



# Staffing as Strategy, Not Headcount: A Configuration-Based KPI Governance Framework for Interpreting Employees- per-Aircraft Ratios across Airline Business Models

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## Abstract

Airline labour productivity is often compressed into headline ratios, especially employees per aircraft. This article argues that such ratios are not universal efficiency measures but strategic configuration signals shaped by airline business model, fleet architecture, network complexity, service proposition, outsourcing boundary, labour regime, digital maturity and operational-control philosophy. Using a design-science-informed comparative documentary approach, the paper synthesizes airline business-model literature, productivity research, employment-relations theory, resource-based logic and nonfinancial KPI governance. Six illustrative airline archetypes are examined: Emirates, KLM, American Airlines, Delta Air Lines, AirAsia/Capital A and Ryanair. Public reports and operating disclosures are used to demonstrate numerator-denominator sensitivity and to show why a high or low ratio cannot be interpreted safely without context. The article develops the Airline Staffing-Strategy Fit Framework, which embeds employees per aircraft within a balanced KPI architecture covering cost productivity, revenue quality, service, safety, operational resilience, digital leverage and profitability. The contribution is conceptual, methodological and managerial: it reframes a familiar aviation ratio as a configuration-sensitive indicator, provides a benchmarking protocol for preventing false comparisons, and supports executive decisions on headcount, automation, outsourcing, insourcing, training and digital maturity. The paper does not claim causal validation; it offers a decision-grade governance architecture that can be expanded into a larger empirical study.

**Key words:** airline workforce productivity; employees per aircraft; airline business models; KPI governance; labour productivity; staffing strategy.

## 1. Introduction

Airlines operate in a sector where capital intensity, labour intensity, safety regulation, network complexity and thin profitability interact continuously. Aircraft, crews, maintenance systems, airport operations, disruption recovery, customer experience, network planning, revenue management, fuel economics and regulatory compliance must be synchronized every



day. In that environment, workforce design is not a peripheral human-resources statistic. It is one of the visible expressions of how an airline chooses to compete, what it keeps under direct control, what it outsources, what level of service it promises and what operational risk it is prepared to absorb.

Employees per aircraft appears attractive because it is simple. Divide employees by aircraft and a comparable number seems to appear. Yet the apparent simplicity is misleading. A premium long-haul hub carrier may operate widebody fleets, cargo businesses, lounges, training academies, in-house service recovery, maintenance capability and complex transfer operations. An ultra-low-cost carrier may operate standardized narrowbody aircraft, point-to-point routes, high-density cabins, digital self-service, outsourced activities and a tight ancillary revenue model. Treating the two ratios as a direct efficiency league table creates false equivalence.

The scholarly problem is therefore a false-equivalence problem. Business-model research shows that airlines cannot be reduced to binary full-service versus low-cost categories; they exist on a spectrum of product, network, cost and organizational configurations [1-4]. Productivity research further shows that labour intensity must be interpreted relative to output, scale, fleet, geography and cost structure [6-9]. The managerial problem is that headline ratios can become restructuring slogans before the numerator, denominator and strategic boundary conditions have been audited. In a safety-critical industry, that is not merely a measurement error; it can become a governance error.

This paper addresses one primary research question: how should employees-per-aircraft ratios be interpreted as strategic configuration indicators across different airline business models? Four secondary questions follow. First, which business-model variables explain ratio variation? Second, how do numerator and denominator definitions distort benchmarking? Third, under what conditions does a high ratio indicate premium capability rather than inefficiency? Fourth, under what conditions does a low ratio indicate lean excellence rather than operational fragility?

The article has five objectives: to synthesize the most relevant airline business-model and productivity literature; to define a safe claim boundary for employees-per-aircraft interpretation; to demonstrate case-based ratio sensitivity across airline archetypes; to develop a KPI-governed staffing-performance framework; and to translate the framework into executive decisions on headcount, automation, outsourcing, insourcing, training and digital maturity. This paper contributes by (1) reframing employees per aircraft from a universal labour-efficiency ratio into a strategic configuration signal, (2) providing numerator-denominator discipline for airline workforce benchmarking, and (3) developing a KPI-governed decision framework linking staffing intensity to cost, revenue, service, safety, resilience and digital leverage.

