Airports as Economic Engines: Driving Growth, Connectivity, and National Prosperity

By Vipin Kumar, IAS, Chairman, Airports Authority of India

Executive Summary

India's civil aviation industry has been transformed, deliberately, in a radical way – from a valuable offering to a powerful driver of national economic development and social diversity. The direction is clear, driven by strategic thinking, continued development, and a proactive policy environment, positioning the sector at the forefront of the country's development efforts. As an indicator of such growth, annual passenger traffic is forecast to surge to between 3 billion and 3.5 billion by the year 2047, a spectacular increase that confirms aviation's growing role in the national economy. Currently, the sector contributes roughly US$54 billion to GDP and supports 7.7 million jobs. The physical proof could be found in doubling the number of operational airports from 74 in 2014 to 164 in 2025, a dream to expand the network out to 350-400 airports by 2047, which is a key pillar of Viksit Bharat, the vision of Hon'ble Prime Minister, Shri Narendra Modi.

This paper presents an analysis of the Indian aviation ecosystem, extending the achievements in the past decade to the vision of the future. Our analysis exposes a distinctive, growth-oriented policy environment combining market liberalization along with government policies to encourage selective democratization of air travel. We emphasize future-proofing the infrastructure with a dual strategy of brownfield optimization of current hubs and large-scale greenfield development, such as the case of the expansion plans for Delhi, Chennai, Kolkata and the launch of Navi Mumbai International Airport.

Moreover, the report outlines India's progressive trend towards regulation and makes it known as being an emerging leader in the future frontier of aviation technology. This is especially the case for early drone and Advanced Air Mobility (AAM) technologies that are being pre-emptively implemented for technological integration. Importantly, we highlight the necessity to fill strategic voids that currently inhibit the sector's capability, that is, much outsourcing of Maintenance, Repair and Overhaul (MRO) work, as well as the growing deficiency of pilot training capacity. Filling these gaps will unleash immense economic value and foster a new era of national self-security.

Lastly, India's commitment to responsible growth is framed as a central pillar within its strategy. This point has manifested through the innovative transition to 100 percent green energy in its airports and a pragmatic, morally sound response to international environmental mandates like CORSIA. So, Indian aviation is not strictly a tale of quantitative expansion but a story of qualitative transformation and a disciplined direction to a new era of global aviation leadership for India.

Indian Aviation: Legacy of Transformation and a Vision for a New Era

A Journey Through Time & The 'Viksit Bharat 2047' Vision

The history of Indian aviation is a tale of progressive evolution. It started on February 18, 1911, with an inflight demonstration flight-the precursor to work that would eventually become one of India's top priorities and a national strategic asset.

The period after 2014 is seen as a golden age. Strong government initiatives, monumental infrastructure construction and an increasing participation of enterprises in the process had to ensure smooth operations in this space. This era also turned India into the third largest market for domestic aviation in the world. There was an increase in passenger travel levels over pre-pandemic levels not seen during the previous 5 years but with continuing positive changes now being experienced everywhere around us.

The entire national aviation strategy has become intimately tied to the ambitious "Viksit Bharat 2047" programme, the vision of Hon'ble Prime Minister, Shri Narendra Modi – a comprehensive blueprint for India at its most advanced state by its 100th year of independence. The aviation sector is central to this picture with a clear intention of increasing the operational airport network from 164 in 2025 to an ambitious 350-400 by 2047. This is not just a numbers game; it's a strategic push to build connectivity and a new wealth generation model for tier-two and tier-three cities to promote regional prosperity and growth that is inclusive and fair.

As the first of its kind in India, the National Civil Aviation Policy (NCAP) 2016 lays the strategic blueprint for the industry's growth. Several key elements of this policy have transformed the world of aviation to an alarming extent.

The Regional Connectivity Scheme (RCS), now titled UDAN (Ude Desh ka Aam Nagrik -Let the Common Citizen Fly) is a flagship initiative put in place to make flying affordable and accessible to the masses by establishing viability gap funding (VGF) for flights to underserved and unserved airports.

