

KEY DRIVERS OF OVERALL PASSENGER SATISFACTION IN AIRPORT SERVICE QUALITY (ASQ) SURVEY AT AAI MAJOR AIRPORTS.

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Abstract - This study investigates the principal determinants of overall passenger satisfaction at 14 major airports operated by the Airports Authority of India (AAI), using the Airport Service Quality (ASQ) survey framework developed by the Airports Council International (ACI). The ASQ survey measures 31 service quality parameters across eight thematic dimensions, with an additional 32nd parameter capturing overall satisfaction. Quarterly data for 2024 (Q1–Q4) from 14 airports were analyzed using Pearson correlation analysis to identify which parameters and thematic groups exert the strongest influence on overall satisfaction scores.

The findings reveal that Staff Service Quality is the most critical determinant of overall satisfaction ($r = 0.73$, $p < 0.001$), followed by Airport Environment & Comfort ($r = 0.62$) and Security & Check-in Process ($r = 0.58$). At the individual parameter level, the courtesy and helpfulness of shopping/dining staff, airport staff in general, and health safety perceptions emerge as the top three predictors. Airports such as Goa (GOI) and Chennai (MAA) consistently achieved the highest overall satisfaction scores, while Srinagar (SXR) exhibited the most significant performance gap. These findings offer actionable, evidence-based insights for airport operators to prioritize service improvement initiatives that yield the greatest impact on passenger satisfaction.

Keywords: Airport Service Quality, ASQ, ACI, Passenger Satisfaction, AAI Airports, Pearson Correlation, Service Quality Dimensions

1. Introduction

Air travel in India has witnessed remarkable growth over the past decade, making the quality of airport services an increasingly critical concern for both passengers and airport operators. As competition among airports intensifies and passenger expectations rise, the ability to measure, benchmark, and improve service quality has become essential to sustaining high satisfaction levels and maintaining a competitive edge in the aviation industry.

The Airports Council International (ACI), headquartered in Montreal, Canada, administers the globally recognized Airport Service Quality (ASQ) survey program, in which India participates as a member nation. The AAI conducts this survey at major airports across India, collecting passenger feedback on 32 key performance indicators spanning dimensions such as check-in experience, security processing, airport facilities, staff behavior, retail offerings, and the overall airport environment.

The central challenge facing airport operators is the prioritization of improvement investments. With 31 service parameters to evaluate, identifying which parameters have the strongest causal relationship with passengers' overall satisfaction enables more effective resource allocation. From an operator's perspective, understanding which service dimensions are the most critical drivers of overall satisfaction allows for targeted interventions that can yield the highest return on improvement efforts.

This paper addresses this challenge by applying Pearson correlation analysis to ASQ data collected from 14 AAI airports across four quarters of 2024. The study proposes a thematic grouping of the 31 parameters into seven categories and examines both individual parameter-level and group-level correlations with the overall satisfaction score. The objective is to provide a clear, data-driven prioritization framework for airport managers.

1.1 Research Objectives

The specific objectives of this study are:

- To identify the individual ASQ parameters most strongly correlated with overall passenger satisfaction at AAI airports.
- To categorize the 31 service parameters into meaningful thematic groups and assess which groups collectively have the greatest influence on overall satisfaction.

- To analyze airport-wise and quarter-wise performance trends in overall satisfaction scores across 2024.
- To provide evidence-based recommendations for airport operators on service improvement prioritization.

2. Literature Review

The measurement of airport service quality has been a well-established area of research within aviation management. Early foundational work by Parasuraman, Zeithaml, and Berry (1988) on the SERVQUAL model provided the conceptual basis for measuring service quality across five dimensions: reliability, assurance, tangibles, empathy, and responsiveness. Subsequent researchers applied and adapted this framework to the airport context.

Fodness and Murray (2007) identified that airport service quality is best understood through a hierarchical model encompassing functional, mechanical, and humanic clues. Their work emphasized that human interaction (staff behavior) plays a disproportionately important role in shaping overall satisfaction, which aligns with the findings of the present study.

The ACI-ASQ program is one of the most comprehensive real-world benchmarking tools for airport service quality, covering over 300 airports globally. Several studies have analyzed ASQ data across different regional contexts. Bezerra and Gomes (2015) found that processing efficiency and terminal comfort were key drivers of satisfaction at Brazilian airports. Kim and Choi (2019) demonstrated that in Asian airport contexts, staff courtesy and the airport environment had stronger predictive validity for overall satisfaction compared to retail and F&B offerings.