## **2. Literature Review and Theoretical Positioning**

### **2.1 Airline business models as strategic configurations**

The first literature stream treats airline business models as configurations rather than labels. Mason and Morrison develop a product and organizational architecture approach for comparing airlines and show that meaningful distinctions require more than naming a carrier as low-cost or full-service [1]. Lohmann and Koo extend this logic by arguing that airline models exist on a spectrum, including hybrid and regional forms that combine features from different ideal types [2]. This matters because an employees-per-aircraft ratio is produced by an operating architecture, not by an HR department alone.



Jean and Lohmann revisit the spectrum in the U.S. context after the global financial crisis and airline mergers, showing that consolidation and strategic repositioning change model boundaries over time [3]. Moir and Lohmann then provide a quantitative approach for comparing competitive advantage among heterogeneous airlines, reinforcing the need to compare like with like rather than impose one universal performance template [4]. Gillen and Lall add the low-cost carrier logic: LCC advantage is not simply operational efficiency; it is a strategic system built around simplicity, point-to-point operations, process discipline and airport economics [5].

This stream supports the central proposition of the article. Employees per aircraft is not a stand-alone labour metric. It is a signal located inside a configuration. A widebody hub carrier, a U.S. network carrier, a hybrid low-cost group and an ultra-low-cost carrier may all be rationally staffed at very different levels because their aircraft are embedded in different service, network and control systems. The question is therefore not whether an airline has many or few employees per aircraft, but whether the staffing architecture fits the model it operates.

This stream also helps explain why the six selected cases are not a convenience list but an archetype set. Emirates represents premium long-haul hub complexity; KLM represents European network-carrier constraints; American and Delta represent U.S. mega-network and regional-feed boundary issues; AirAsia/Capital A represents a digitalized low-cost group with entity-boundary complexity; and Ryanair represents a highly standardized ULCC model. The point is not to rank these airlines; it is to show that the same staffing ratio changes meaning across configurations.

## **2.2 Labour productivity, denominator discipline and benchmarking risk**

The second stream concerns productivity and measurement. Barbot, Costa and Sochirca compare airline productivity and efficiency in a changing market context and show that labour is a decisive input in airline performance analysis, but only when interpreted with output and efficiency logic [6]. Wang, Fan, Fu and Zhou benchmark Chinese airlines against global carriers and demonstrate that productivity, yield and cost competitiveness must be considered together rather than through a single ratio [7]. Their work reinforces the need to connect workforce intensity with output, revenue quality and cost competitiveness.

Belobaba provides the industry-economics foundation: aircraft productivity, employee productivity, unit cost and output measures such as available seat kilometres, departures, block hours and passenger volumes are interdependent [8]. Cankaya and colleagues extend the point to contemporary workforce analytics by showing that pilot-aircraft planning is dynamic and can be optimized through advanced models under fleet, promotion and recruitment constraints [9]. The implication is clear: employee-to-aircraft ratios should be treated as starting signals for analysis, not as final conclusions.

This literature produces a strict denominator rule. Aircraft are not homogeneous units. An A380, B777, A320, B737 MAX and regional jet differ in seat capacity, range, crew requirement, maintenance burden, turnaround complexity and revenue potential. Therefore employees per aircraft should be complemented by employees per ASK, employee cost per ASK, revenue per employee, departures per employee, aircraft utilization, block-hour productivity and outsourcing-adjusted labour intensity. Without these companion metrics, an airline with larger aircraft or more complex operations may be penalized simply because the denominator is too crude.

The numerator rule is equally strict. An employee count may include mainline staff, group subsidiaries, cargo, MRO, catering, loyalty, contact centres, digital businesses and training



academies; it may exclude contractors, outsourced handlers, regional-carrier employees and wet-lease capacity. The ratio can therefore move because of accounting boundaries rather than productivity. A journal-quality interpretation must state whether the analysis uses group employees, airline-entity employees, full-time equivalents, aviation professionals, contractors, or a blended labour measure.

### **2.3 Human capital, employment relations and service capability**

A cost-only interpretation of staffing is incomplete. Low and Lee examine internal resources and airline competitiveness through the resource-based view, showing that human, physical and intangible resources are part of competitive performance [10]. This lens is essential because airline employees do not merely execute tasks; they carry safety culture, service recovery capability, operational memory, disruption response, maintenance reliability and brand promise. These capabilities are not always visible in short-term cost ratios, but they become visible during irregular operations, safety events, service failures and recovery moments.

