



Financial Efficiency Evaluation of Airports Authority of India Operations

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Abstract— The Airports Authority of India (AAI) occupies a strategic position in India's civil aviation infrastructure, owning and managing the majority of the country's airports while simultaneously providing air traffic services across Indian airspace. As India's aviation sector expands rapidly and the government pursues selective privatization of major airports, questions about the financial and operational efficiency of AAI-managed airports have gained renewed policy relevance. This paper examines the financial efficiency of AAI operations by reviewing existing empirical literature—largely based on Data Envelopment Analysis (DEA) and financial ratio techniques—and by synthesizing publicly disclosed financial indicators of the organisation. The study finds that AAI's profitability has historically been driven by a small number of high-traffic airports, that non-aeronautical revenue generation lags global and even

domestic private-sector benchmarks, and that regional and non-major airports continue to operate at a loss. The paper concludes with policy-oriented recommendations for improving financial efficiency, including diversification of revenue streams, tariff rationalisation, and continued public-private partnership in select airports.

Keywords— Airports Authority of India, financial efficiency, Data Envelopment Analysis, airport management, aviation economics, non-aeronautical revenue

INTRODUCTION

Airports function as critical nodes of national economic infrastructure, facilitating trade, tourism, and regional connectivity while acting as catalysts for local economic



development. In India, the Airports Authority of India, a statutory body under the Ministry of Civil Aviation, has historically been the dominant player in the ownership and management of civil airports. AAI presently owns and manages over a hundred airports across the country, in addition to providing air traffic management services over the entire Indian airspace and adjoining oceanic areas an organisation that in the early 2000s already owned and managed 94 airports and 28 civil enclaves at defence airfields while providing air traffic services over the entire Indian airspace and adjoining oceanic areas.

Since the early 2000s, India's civil aviation sector has undergone significant structural transformation. The privatisation of metropolitan airports at Delhi and Mumbai, followed more recently by the award of several airports to private consortia under public-private partnership (PPP) arrangements, has altered the competitive and financial landscape within which AAI operates. AAI now functions as a residual owner-operator of a very large number of small and medium airports, many of which are not commercially self-sustaining, while continuing to earn substantial and growing revenue from air navigation services and from revenue-sharing/concession arrangements with privatised airports.

physical inputs (capital expenditure, operating costs, infrastructure assets). Evaluating AAI's financial efficiency is important for at least three reasons. First, AAI is a public sector undertaking whose financial performance has direct fiscal implications, since profits are partly distributed as dividends to the Government of India. Second, financial efficiency benchmarking can identify structural weaknesses—such as over-dependence on a few airports for profitability—that inform infrastructure investment and tariff policy. Third, as the government continues to evaluate further privatisation of AAI airports, a rigorous understanding of comparative financial efficiency across airports is essential to make informed policy decisions regarding which airports should remain under public ownership.

This paper reviews the existing body of academic and policy-oriented literature on the financial and operational efficiency of AAI and Indian airports more broadly, synthesises verifiable secondary data on AAI's financial performance, and develops a structured discussion of the determinants and constraints of financial efficiency in the Indian airport sector.

LITERATURE REVIEW

The efficiency measurement literature on airports has predominantly relied on two broad methodological traditions: (a) non-parametric frontier techniques, principally Data Envelopment Analysis (DEA), and (b) financial ratio analysis based on published accounting data. Both traditions have been applied, in varying degrees, to Indian airports and to AAI specifically.

Foundational DEA methodology. The DEA approach traces its methodological origin to Charnes, Cooper and Rhodes, who developed the original constant-returns-to-scale (CCR) formulation for measuring the relative efficiency of decision-making units with multiple inputs and outputs. This was subsequently extended by Banker, Charnes and Cooper, who introduced the variable-returns-to-scale (BCC) model, allowing efficiency measurement under conditions where scale economies are not constant—a feature particularly relevant to airports of vastly different sizes, such as those operated by AAI.