In the Indian context, limited peer-reviewed research has been published using AAI's ASQ data, making this study a significant contribution to the literature. The present paper fills this gap by using actual 2024 quarterly data from 14 AAI airports to empirically determine which service dimensions drive overall satisfaction in the Indian domestic airport setting.

The importance of a data-driven, group-level analysis is underscored by Laming and Mason (2014), who argued that aggregate service constructs offer more stable predictive validity than individual item-level correlations due to the compensatory effects of averaging across related items. This

justifies the present study's dual approach of examining both individual parameters and thematic group-level effects.

3. Methodology

3.1 Survey Framework and Data Collection

The ASQ survey conducted by AAI follows the standardized methodology prescribed by the Airports Council International. The survey is conducted over a minimum of seven days per quarter to ensure coverage of all days of the week and different passenger flow patterns. A minimum of 350 passenger responses are collected per airport per quarter, with higher sample sizes (550) required for Chennai and Kolkata airports given their higher traffic volumes. Data collection is carried out by an independent consultant appointed by AAI, ensuring objectivity.

Passengers rate 32 service parameters (31 specific service dimensions plus overall satisfaction) on a 5-point Likert scale ranging from 1 (very poor) to 5 (excellent). The present analysis uses quarterly average scores (Q1–Q4 of 2024) from 14 AAI airports, yielding a dataset of 56 airport-quarter observations for each parameter.

3.2 Study Airports

The 14 airports included in this study are: Amritsar (ATQ), Bhubaneswar (BBI), Calicut/Kozhikode (CCJ), Kolkata (CCU), Coimbatore (CJB), Goa/Dabolim (GOI), Indore (IDR), Chennai (MAA), Patna (PAT), Pune (PNQ), Raipur (RPR), Srinagar (SXR), Tiruchirappalli (TRZ), and Varanasi (VNS). These airports represent a diverse cross-section of geographic regions, traffic volumes, and infrastructure categories within India's civil aviation network.

3.3 Thematic Grouping of Parameters

To facilitate a structured analysis, the 31 service parameters were categorized into seven thematic groups based on their operational and conceptual similarity. This grouping was developed by the research team drawing on ACI's categorization framework and the operational logic of airport service delivery. The seven groups are: (1) Staff Service Quality, (2) Airport Environment & Comfort, (3) Navigation & Accessibility, (4) Security & Check-in Process, (5) Facilities & Services, (6) Retail, Food & Beverage, and (7) Transportation Access.

3.4 Analytical Method

Pearson correlation coefficients were computed between each of the 31 individual service parameters and the overall satisfaction score across all 56 airport-quarter observations. Additionally, composite group scores were computed by averaging parameter scores within each thematic group, and Pearson correlations were then computed between each group composite score and overall satisfaction. Data points with a score of zero were treated as missing values (indicating parameters not assessed at specific airports). All analyses were conducted using Python (pandas, scipy.stats) at a significance level of $p < 0.05$.

4. Results

4.1 Overall Satisfaction — Airport-wise Performance (2024)

Table 1 presents the quarterly and annual mean overall satisfaction scores for all 14 study airports. The mean overall satisfaction score across all airports and quarters in 2024 was 4.80 on a 5-point scale, indicating generally high passenger satisfaction at AAI airports. However, significant variation was observed across airports.

Table 1: Overall Satisfaction Scores by Airport and Quarter (2024)

Airport	Q1-2024	Q2-2024	Q3-2024	Q4-2024	Annual Mean
Goa (GOI)	4.90	4.93	4.92	4.92	4.92
Chennai (MAA)	4.90	4.91	4.93	4.89	4.91
Tiruchirappalli (TRZ)	4.89	4.91	4.81	4.97	4.89
Varanasi (VNS)	4.88	4.90	4.87	4.90	4.89
Bhubaneswar (BBI)	4.85	4.88	4.90	4.90	4.88
Kolkata (CCU)	4.82	4.89	4.92	4.89	4.88
Pune (PNQ)	4.83	4.81	4.84	4.91	4.85

Raipur (RPR)	4.87	4.82	4.81	4.84	4.83
Calicut/Kozhikode (CCJ)	4.87	4.76	4.79	4.86	4.82
Indore (IDR)	4.74	4.66	4.91	4.96	4.82
Coimbatore (CJB)	4.81	4.78	4.72	4.71	4.75
Patna (PAT)	4.75	4.78	4.72	4.70	4.74
Amritsar (ATQ)	4.69	4.53	4.71	4.78	4.68
Srinagar (SXR)	4.56	4.44	4.09	4.20	4.33