Gittell and Bamber distinguish high-road and low-road cost strategies in airlines, showing that cost competition can be pursued through capability-building employment relations or through narrow labour-cost pressure [11]. Heracleous and Wirtz show that Singapore Airlines has historically combined premium service differentiation with cost discipline, supporting the argument that high service quality does not automatically require uncontrolled cost growth [12]. Pfeffer's human-capital logic further strengthens the point that people-centered management can be a source of performance rather than only a cost item [13].

The managerial implication is important. High employees per aircraft is not automatically waste, and low employees per aircraft is not automatically excellence. A high ratio can reflect premium service, hub complexity, in-house maintenance, training capability, safety discipline and resilience capacity. It can also reflect duplication, weak digital maturity or legacy inefficiency. A low ratio can reflect standardization, digitalisation, supplier leverage and disciplined operating design. It can also reflect excessive outsourcing, thin recovery capability, fatigue risk or underinvestment in skills. The interpretation must therefore be governed.

This human-capital logic also prevents a common restructuring error: assuming that labour reduction is equivalent to productivity improvement. In airlines, some workforce capacity is a risk-control asset. Crew planning, maintenance oversight, irregular-operations recovery, training, safety assurance and premium service recovery can protect revenue and trust even when they increase labour intensity. Conversely, unmanaged workforce growth can still damage CASK, decision speed and accountability. The correct test is not low versus high staffing, but whether staffing intensity is productive, resilient and strategically coherent.

### **2.4 KPI governance and nonfinancial performance logic**

The fourth stream concerns performance governance. Behn and Riley demonstrate that nonfinancial information can help predict financial performance in the U.S. airline industry [14]. This is particularly relevant because airline staffing decisions affect outcomes that financial accounting captures only after delay: punctuality, completion factor, baggage reliability, customer satisfaction, complaint intensity, safety events, disruption recovery and service consistency. A staffing ratio should therefore be connected to leading indicators before it is used for executive decisions.

A limited group of prior airline KPI-framework studies by MoghadasNian and co-authors is used selectively to support the governance architecture. These studies are cited in the same way as other prior work and are not treated as validation of the present framework. The



human-capital study provides KPI categories for talent acquisition, engagement, learning and retention [21]. The data-governance study links data accuracy, completeness, timeliness and stewardship to decision quality in airlines [22]. The data-analytics study connects data freshness, analytical culture and forecast accuracy to operational and commercial performance [23]. The human-centric AI study adds a safeguard against skill atrophy in safety-critical digital workflows [24]. The OCC KPI study links operational control, OTP, disruption recovery, safety and customer satisfaction within control-tower governance [25]. These studies support the architecture of KPI governance, while the external peer-reviewed literature remains the analytical foundation.

The research gap is therefore conceptual, methodological and governance-related. Conceptually, employees per aircraft is under-theorized as a configuration signal. Methodologically, aviation benchmarking lacks a standard protocol for defining the employee numerator and aircraft denominator. From a governance perspective, workforce indicators are often separated from service, safety, resilience, digital maturity and profitability KPIs. This article addresses these gaps through a framework that is decision-grade rather than ranking-oriented.

Taken together, the four streams create the theoretical position of the paper. Business-model theory explains why airlines differ; productivity literature explains why the denominator is unstable; human-capital and employment-relations theory explains why labour is both cost and capability; and KPI governance explains why a single ratio must be interpreted through financial and nonfinancial consequences. This integration is the basis of the Airline Staffing-Strategy Fit Framework.

### **3. Conceptual Model and Propositions**

The conceptual model treats staffing intensity as an intermediate signal between strategic configuration and performance governance. The ratio is produced by choices about network, fleet, service, labour boundaries, digital maturity and control philosophy. It becomes meaningful only when it is interpreted through balanced KPI consequences. This logic generates six propositions for future empirical testing.