UDAN Achievement Metric	Current Status (2024)	Impact
Operational Routes	625 routes	Enhanced regional connectivity
Airports Connected	90 (including 15 heliports, 2 water aerodromes)	Expanded aviation network
Total Passengers	1.49 crore passengers	Democratized air travel
Flights Operated	2.8 lakh flights	Regular connectivity maintained
Investment Utilization	₹3,751 crores (83% of allocated funds)	Efficient resource deployment

The National Civil Aviation Policy 2016 significantly liberalized international operating conditions by replacing the erstwhile 5/20 rule with a more flexible 0/20 framework. This critical regulatory shift immediately granted Indian airlines greater freedom to expand globally. Specifically, under these new guidelines, an Indian carrier is now permitted to commence international operations as soon as it meets a minimum domestic operational threshold: either possessing 20 aircraft in its fleet or ensuring 20% of its total fleet is operational on domestic routes—whichever metric results in the higher number. Furthermore, a key

advantage of this revision is the elimination of any prerequisite time period for domestic operations before an airline can start flying internationally.

NCAP 2016 also provided a new framework for airport development and management. It favoured a hybrid-till model for next tariffs, in which 30% of revenue from non-aeronautical activities are converted to cross-subsidization of aeronautical fees. This financial model seeks to harmonize the economic feasibility of airport operators with the affordability of services to airlines and passengers. Also, the policy aimed to increase the domestic MRO (Maintenance, Repair, and Overhaul) sector, through tax rationalization and simplified procedures.

These levers reflect a cohesive and holistic approach to promoting the whole aviation ecosystem involving infrastructure, connectivity and economic viability.

Global Policy Benchmarking: India and ICAO

The comparative perspectives of global aviation policy frameworks under the International Civil Aviation Organization (ICAO) are useful for understanding India's unique and evolving approach. ICAO promotes harmonised international standards and recommended practices (SARPs) that ensure safety, efficiency, and environmental sustainability across member states, while encouraging local adaptation based on national priorities and levels of development.

India's aviation policy framework—reflected in the National Civil Aviation Policy (NCAP) and implemented through flagship initiatives such as the Regional Connectivity Scheme (UDAN)—embodies this principle of balanced alignment. It combines market-driven mechanisms with targeted viability gap funding (VGF), shared between the Central and State Governments,

thereby creating an economically sustainable and politically resilient model of regional air connectivity.

Unlike a purely deregulated or fully subsidised system, India's approach fosters an ecosystem in which major hubs such as Chennai and Kolkata Airports act as growth anchors, complemented by the development of smaller regional airports. This shared-cost model reinforces inclusivity, operational viability, and long-term resilience, while remaining consistent with ICAO's global vision for safe, efficient, and equitable air transport development.

The following table provides a clear, high-level overview of the Indian civil aviation sector's robust expansion across key operational and financial parameters, underscoring the success of the current policy direction:

Performance Metric	FY 2022-23	FY 2023-24	Growth (%)
Revenue from Operations (₹ Crores)	11,424.90	14,962.76	31.0%
Passenger Traffic (Millions)	324.0	376.0	16.0%
Aircraft Movements	2.8 Million	3.2 Million	14.3%

