



WORKING PAPER

**SEVENTH WORLDWIDE AIR TRANSPORT CONFERENCE
(ATCONF/7)**

Montréal, HQ, 16 to 20 November 2026

Agenda Item 4: Emerging technologies, new business models and other associated aspects
4.3: Leveraging air transport data and the digital ecosystem for seamless, secure and resilient operations

**LEVERAGING AIR TRANSPORT DATA AND THE DIGITAL ECOSYSTEM FOR AGILE,
EVIDENCE-BASED ECONOMIC REGULATION**

(Presented by Malaysia)

EXECUTIVE SUMMARY

This paper contends that the economic regulatory frameworks governing international air transport were largely designed before the emergence of the real-time traffic, fare, capacity, and consumer-complaint data now routinely generated across the aviation industry. A structural misalignment has consequently developed between the pace at which market conditions and business models are evolving and the pace at which regulatory frameworks are being reviewed. This paper discusses that regulators at both national and international levels should transition progressively from static, periodic rulemaking toward an agile, evidence-based oversight model, supported by structured access to aviation data, common data standards, and shared analytical capacity. To facilitate this transition in a manner that is inclusive and proportionate, the paper proposes a set of guiding principles and a phased, voluntary roadmap for adoption by Member States.

Action: The action by the conference is detailed in paragraph 4.1.

<i>Strategic Goals:</i>	This working paper relates to Strategic Goals: <i>The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All; and No Country Left Behind.</i>
<i>Financial implications:</i>	Nil
<i>References:</i>	Seventh Worldwide Air Transport Conference (ATConf/7) — Conference theme and objectives, https://www.icao.int/events/ATConf7 . Doc 9587 — <i>Policy and Guidance Material on the Economic Regulation of International Air Transport</i> Doc 9626 — <i>Manual on the Regulation of International Air Transport</i> Doc 10009 — <i>Sixth Worldwide Air Transport Conference: Sustainability of Air Transport. ICAO Headquarters, Montréal, 18–22 March 2013. Economic Development Report</i> ICAO Council, Concept Note for ATConf/7 (State letter circulated October 2025)

1. INTRODUCTION

1.1 The Sixth Worldwide Air Transport Conference (ATConf/6), held in Montréal in March 2013, established conclusions that have since underpinned the International Civil Aviation Organization's (ICAO) work on economic regulatory policy. Those conclusions were, however, reached before the widespread availability of the granular, real-time data now routinely produced by reservation systems, e-ticketing platforms, slot-coordination bodies, and digital distribution channels. The technological environment within which aviation markets operate is fundamentally different from the one that informed ATConf/6.

1.2 The structure of the international aviation market has undergone substantial transformation in the intervening period. The emergence of capacity discipline strategies among major network carriers, rapid expansion of ultra-long-haul services, hybridization of low-cost and full-service operating models, and proliferation of complex joint ventures and code-share alliances have collectively reshaped competitive dynamics in ways that traditional instruments of economic regulation — bilateral capacity entitlements, tariff filing requirements, ownership and control tests, and periodic route-rights reviews — were not designed to address with the precision and timeliness now required.

1.3 Agenda Item 4.3 of the Seventh Worldwide Air Transport Conference (ATConf/7) invites Member States and the ICAO Secretariat to consider how the digital ecosystem and air transport data can be leveraged for seamless, secure, and resilient operations. This paper responds by focusing on one particularly consequential application: transforming economic regulatory oversight from a periodic into an agile, evidence-based function capable of responding to market developments in near real time.

1.4 The paper discusses the presenting Authority's operational experience in modernising its regulatory function, and reviews emerging practice across comparable regulatory jurisdictions. It does not propose new prescriptive international rules or a new supranational regulatory mechanism. Instead, it proposes a set of principles reflecting good practice in data-driven regulation, a voluntary self-assessment tool for Member States, and a phased peer-learning mechanism.

2. DISCUSSION

2.1 The Regulatory Lag Problem

2.1.1 Traditional economic regulation of international air transport was designed for an era of relatively stable bilateral market structures, limited competition, and a comparatively slow pace of commercial innovation. Its principal instruments — bilateral air services agreements, tariff filing requirements, route-rights review processes, and ownership and control provisions — remain, in many jurisdictions, calibrated to multi-year regulatory cycles. Regulators typically initiate formal reviews at intervals measured in years, working from data that may already be twelve to eighteen months old by the time a decision is reached.