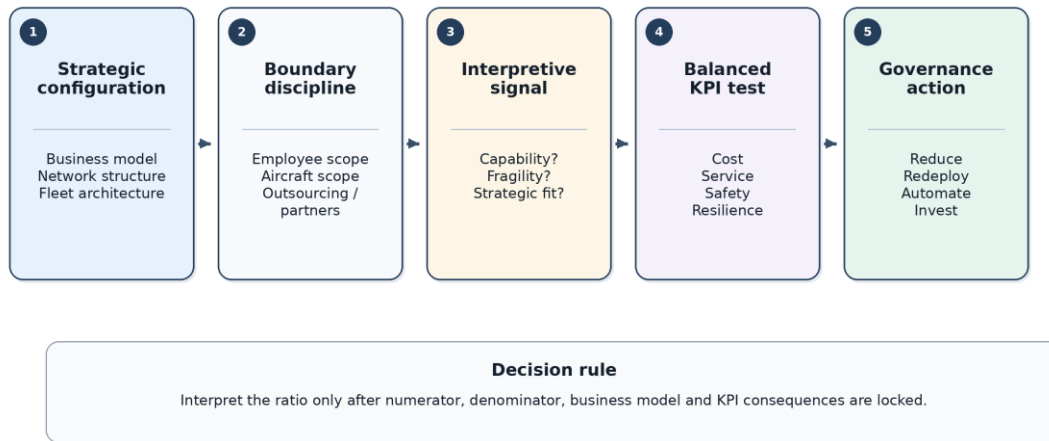
Proposition 1: the relationship between employees per aircraft and airline performance is moderated by business-model configuration. Proposition 2: numerator and denominator boundary variation produces material measurement error in cross-airline comparisons. Proposition 3: high staffing intensity is more likely to be value-creating when it is associated with premium service, complex network coordination, insourced control and resilience capability. Proposition 4: low staffing intensity is more likely to be value-creating when it is associated with fleet commonality, process standardisation, digital self-service, high utilisation and disciplined ancillary revenue logic. Proposition 5: both high and low staffing intensity can become strategically harmful when they are disconnected from safety, service, resilience and employee-capability indicators. Proposition 6: KPI governance improves interpretive validity by converting a single ratio into a multi-dimensional fit judgement.

These propositions avoid causal overreach. They do not claim that staffing intensity alone produces performance. Instead, they specify the conditions under which the same ratio can signal different strategic states. This is important for future research because it shifts the empirical task from simple ranking to configuration-sensitive modelling.



**Figure 1. Airline Staffing-Strategy Fit Framework**

A five-stage decision logic for interpreting employees-per-aircraft ratios



Source: author-developed framework based on configuration-sensitive KPI governance logic.

**Figure 1. Airline Staffing-Strategy Fit Framework**

#### 4. Methodology

The study uses a design-science-informed comparative documentary design. It is not a causal econometric study and does not claim to estimate the effect of staffing ratios on profitability, service quality or safety. Its claim type is conceptual, diagnostic and governance-oriented: it develops and demonstrates a framework for interpreting a widely used aviation KPI in a more valid way. This design is appropriate because the practical problem is not a lack of one more ratio; it is a lack of interpretive governance around a ratio already used in aviation debate.

The unit of analysis is the airline operating model. Six illustrative cases are selected to represent different archetypes: Emirates as a premium long-haul hub carrier; KLM as a traditional European network carrier with group-boundary complexity; American Airlines as a mega-scale U.S. network carrier; Delta Air Lines as a service-focused U.S. network carrier with strong operational-control culture; AirAsia/Capital A as a digitalised Asian low-cost group with restructuring and active-fleet boundary issues; and Ryanair as an ultra-low-cost carrier with high standardisation.

The documentary evidence base consists of public annual reports, Form 10-K filings, investor and press releases, official operating statistics and airline annual-report portals. The sources are used to identify employee counts, aircraft counts, active versus total fleet distinctions, regional-operation boundaries, service model, network structure, insourcing indicators and digital or operational-control characteristics. Only public organisational data are used; no employee-level, passenger-level or confidential corporate data are included.

The core ratio is defined as employees per aircraft = reported employees or full-time equivalent employees divided by reported aircraft. The analysis deliberately treats this formula as unstable unless the numerator and denominator are locked. Numerator risks include group employees, subsidiaries, MRO, cargo, loyalty businesses, catering, contact centres, contractors and outsourced labour. Denominator risks include mainline aircraft,



regional aircraft, active versus total fleet, parked aircraft, wet-leased aircraft and aircraft operated by third-party partners.