Source: <https://www.aai.aero/en/business-opportunities/traffic-survey-result/> Survey Data, AAI 2024

Goa (GOI) and Chennai (MAA) achieved the highest annual mean overall satisfaction scores of 4.92 and 4.91 respectively, consistently maintaining near-perfect scores across all quarters. Indore (IDR) showed the most remarkable improvement trajectory, rising from 4.74 in Q1 to 4.96 in Q4. In contrast, Srinagar (SXR) recorded the lowest annual mean score of 4.322, with a pronounced dip in Q3 (4.09), indicating significant seasonal or operational challenges at this airport.

4.2 Individual Parameter Correlations with Overall Satisfaction

Table 2 presents the Pearson correlation coefficients between each of the 31 service parameters and overall satisfaction, sorted by strength of correlation. Parameters with $r > 0.60$ are considered strongly correlated, those between 0.40 and 0.60 moderately correlated, and those below 0.40 weakly correlated.

Table 2: Pearson Correlation of ASQ Parameters with Overall Satisfaction (n = 56 airport-quarter observations)

ASQ Parameter	Pearson r	p-value	Thematic Group
Courtesy & helpfulness of	0.7324	< 0.001	Staff Service Quality

shopping and dining staff			
Courtesy & helpfulness of airport staff	0.7300	< 0.001	Staff Service Quality
Health safety	0.7103	< 0.001	Airport Environment & Comfort
Ambience	0.7027	< 0.001	Airport Environment & Comfort
Wi-Fi service quality	0.6796	< 0.001	Facilities & Services
Ease of making connection with other flights	0.6672	< 0.001	Navigation & Accessibility
Comfort of waiting at the gate areas	0.6523	< 0.001	Airport Environment & Comfort
Courtesy & helpfulness of security screening staff	0.6489	< 0.001	Staff Service Quality
Courtesy & helpfulness of staff in the check-in area	0.6100	< 0.001	Staff Service Quality
Availability of seats at the gate areas	0.5912	< 0.001	Airport Environment & Comfort
Shops	0.5856	< 0.001	Retail, Food & Beverage
Entertainment and leisure options	0.5805	< 0.001	Facilities & Services

Ease of going through security screening	0.5633	< 0.001	Security & Check-in Process
Value for money of shops	0.5576	< 0.001	Retail, Food & Beverage
Courtesy & helpfulness of border/passport control staff	0.5574	< 0.001	Staff Service Quality
Walking distance inside the terminal	0.5441	< 0.001	Airport Environment & Comfort
Waiting time at border/passport control	0.5412	< 0.001	Security & Check-in Process
Restaurants/bars/café s	0.5132	< 0.001	Retail, Food & Beverage
Waiting time at security screening	0.4926	< 0.001	Security & Check-in Process
Waiting time at check-in (incl. baggage drop)	0.4925	< 0.001	Security & Check-in Process
Ease of finding your check-in area	0.4859	< 0.001	Navigation & Accessibility
Signage to access the terminal	0.4276	0.001	Navigation & Accessibility
Value for money of restaurant/bars/café s	0.4262	0.001	Retail, Food & Beverage
Ease of finding your way	0.4211	0.001	Navigation & Accessibility

Availability of flight information	0.4119	0.002	Facilities & Services
Value for money of transport mode	0.3785	0.004	Transportation Access
Cleanliness	0.3746	0.005	Airport Environment & Comfort
Ease of getting to the airport	0.3547	0.007	Navigation & Accessibility
Availability of charging stations	0.3434	0.010	Facilities & Services
Availability of washrooms/toilets	0.2531	0.060	Airport Environment & Comfort
Cleanliness of washrooms/toilets	0.1350	0.321	Airport Environment & Comfort

Note: Parameters with $p > 0.05$ are not statistically significant at the conventional level.

The analysis reveals a clear hierarchy of influence. The top five parameters — courtesy of shopping/dining staff ($r = 0.73$), courtesy of airport staff ($r = 0.73$), health safety ($r = 0.71$), ambience ($r = 0.70$), and Wi-Fi service quality ($r = 0.68$) — all demonstrate strong, highly significant correlations with overall satisfaction. Notably, all five of the staff courtesy-related parameters feature in the top nine, underscoring the dominant role of human service interactions in shaping passenger perceptions.