2.1.2 The information environment within which aviation markets operate has changed substantially. Airlines, airports, distribution intermediaries, and consumer-facing platforms now generate continuous, high-volume streams of operational and commercial data — including traffic flows, load factors, fare distributions, complaint volumes, slot utilization, and on-time performance — available in near real time to industry actors. This development has created a widening and structurally significant information asymmetry: the entities subject to economic regulation often possess a considerably more current and granular picture of market conditions than the regulatory authorities responsible for overseeing them.

2.1.3 This asymmetry undermines the credibility, effectiveness and timeliness of regulatory intervention. When regulators make decisions about market entry, capacity allocation, or competitive conduct on the basis of significantly dated information, the quality of those decisions could be compromised — a challenge that is particularly acute during periods of rapid market change, such as the post-pandemic recovery phase.

2.2 What Data-Driven Regulation Means in Practice

2.2.1 It is important to clarify what data-driven economic regulation entails. It is not the mere digitisation of existing administrative processes — converting paper-based forms into electronic equivalents or maintaining digital rather than physical records. While such digitalisation is a necessary precondition for regulatory modernisation, it does not in itself alter the logic or effectiveness of the regulatory function.

2.2.2 Genuinely data-driven economic regulation involves three conceptually distinct and mutually reinforcing shifts in regulatory practice:

- a) From periodic to continuous market monitoring. Rather than initiating reviews on a fixed calendar, regulators need to adopt standing data feeds — covering capacity deployment, load factor trends, fare distribution, and consumer complaints — enabling them to identify issues as they emerge. This approach directs regulatory resources toward areas of genuine concern and reduces the risk of market distortions persisting undetected between review cycles.
- b) From compliance-oriented reporting to shared analytics. Current frameworks typically generate data in formats that reflect the submitting entity's internal reporting conventions rather than the regulator's analytical needs, producing protracted disputes about interpretation. A shared-analytics approach, by contrast, involves common data definitions, interoperable formats, and jointly accessible analytical tools — focusing regulatory engagement on matters of genuine policy judgement.
- c) From national-centric regulation to structured peer benchmarking. Individual national regulators — particularly those overseeing smaller or less liquid markets — frequently lack the data volume and comparative reference points needed for well-informed judgements. A mechanism enabling regulators to benchmark tariff levels, capacity utilisation, and consumer outcomes against comparable markets, using appropriately aggregated data, can materially improve regulatory decision quality without requiring a new supranational body.

2.2.3 Several ICAO Member States and regional regulatory bodies have begun implementing elements of this data-driven approach, including open aviation data portals, real-time slot and capacity dashboards, and automated consumer-complaint analytics. These initiatives represent meaningful progress but remain fragmented. There is currently no common ICAO reference framework describing good regulatory practice in data-driven economic oversight, nor minimum data standards to which economic regulators are expected to aspire. The development of such a framework is a concrete and actionable contribution that ICAO is well placed to make.

2.3 Proposed Principles for Data-Driven Economic Regulation

2.3.1 Based on the presenting Authority's operational experience and a review of emerging practice, the following five principles are proposed for the Conference's consideration. Subject to the Conference's guidance, these may serve as the basis for further elaboration by the Member States:

- a) **Proportionality:** Data requirements for economic oversight should be calibrated to the size of the market and the level of regulatory risk, rather than applied uniformly. Proportionality is an essential precondition for the meaningful participation of developing States in any data-driven regulatory framework.
- b) **Interoperability:** Data schemas, definitions, and formats used by economic regulators should, to the greatest extent practicable, be aligned with standards already established within ICAO and across the aviation industry, avoiding duplication and lowering the marginal cost of compliance.
- c) **Transparency with Confidentiality Safeguards:** Aggregated or appropriately anonymised market performance indicators should be shared more openly between regulators and with the public, while commercially sensitive, disaggregated data must remain subject to appropriate confidentiality protections. The balance between transparency and confidentiality must be addressed explicitly in any data-sharing framework.
- d) **Capacity Before Compliance:** Technical assistance, analytical tooling, and capacity-building support should be made available — particularly to regulators in developing States with limited analytical infrastructure — before new data obligations are imposed on the industry they regulate.
- e) **Continuous Review:** Economic regulatory instruments should be subject to indicator-triggered review processes, rather than cycles tied exclusively to fixed calendar dates. Where standing data feeds indicate material changes in market conditions, a review should be initiated on that evidentiary basis — supplementing, not replacing, periodic scheduled reviews.