Fig. 1. AAI Revenue Structure Flowchart

Financial efficiency, in this context, refers to the ability of an organisation to generate maximum output (revenue, profitability, service quality) from a given set of financial and



Airport-specific efficiency studies in India. Kashiramka, Banerjee, Kumar and Jain examined the efficiency of 46 Indian airports between 2012 and 2014 using the BCC model and the Malmquist productivity index, finding that international airports and airports located in southern India tended to perform more efficiently, and that airports managed through joint ventures were relatively more efficient than those under direct public management. This finding is significant for the present study because it suggests that ownership structure and managerial autonomy—not merely traffic volume—are associated with efficiency outcomes among Indian airports.

More recently, Thomas and Jha applied a two-stage DEA framework to assess the structural efficiency of 42 Indian regional airports operated by AAI over the period 2014 to 2019. Their study is particularly relevant to an evaluation of AAI because it isolates regional (non-major) airports, which constitute the bulk of AAI's portfolio and are frequently loss-making. The authors found that distance to the nearest airport, distance from the city centre, per capita income of the catchment region, accessibility, and airport profitability were significant determinants of structural efficiency scores, and they also computed productivity growth using the Malmquist Productivity Index to provide airport authorities with rankings and diagnostic insight into sources of inefficiency.

At the level of major airports, Chand, Mohapatra and Jena used DEA to evaluate the technical efficiency of 20 major Indian airports, motivated by the government's initiative to privatise airport operations and the consequent need for airports to be technically and operationally efficient in order to remain profitable. Their input-output specification is instructive for financial efficiency research: the study used average airport spending, airport size, number of parking bays and number of runways as input variables, and average passenger traffic, average revenue, average aircraft movements and freight volume as output variables.

Earlier work by Charles Oberoi (cited widely in subsequent Indian airport efficiency literature) examined the efficiency of Delhi International Airport prior to privatisation. This study compared Delhi Airport's technical efficiency index with that of other domestic airports using data envelopment analysis based on aircraft movements as an output and passenger and

cargo movements as inputs, over the period March 2000 through July 2004, in the specific context of assessing whether privatisation and deregulation could be expected to improve airport performance.

Review and synthesis studies. Iyer and Jain conducted a systematic review of the DEA-based airport performance measurement literature, examining 61 articles published between 2009 and 2017 through ontology-based text analysis. Their review is valuable for situating India-specific studies within the global literature; among their conclusions was the observation of a dearth of studies focused on small, regional airports and airports located in developing countries, as well as the absence of a systematic approach for selecting inputs, outputs, or explanatory factors in DEA-based airport studies. This gap is directly relevant to AAI, whose portfolio is dominated by small, financially marginal regional airports that have received comparatively less rigorous efficiency analysis than major metropolitan airports.

Financial ratio-based approaches. In addition to DEA-based technical efficiency studies, financial-statement-based analyses have also been used to evaluate AAI's operations. One such study conducted a financial ratio analysis using secondary data on AAI's financial information drawn from FY 2014-15 through FY 2019-20, focusing specifically on the financial position of Delhi International Airport prior to and following its transfer to private management. This line of research complements DEA-based technical efficiency studies by directly examining liquidity, profitability, and solvency ratios rather than input-output frontier distances.

International parallels. Comparable public airport-authority efficiency studies from other countries provide useful methodological benchmarks. Studies of Brazil's centrally administered public airport infrastructure company, Spain's centrally managed AENA airport network, and Germany's major airports have each applied DEA to publicly owned, centrally administered multi-airport systems, offering a structural analogy to AAI's position as a single public entity managing a large and heterogeneous network of airports.