Cleanliness of washrooms/toilets ($r = 0.14$, $p = 0.32$) and availability of washrooms/toilets ($r = 0.25$, $p = 0.06$) were the only parameters that did not achieve statistical significance at the $p < 0.05$ level, suggesting these hygiene factors may function more as "threshold" requirements — once met at an acceptable level, they do not differentiate overall satisfaction.

4.3 Thematic Group Correlations with Overall Satisfaction

To provide a more actionable framework for airport operators, the 31 parameters were aggregated into seven thematic groups. Table 3 presents the group-level correlation results, ranked by strength of association.

Table 3: Thematic Group Composite Scores — Correlation with Overall Satisfaction

Thematic Group	Pearson r	p-value	Impact Level	Key Parameters
Staff Service Quality	0.7303	< 0.001	Highest	Courtesy and helpfulness across all staff touch-points
Airport Environment & Comfort	0.6239	< 0.001	High	Ambience, comfort, cleanliness, seating, health safety
Security & Check-in Process	0.5815	< 0.001	Moderate-High	Wait times, ease of processing at check-in and security
Facilities & Services	0.5731	< 0.001	Moderate-High	Wi-Fi, charging, F&I, entertainment
Retail, Food & Beverage	0.5486	< 0.001	Moderate	Restaurants, shops, and value for money

Navigation & Accessibility	0.4703	< 0.001	Moderate	Wayfinding, signage, ease of movement
Transportation Access	0.3785	0.004	Lower	Ease and value of access to the airport

Source: Computed from ASQ Survey Data, AAI 2024

Staff Service Quality emerges as the dominant thematic group with the highest correlation ($r = 0.73$), clearly indicating that how airport personnel interact with passengers is the single most powerful predictor of overall satisfaction. Airport Environment & Comfort is ranked second ($r = 0.62$), emphasizing the importance of the physical experience — ambience, cleanliness, comfort, and health safety perceptions. Security & Check-in Process ($r = 0.58$) and Facilities & Services ($r = 0.57$) occupy the third and fourth positions, both representing operationally critical areas. Retail, Food & Beverage ($r = 0.55$) and Navigation & Accessibility ($r = 0.47$) occupy middle positions, while Transportation Access ($r = 0.38$) has the weakest but still significant group-level association with overall satisfaction.

5. Discussion

5.1 The Primacy of Staff Service Quality

The unequivocal finding of this study is that staff behavior and interpersonal service quality are the most powerful drivers of overall passenger satisfaction at AAI airports. Four of the top five individual predictors are courtesy and helpfulness parameters, spanning airport staff, shopping/dining staff, security screening staff, and check-in staff. This finding is consistent with the broader services management literature, which consistently identifies the human dimension as the most impactful and memorable component of a service experience.

From an operational perspective, this implies that investment in staff training, service culture development, and performance management systems for frontline employees should be the highest priority for airport operators seeking to improve overall satisfaction scores. The finding is particularly significant because staff quality is a controllable variable — unlike certain physical infrastructure constraints that require capital

investment and longer timelines to change. Regular training on passenger interaction protocols, empathy-based service delivery, and complaint resolution can yield measurable improvements in satisfaction scores within a single survey cycle.

5.2 The Role of Airport Environment and Health Safety

Health safety ($r = 0.71$) and ambience ($r = 0.70$) are the strongest predictors outside the staff courtesy cluster. The high correlation of health safety with overall satisfaction likely reflects the post-pandemic context in which passenger perceptions of hygiene and cleanliness have become elevated benchmarks. Airports that visibly maintain sanitation standards, ensure well-maintained restrooms, provide hand sanitization facilities, and create a sense of cleanliness and order generate significantly higher satisfaction scores.

Interestingly, while ambience scores highly, the cleanliness of washrooms/toilets shows a very low and statistically non-significant correlation ($r = 0.14$). This apparent paradox may be explained by the fact that washroom cleanliness at AAI airports is generally adequate — it operates as a hygiene factor that does not differentiate satisfaction when met, but would negatively impact scores only if it were to fall below acceptable thresholds. The ambience score, by contrast, captures a broader aesthetic and emotional quality of the terminal environment.

5.3 Wi-Fi and Connectivity as an Emerging Driver

The emergence of Wi-Fi service quality as the fifth strongest individual predictor ($r = 0.68$) reflects the changing expectations of the modern air traveler. As passengers increasingly depend on digital connectivity for work, entertainment, and real-time flight updates during airport dwell time, the quality of Wi-Fi service has become a core determinant of airport experience quality. This is an area where many AAI airports currently score lower (mean Wi-Fi score = 3.90 — the lowest of all parameters), indicating a significant gap between the importance of this parameter and current performance levels, making it a high-priority improvement area.