Analysis proceeded in four steps. First, public data points were extracted and reconciled where available. Second, ratio sensitivity was tested by changing denominator definitions, especially mainline-only versus mainline-plus-regional aircraft. Third, cases were interpreted through configuration logic: business model, fleet architecture, network complexity, service proposition, insourcing, labour regime, digitalisation and operational-control philosophy. Fourth, the findings were converted into a KPI-governed framework and benchmarking protocol. Validity is strengthened through transparent definitions, source hierarchy and cross-case interpretation. The main limitation is comparability: airlines report workforce and fleet boundaries differently. The study addresses this limitation by treating employees per aircraft as an interpretive signal rather than a definitive efficiency score.

## **5. Findings**

The first finding is that the ratio is highly sensitive to boundary definitions. Delta illustrates the issue clearly. Using approximately 103,000 full-time equivalent employees and 975 mainline aircraft produces a ratio of about 106 employees per aircraft. Adding 317 regional aircraft operated on Delta's behalf changes the denominator to 1,292 aircraft and reduces the ratio to about 80. The labour numerator does not automatically move in the same way because Delta's filing excludes some employees of regional carriers that it does not own. A single ratio can therefore change materially before any real productivity difference is observed.

The second finding is that high staffing intensity can represent capability rather than inefficiency. Emirates' 2024-25 reporting supports an illustrative ratio of roughly 267 employees per aircraft. Read superficially, the ratio appears high. Read configurationally, it is associated with a premium long-haul hub model, widebody fleet, global service promise, cargo and logistics scope, training, premium experience, airport and disruption capability, and in-house coordination around a complex Dubai hub. The ratio should therefore be evaluated against revenue quality, premium margin, network complexity, customer experience and resilience.

The third finding is that low staffing intensity can represent lean excellence when it is supported by coherent operating design. Ryanair's FY2025 reporting describes more than 26,000 aviation professionals and a 613-aircraft fleet, producing a ratio near 42-43 employees per aircraft. This is not a target for all airlines; it is an output of an ultra-low-cost configuration built around fleet commonality, direct sales, rapid turnarounds, ancillary revenue, standardisation and cost discipline.

The fourth finding is that a low ratio must still be risk-tested. Lean staffing is strategically positive only if it does not produce unacceptable deterioration in safety, operational control, service recovery, employee fatigue, regulatory compliance, maintenance reliability or disruption resilience. A low ratio can hide outsourced labour, supplier dependence or under-resourced recovery capacity. Conversely, a high ratio can hide inefficiency if it is not accompanied by service, revenue, resilience or safety benefits.

The fifth finding is that some airlines should be treated as boundary cases rather than locked point estimates until group scope is reconciled. KLM and AirAsia/Capital A are useful precisely because public reporting involves group, subsidiary, active-fleet and restructuring distinctions. These cases show why a benchmarking protocol must define whether the



analysis covers the airline entity, the group, the mainline fleet, the active fleet, subsidiaries, regional partners or discontinued operations.

The sixth finding is that employees per aircraft becomes useful only when embedded in a balanced KPI architecture. It should be read beside CASK, CASK ex-fuel, RASK, revenue per employee, employee cost per ASK, OTP, completion factor, maintenance delay rate, mishandled baggage rate, NPS, complaint rate, disruption recovery time, safety occurrence rate, digital self-service adoption and outsourcing-adjusted labour intensity.

**Table 1. Illustrative ratio evidence and governance interpretation**

Case	Business-model interpretation	Illustrative evidence	Ratio implication	Governance warning
Emirates	Premium long-haul hub carrier	69,465 employees and 260 aircraft in 2024-25 reporting	c. 267 employees per aircraft	Do not compare directly with ULCC ratios without service, cargo, hub and insourcing adjustment.
Delta Air Lines	Service-focused U.S. network carrier	103,000 FTEs; 975 mainline aircraft; 317 regional aircraft operated on its behalf	c. 106 mainline; c. 80 including regional aircraft	Denominator choice changes interpretation materially.
Ryanair	Ultra-low-cost standardized carrier	More than 26,000 aviation professionals and 613 aircraft in FY2025 reporting	c. 42-43 employees per aircraft	Low ratio reflects model design; not a universal target.
KLM / AirAsia	Boundary-sensitive cases	Group, subsidiary, active fleet and restructuring distinctions	Point estimates require caution	Define whether entity, group, active fleet or partner operations are included.

**6. Framework: Airline Staffing-Strategy Fit Governance**

The proposed framework converts the ratio into an executive governance process. The first stage is definition: lock the numerator and denominator. The second stage is classification: define the business model, fleet, network and service promise. The third stage is triangulation: read the ratio beside cost, revenue, reliability, service, digital and safety KPIs. The fourth stage is action: translate interpretation into a decision that has an owner, cadence and risk control.