Fig. 2. Profitable vs Loss-making Airports

RESEARCH GAP

While the literature on DEA-based technical efficiency of Indian airports has grown substantially over the past decade, several gaps remain. First, most studies (Kashiramka et al.; Chand et al.) focus predominantly on major or metropolitan airports, with comparatively fewer studies, such as that of Thomas and Jha, isolating the financial performance of AAI's much larger population of small and loss-making regional airports. Second, there is limited integration between technical efficiency (DEA) studies and financial ratio-based studies; the two methodological traditions have developed largely in parallel rather than being combined into a composite financial-efficiency framework specific to AAI as a corporate entity. Third, publicly available literature rarely triangulates AAI's aggregate financial disclosures (annual reports, government replies in Parliament, press disclosures) with airport-level efficiency scores, making it difficult to connect micro-level (airport-wise) efficiency findings to AAI's macro-level (organisation-wide) financial performance. This paper attempts to partially address this gap by combining a review of frontier-efficiency literature with a synthesis of AAI's publicly disclosed financial performance indicators.

OBJECTIVES OF THE STUDY

The specific objectives of this study are:

- To review and synthesise existing empirical literature on the technical and financial efficiency of AAI and Indian airports.
- To examine publicly available financial performance indicators of AAI over the past decade in order to identify broad trends in revenue, profitability, and cost structure.
- To identify the principal determinants and constraints affecting the financial efficiency of AAI's airport operations, particularly the divergence between major and regional airports.
- To offer policy-relevant recommendations for improving the financial efficiency of AAI operations.

RESEARCH METHODOLOGY

This study adopts a descriptive-analytical research design based entirely on secondary data. Data sources include peer-reviewed journal articles on airport efficiency (particularly DEA-based studies of Indian and AAI-managed airports), AAI's published annual reports, disclosures made by the Ministry of Civil Aviation in Parliament, and financial reporting in reputable business media regarding AAI's revenue, profit, and dividend performance. Given the constraints of chat-based secondary research, the study does not independently run a DEA model on airport-level micro-data; rather, it synthesises the input-output specifications, methodologies, and findings of published DEA studies to build a qualitative and semi-quantitative picture of financial efficiency across the AAI network. Financial indicators reported in the following sections are drawn directly from verifiable public disclosures and are presented with their original source and reporting basis, since different disclosures (annual reports versus press statements versus Parliamentary replies) sometimes use different definitions of "revenue" (e.g., total income versus operational income versus a specific revenue head), a limitation discussed further below.

FINANCIAL PERFORMANCE OVERVIEW OF AAI

AAI's revenue model is built on two broad streams: aeronautical revenue (landing charges, parking charges, user development fees, air navigation service charges) and non-aeronautical revenue (retail concessions, cargo handling, real estate, advertising, and, importantly, revenue-share/concession fees

collected from privatised airports such as Delhi and Mumbai). Table 1 summarises selected financial indicators drawn from verifiable public sources.

Table 1: Selected Financial Indicators of AAI (Verified Public Disclosures)

Financial Year	Reported Revenue / Income (₹ crore)	Reported Profit (₹ crore)	Basis / Source
2011-12	5,879	1,364 (Pre-tax)	AAI disclosure reported in Business Standard (2013)
2012-13	6,917	1,337 (Pre-tax)	AAI disclosure reported in Business Standard (2013)
2015-16	Not separately disclosed	2,537 (Net profit)	AAI disclosure reported in Business Standard (2017)
2016-17	12,542 (Total income); 8,024 (Operational income)	3,115.93 (Net profit)	AAI disclosure reported in Business Standard (2017)
2023-24	Not separately disclosed	3,257.28 (Net profit, provisional, ~10% YoY growth)	Government officials cited in Business Standard (2024)

Note: Figures are drawn from distinct disclosure episodes and may not be strictly comparable across years owing to differing definitions of "revenue"/"income" used in different disclosures.

Readers seeking a standardised time series should consult AAI's audited annual reports directly.

A striking feature evident from Table 1 is that AAI's net profit in FY2023-24 (₹3,257.28 crore, provisional) represented, at the time of reporting, the highest net profit recorded in eight years, surpassing the previous peak of ₹3,115.93 crore achieved in FY2016-17. This recovery was attributed by officials to consistently high passenger footfalls and a substantial year-on-year increase in concession fees receivable from the eight privatised airports operating under AAI-linked revenue-sharing arrangements, with domestic passenger traffic rising by 15.3 per cent year-on-year to 254.44 million and international traffic rising by 23.5 per cent to 57.56 million during the April-January period of FY2023-24. This finding is significant for a financial efficiency evaluation because it indicates that a meaningful share of AAI's profitability now derives not from its own airport operations but from concession/revenue-share income generated by privately-operated airports—a structural feature that must be accounted for when attributing "efficiency" to AAI's own operational management.