5.4 Airport-Level Performance Insights

The wide range in overall satisfaction scores — from GOI's 4.918 to SXR's 4.322 — suggests that structural and operational factors vary significantly across the 14 airports. Srinagar's notably lower scores, particularly the seasonal dip in

Q3, may reflect challenges related to seasonal tourist influx, staffing levels, or infrastructure constraints. The dramatic improvement at Indore (from 4.74 in Q1 to 4.96 in Q4) suggests that targeted improvement initiatives during the year can produce meaningful results within a short timeframe.

Airports like GOI, MAA, and TRZ consistently maintain high scores, potentially serving as internal benchmarks within the AAI system. Identifying and disseminating the best practices of these high-performing airports to lower-performing ones could be a cost-effective strategy for system-wide improvement.

6. Recommendations for Airport Operators

Based on the empirical findings of this study, the following priority-ordered recommendations are offered to AAI airport operators:

- **Invest in Staff Service Excellence (Highest Priority):** Given that staff courtesy and helpfulness parameters collectively form the strongest predictor group ($r = 0.73$), AAI airports should institutionalize structured frontline staff training programs focusing on passenger interaction quality, empathy, and service recovery. This should cover all staff touchpoints — check-in, security, shopping, F&B, and general airport assistance.
- **Enhance the Physical Environment and Health Safety:** The strong correlation of ambience ($r = 0.70$), comfort ($r = 0.65$), and health safety ($r = 0.71$) parameters indicates that the physical airport environment is a critical satisfaction driver. Investments in terminal aesthetics, seating adequacy, temperature regulation, and visible hygiene measures will yield high returns in passenger satisfaction.
- **Upgrade Wi-Fi Infrastructure Urgently:** Wi-Fi service quality scores the lowest mean of all parameters (3.90) while having the fifth highest correlation with overall satisfaction. This gap between importance and performance makes it a critical improvement target. AAI should prioritize upgrading Wi-Fi infrastructure across all airports, particularly at underperforming locations.
- **Streamline Security and Check-in Processes:** The Security & Check-in Process group ($r = 0.58$) reflects waiting times and process efficiency. Deployment of

automated check-in kiosks, efficient baggage drop systems, and adequate security lanes during peak periods can significantly reduce wait times and positively impact satisfaction scores.

- **Address SXR Performance Gap with Targeted Intervention:** Srinagar airport's consistently lower satisfaction scores warrant a dedicated diagnostic review. A root cause analysis examining staffing patterns, infrastructure capacity, seasonal demand management, and service delivery protocols at SXR should be commissioned.
- **Leverage High-Performing Airports as Internal Benchmarks:** GOI, MAA, and TRZ consistently achieve near-ceiling satisfaction scores. AAI should formally study and document the operational and service culture practices at these airports, and facilitate knowledge transfer to lower-performing airports through structured peer-learning programs.

7. Conclusion

This study provides an empirical, data-driven analysis of the key determinants of overall passenger satisfaction at 14 major AAI airports using 2024 ASQ survey data. The core finding is clear and consistent: Staff Service Quality is the single most powerful driver of overall airport satisfaction, with the courtesy and helpfulness of staff across all service touchpoints accounting for the highest correlations with the overall satisfaction parameter.

The thematic group analysis reinforces this finding at the aggregate level, with Staff Service Quality achieving the highest group correlation coefficient ($r = 0.73$), followed by Airport Environment & Comfort ($r = 0.62$) and Security & Check-in Process ($r = 0.58$). These three groups together explain the majority of variation in overall satisfaction scores across airports and quarters.

For airport operators, these findings translate into a clear prioritization framework: invest first and most heavily in human capital and service culture; ensure the physical environment meets high standards of comfort, cleanliness, and safety; and streamline process efficiency at passenger processing touchpoints. Simultaneously, addressing the critical gap in Wi-Fi quality — a parameter that combines high importance with current low performance — should be treated as an urgent priority.



Future research could extend this work by incorporating passenger segmentation analysis (business vs. leisure, domestic vs. international travelers), examining year-on-year trends, and applying multivariate regression or structural equation modeling to better understand the causal pathways through which service parameters influence overall satisfaction.

intersection of civil aviation, transport economics, and corporate airport management. A prolific researcher and master trainer, his work on airport economic efficiencies is widely published in top-tier national and international peer-reviewed journals.

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