours. By integrating both attitudinal and behavioural measures, researchers and practitioners can

gain a more comprehensive understanding of passenger experiences and preferences. Men were found to exhibit greater sensitivity to price than women. This suggests that demographic variables may require personalised approaches to enhance service effectiveness and induce higher satisfaction levels. By attributing a dependent role to behavioural intentions, implications underscore the central importance of behavioural outcomes for airline practitioners, shaping the sustainable mechanisms necessary to achieve passenger satisfaction.

The presented framework and justifications offer a comprehensive quantitative meta-analysis but are limited by language bias since all selected studies were written in English. Future studies could include publications in other languages to reduce this bias. Furthermore, this study did not analyse the moderating roles of nominal or scale variables. Future research could explore how age, nationality, and passenger sophistication may influence the effect size. Additionally, the general model of airline satisfaction is based on existing quantitative findings, and there is potential for an induction/deduction thematic and content analysis to categorise further and classify the studied concepts. Future research that critically reviews the field's conceptual definitions and measurement models would also be highly valuable and could reduce conceptual ambiguity and provide further clarity surrounding the shared use of metrics for standardisation. Future research could further explore how ongoing technological advancements, changing customer expectations, and megatrends such as economic conditions and pandemics influence trends in passenger satisfaction within the dynamic airline industry.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

M. Sadegh Eshaghi: Conceptualization, Formal analysis, Methodology, Writing – original draft. **Mona Afshardoost:** Conceptualization, Formal analysis, Methodology, Writing – original draft. **Gui Lohmann:** Supervision, Writing – review & editing. **Brent D Moyle:** Conceptualization, Supervision, Writing – review & editing.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jatrs.2024.100034.

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