A second important structural feature relates to the composition and adequacy of non-aeronautical revenue, which is a widely used proxy for commercial and financial efficiency in international airport-benchmarking literature, since non-aeronautical revenue is unregulated and reflects the airport operator's own commercial capability.

Table 2: Non-Aeronautical Revenue Benchmarking (ICRA Estimates, cited in ThePrint, 2024)

Category	Non-Aeronautical Revenue per Passenger (US\$)
AAI-operated airports	1.3
Major Indian PPP airports (Delhi, Mumbai, Bengaluru, Hyderabad, Cochin), 2023-24 average	4.3
Major global airports (average range)	7.2 – 15.9

Data from the rating agency ICRA show that India's major public-private partnership airports earned an average of \$4.3

per customer in 2023-24 from non-aeronautical sources such as duty-free sales, in-store retail, and other passenger services, whereas for airports operated by AAI, this figure is considerably lower at \$1.3 per passenger, compared with a much higher \$7.2 to \$15.9 per passenger typically earned by major global airports. This gap represents one of the clearest quantifiable indicators of a financial efficiency shortfall in AAI's commercial operations relative to both domestic private operators and international peers, and it points to underdeveloped retail, real-estate, and ancillary commercial capabilities across the AAI network. Separately, group-level non-aeronautical revenue grew from ₹2,488.19 crore in FY2022 to ₹3,830.97 crore in FY2023, with non-aeronautical services accounting for 57.24 per cent of total group revenue in FY2023, indicating a positive trajectory in the broader Indian airport sector even as AAI-specific per-passenger performance continues to lag.

A third structural constraint is the profitability skew across AAI's very large network of airports. According to the Committee of Estimates of the Civil Aviation Ministry, as revealed in the Lok Sabha, only 10 out of 109 operational airports out of the 136 owned and managed by AAI generated revenue in fiscal year 2021-22. This finding is central to any evaluation of AAI's financial efficiency: it indicates that AAI's organisation-wide profitability is generated almost entirely by a small subset of high-traffic airports, while the overwhelming majority of the network operates at a loss and is cross-subsidised.

Data Analysis and Discussion

Table 3: Illustrative DEA Input-Output Specification Used in Indian Airport Efficiency Studies

Study	Inputs Used	Outputs Used	Scope
Chand, Mohapatra & Jena (2024)	Average airport spending, airport size, number of parking bays, number of runways	Average passengers, average revenue, average aircraft movements, freight	20 major Indian airports
Thomas & Jha (2022)	Operating costs, capital assets (Stage 1); distance and demographic variables (Stage 2)	Passenger traffic, aircraft movements, revenue, profitability	42 AAI regional airports, 2014-2019
Kashiramka, Banerjee, Kumar & Jain (2016)	Operating costs, capacity variables	Passenger traffic, aircraft movements	46 Indian airports, 2012-2014

Table 4: Synthesis of Literature Findings Relevant to AAI Financial Efficiency

Author(s) & Year	Method	Key Finding Relevant to AAI
Kashiramka et al. (2016)	BCC DEA + Malmquist Index	Southern and international airports more efficient; joint-venture-managed airports outperform wholly public-managed airports
Thomas & Jha (2022)	Two-stage DEA + Malmquist Index	Regional airport efficiency significantly determined by distance,