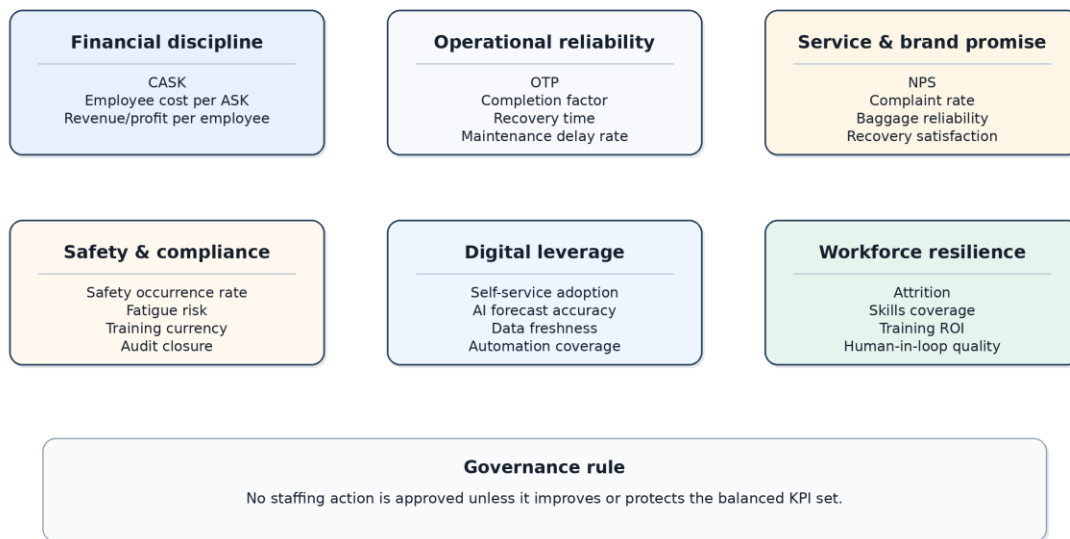
A defensible staffing decision should answer five questions. Does the current workforce architecture protect the airline safety case? Does it support the service promise? Does it enable reliable operations and disruption recovery? Does it generate revenue quality or cost advantage? Does digitalisation reduce manual workload without creating skill atrophy, accountability gaps or data-quality risk? If these questions cannot be answered, the ratio is not yet governance-ready.



Possible governance actions are not limited to headcount reduction. They include role redesign, cross-skilling, workforce redeployment, automation, HRIS enhancement, shared services, outsourcing, strategic insourcing, digital self-service, predictive crew planning, training investment and KPI-definition repair. The most mature airline does not ask only “how many employees per aircraft?” It asks “which capabilities must remain internal, which can be digitised, which can be outsourced safely, and which must be strengthened because they protect resilience, compliance or revenue quality?”

**Figure 2. KPI Governance Architecture for Staffing-Strategy Fit**

Balanced KPI domains for approving or rejecting staffing actions



Source: author-developed KPI architecture for staffing-strategy fit decisions.

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KLM / AirAsia	Boundary-sensitive cases	Group, subsidiary, active fleet and restructuring distinctions	Point estimates require caution	Define whether entity, group, active fleet or partner operations are included.



## **7. Discussion**

The findings support the central argument that staffing is operating-model architecture. High staffing intensity can represent service capability, hub complexity, in-house control, cargo and maintenance integration, or premium differentiation. It can also represent inefficiency, duplication, outdated processes or weak digital maturity. Low staffing intensity can represent lean excellence, fleet simplicity, outsourcing and digital discipline. It can also represent fragility, underinvestment, service recovery weakness or hidden supplier labour. Therefore, ratio interpretation must be conditional rather than categorical.

Rival explanations must be tested before any decision. A high ratio may be caused by numerator inflation rather than excess labour. A low ratio may be caused by outsourcing rather than superior productivity. A ratio improvement may come from adding aircraft faster than adding people rather than from genuine process productivity. A ratio deterioration may reflect temporary fleet grounding, labour rebuilding after disruption, regulatory change, strategic insourcing or the expansion of cargo, loyalty, training or digital functions.