2.4 **A Phased, Voluntary Implementation Roadmap**

2.4.1 The presenting Authority recognises that regulatory capacity varies considerably among ICAO Member States. Any implementation roadmap that fails to account for this variation will, in practice, benefit only those States already best positioned to comply, while leaving behind those that would benefit most from enhanced regulatory capability. For this reason, the following three-phase, opt-in roadmap is proposed:

- a) **Phase 1 — Self-Assessment.** ICAO could develop a concise self-assessment tool enabling Member States to evaluate their current data collection and analytical practices against the five principles in section 2.3. The tool is designed to be completed without specialist external assistance and to identify specific capability gaps and improvement priorities. Participation is voluntary and carries no compliance implications; aggregate anonymised results provide ICAO with a baseline picture of current regulatory data practice across the membership.
- b) **Phase 2 — Peer-Learning Network.** Member States completing the Phase 1 self-assessment are invited to join a voluntary peer-learning network coordinated through ICAO. The network provides a structured mechanism for exchanging practical experience on data collection methods, dashboard design, analytical tool selection, and data-sharing arrangements. It does not involve the exchange of commercially sensitive data and creates no new legal obligations; its function is to accelerate the diffusion of good regulatory practice across jurisdictions of varying size and institutional maturity.

- c) Phase 3 — ICAO Guidance Material Updates. Drawing on experience accumulated through Phases 1 and 2, the ICAO updates Doc 9587 and Doc 9626 to reflect good practice in data-driven economic oversight, addressing data governance arrangements, interoperability standards, and approaches to analytical capacity-building suited to regulators of different sizes. This sequencing ensures the guidance material is based on demonstrated operational experience.

2.4.2 This phased design is consistent with ICAO's *No Country Left Behind* strategic goal, which emphasises the importance of ensuring all Member States — particularly those with the most limited institutional resources — can participate meaningfully in the implementation of international standards and best practices. By sequencing capacity-building before the formalisation of expectations, the roadmap avoids introducing obligations that are aspirational for well-resourced regulators but practically unachievable for those with more constrained means.

3. CONCLUSION

3.1 The economic regulatory frameworks currently governing international air transport were developed in an era fundamentally different from the one in which the industry now operates. The volume, variety, and immediacy of data available to aviation market participants have created both an opportunity and an obligation for regulatory authorities to modernise their oversight practices. A regulatory function that relies on periodic data submissions and multi-year review cycles is structurally ill-suited to overseeing a market characterised by continuous commercial innovation and rapidly evolving competitive dynamics.

3.2 A voluntary, proportionate, and capacity-sensitive transition toward data-driven economic regulation would enable Member States to make faster and more justifiable regulatory decisions, reduce information asymmetries, and improve the coherence of economic oversight across jurisdictions. The phased roadmap proposed in this paper provides a practical pathway accessible to Member States of widely varying institutional capacity, consistent with ICAO's *No Country Left Behind* strategic goal, and achievable within existing ICAO institutional structures.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to:

- a) note the growing structural gap between the pace of change in aviation business models and the pace at which economic regulatory review cycles are currently conducted;
- b) endorse the five core principles for data-driven economic regulation set out in section 2.3 as guidance for Member States seeking to modernise their economic regulatory frameworks;
- c) request the ICAO Secretariat to update Doc 9587 and Doc 9626 to incorporate guidance on data governance, interoperability standards, and approaches to analytical capacity-building for economic regulatory authorities; and
- d) invite Member States to participate in a voluntary peer-learning network on data-driven economic oversight, to be coordinated through ICAO.