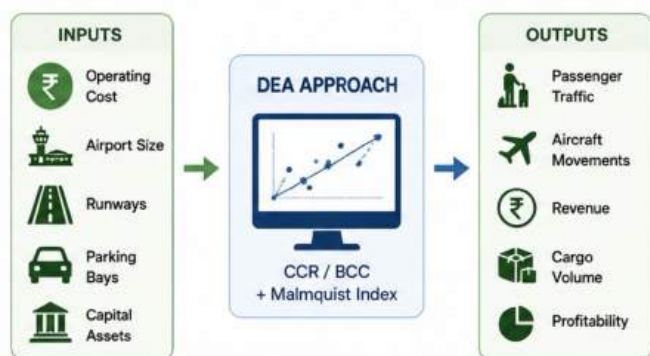


Fig. 3. DEA Input-Output Framework

		accessibility, catchment income and profitability
Chand, Mohapatra & Jena (2024)	DEA (technical efficiency)	Technical efficiency of major airports is critical for profitability under privatisation-oriented policy
Iyer & Jain (2019)	Systematic literature review	Regional/developing-country airports understudied; input-output selection lacks methodological consensus
ICRA (2024, cited in ThePrint)	Benchmarking analysis	AAI's non-aeronautical revenue per passenger substantially below domestic PPP and global peers

AAI's profitability is heavily concentrated: only a small fraction of its very large airport network is revenue-generating, with the vast majority of regional airports operating at a loss.

A significant and growing share of AAI's reported profit growth in recent years is attributable to concession/revenue-sharing income from privatised metropolitan airports rather than efficiency gains in AAI's own directly operated airports.

AAI lags substantially behind both domestic private airport operators and international peers in non-aeronautical revenue generation per passenger, indicating comparatively underdeveloped commercial and retail efficiency.

DEA-based technical efficiency studies consistently find that ownership structure (public versus joint-venture/private) and locational/demographic determinants (catchment income, accessibility, distance from city centres) are significant predictors of airport-level efficiency, which is consistent with the pattern of profitability concentration observed in AAI's own disclosures.



Fig. 4. Determinants of Financial Efficiency

Existing literature exhibits a methodological gap in combining DEA-based technical efficiency analysis with financial ratio-based analysis specific to AAI as a consolidated corporate entity, limiting the ability to draw an integrated picture of organisation-wide financial efficiency.

KEY FINDINGS

LIMITATIONS OF THE STUDY

This study is based entirely on secondary literature and publicly disclosed financial data rather than on primary DEA modelling using airport-level micro-data, and therefore does not generate new efficiency scores. Financial figures cited from different disclosure sources use varying definitions of revenue and income, limiting direct year-on-year comparability, as noted in Table 1. Additionally, several relevant studies (e.g., Kashiramka et al., 2016) are based on data that predate more recent structural changes in the sector, including the expansion of airport privatisation after 2019 and the post-pandemic recovery in passenger traffic, which may affect the continued applicability of some findings.

CONCLUSION AND POLICY RECOMMENDATIONS

The financial efficiency of AAI's operations presents a mixed picture. On one hand, AAI's aggregate profitability has reached record levels in recent years, buoyed by strong passenger traffic recovery and growing concession income from privatised airports. On the other hand, a disaggregated view—supported by both the empirical DEA literature and AAI's own disclosed data—reveals persistent structural inefficiencies: a heavy concentration of profitability in a handful of major airports, chronic loss-making at the majority of regional airports, and a substantial and unresolved gap in non-aeronautical, commercially-driven revenue generation relative to both domestic private operators and global peers.

Based on this review, the study recommends: (a) targeted commercial capacity-building at AAI-operated airports, particularly in retail, real estate monetisation, and duty-free concessions, to close the non-aeronautical revenue gap identified through ICRA benchmarking; (b) continued and possibly expanded use of joint-venture or management-contract arrangements at underperforming regional airports, consistent with the efficiency advantage of joint-venture management found in the literature; (c) more granular, airport-wise

disclosure of financial performance to enable systematic DEA-based monitoring of efficiency trends over time; and (d) further academic research combining financial ratio analysis with DEA-based technical efficiency scoring at the level of individual AAI airports, to better link organisation-wide financial outcomes to airport-specific operational performance.

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