The theoretical contribution is to connect airline business-model theory with workforce productivity interpretation. The methodological contribution is numerator-denominator discipline. The managerial contribution is a KPI governance protocol that moves the executive conversation from “too many people” to “is the workforce architecture fit for strategy, risk and performance?” This contribution is particularly important for airlines facing post-pandemic recovery, supply-chain disruption, digital transformation, AI adoption, training constraints and labour-market scarcity. Under such conditions, simplistic headcount reduction can damage capability; equally, unmanaged staffing growth can weaken cost competitiveness.

The human-centric AI literature and the selected airline KPI studies therefore reinforce the need to evaluate digital leverage together with human capability, not against it.

This is why the proposed framework treats staffing decisions as governance choices rather than HR-only adjustments. A headcount action is defensible only when its data boundary is clear, its operational mechanism is plausible, its effect on nonfinancial indicators is monitored and its risk controls are owned by named functions. The ratio therefore becomes an entry point into decision architecture: CFO ownership of cost productivity, COO ownership of operational reliability, CHRO ownership of capability and retention, CDO/CIO ownership of digital leverage, and safety leadership ownership of compliance and human oversight.

## **8. Managerial Implications**

For CEOs and boards, employees per aircraft should be treated as a strategic warning indicator, not a direct verdict. For CFOs, it should be tied to employee cost per ASK, revenue per employee, profit per employee and productivity-adjusted CASK. For COOs, it should be linked to OTP, completion factor, disruption recovery and aircraft utilisation. For CHROs, it should trigger role design, retention, training, succession and skills-coverage analysis. For CIOs and CDOs, it should test whether digital platforms, data governance and AI reduce friction without creating opaque accountability or poor data lineage. For safety leaders, it should never be separated from fatigue, maintenance reliability, safety reporting and regulatory compliance.

The practical protocol is straightforward: define the numerator; define the denominator; classify the business model; normalize for outsourcing, regional flying, fleet mix and group activities; triangulate with balanced KPIs; test rival explanations; then decide whether to



reduce, redeploy, automate, insource, outsource or invest. No single ratio should authorize a workforce decision in a safety-critical airline. The output of the protocol should be a decision memo with assumptions, data sources, KPI impacts, risk controls, owner, implementation wave and review cadence.

#### 9. Limitations and Future Research Agenda

The manuscript does not include a search-string appendix in the main body because it is not presented as a systematic review. Future researchers should instead document a full search protocol if they expand the work into a systematic, scoping or bibliometric study: database names, exact strings, search dates, inclusion and exclusion rules, screening decisions and quality appraisal. Until such a protocol is executed, search strings are best treated as an internal evidence-extension tool, not as proof of literature exhaustiveness.

A stronger empirical version should build a panel dataset including employees, contractors, outsourced labour proxies, ASK, RPK, block hours, departures, seats, aircraft type, active aircraft, regional partner aircraft, fleet age, digital maturity, safety outcomes, service quality and financial performance. That dataset would allow sensitivity testing, clustering by business-model archetype and robustness checks across full-service network carriers, hybrid carriers and low-cost/ultra-low-cost carriers.

Several limitations remain. Public documents do not always disclose comparable workforce boundaries. Outsourced labour is often invisible. Regional operations create denominator ambiguity. Aircraft differ by capacity, range, utilization and maintenance burden. Case evidence demonstrates interpretive logic but does not statistically validate causal performance effects. The framework should therefore be used as a decision protocol and research agenda, not as a final global ranking of airlines.

#### 10. Conclusion

Employees per aircraft is useful only when governed. It should be interpreted as a configuration signal shaped by business model, boundary definitions, outsourcing, fleet architecture, digital maturity and service-control philosophy. A high ratio may be strategically coherent when it supports premium service, network complexity, in-house control and resilience. A low ratio may be strategically coherent when it reflects fleet simplicity, process standardization, digital self-service and disciplined cost architecture. Both can be dangerous when disconnected from safety, service, resilience and human capability.

The practical takeaway is disciplined balance. External peer-reviewed scholarship should remain the scholarly spine of the manuscript, while the selected airline KPI works by MoghadasNian and co-authors should remain supporting architecture. For a future full journal submission, the next step is audited data, formula-level definitions, sensitivity analysis and robustness checks across several airline archetype groups.

Accordingly, the manuscript should be read as a decision-quality governance article: it strengthens how executives and researchers interpret an existing metric, while leaving causal effect estimation and full global ranking for a later audited empirical design.

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