Measuring India's Ascendancy: A Data-Driven View

The Economic Engine

The Indian aviation sector has become a major economic force in the country. In 2023, the industry's aggregate annual contribution to India's Gross Domestic Product accounted for
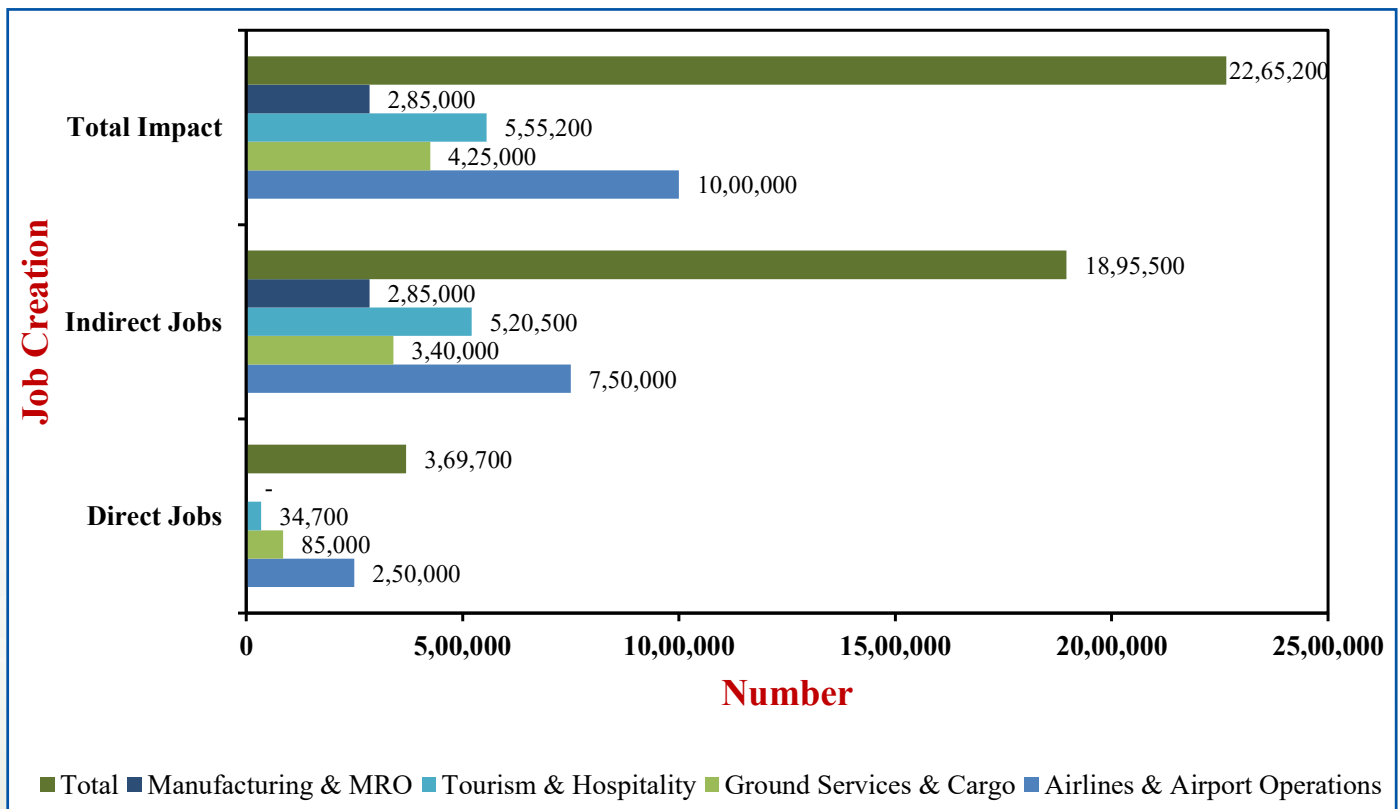
nearly $53.6 billion with almost 1.5% of GDP. Its ability to create jobs is equally impressive, underpinning 7.7 million jobs at a national level. This overall employment comprises individual positions (369,700 workers directly working at the core operations of aeronautics, airports and services for the navigation of air traffic), as well as indirect jobs and induced jobs. This employment extends beyond basic operations to encompass various ancillary and support services – from ground handling, logistics, retail and hospitality – all of which underscore the strong economic multiplier effect of the sector. The strong growth in passenger numbers is evidence of the sector's dynamic nature and its contribution to national development with a reported 15% increase year-on-year in total air passengers handled in FY24.

Global and Domestic Benchmarking

India's civil aviation market has a history of explosive growth and is in a leading position to expand air traffic worldwide. By 2040, annual passenger traffic in the country is expected to grow at rate of more than 6.2%, the fastest of the world major economies, and far exceeding the world average of 3.9 per cent. This explosive growth is evidenced by historical performance: domestic traffic has exploded threefold over the last decade, compared with more than two-fold international traffic.

Outside of passenger operations, the air cargo sector is also on a strong path. India's air freight market is set to grow at the pace of 6-9% per year until 2029 – and it does so comfortably ahead of the global air freight market's average (and in

Job Creation (y-axis) / **Number** (x-axis)

Total Impact:
- Total: 22,65,200
- Manufacturing & MRO: 2,85,000
- Tourism & Hospitality: 5,55,200
- Ground Services & Cargo: 4,25,000
- Airlines & Airport Operations: 10,00,000

Indirect Jobs:
- Total: 18,95,500
- Manufacturing & MRO: 2,85,000
- Tourism & Hospitality: 5,20,500
- Ground Services & Cargo: 3,40,000
- Airlines & Airport Operations: 7,50,000

Direct Jobs:
- Total: 3,69,700
- Manufacturing & MRO: -
- Tourism & Hospitality: 34,700
- Ground Services & Cargo: 85,000
- Airlines & Airport Operations: 2,50,000

Legend: Total ■ Manufacturing & MRO ■ Tourism & Hospitality ■ Ground Services & Cargo ■ Airlines & Airport Operations

particular sub-regional) growth in comparison with the rest of the world. International air cargo is especially strong, with an estimated 19% growth in 2024 in the market. This growth is extremely centralised -- with 90% of India's air cargo capacity under the control of six of the major airport hubs and, thus, the importance of specific infrastructure works in national logistics.

Futureproof the Future

With data-driven projections – the evolution of Indian aviation is inherently the result of structural, rather than simply cyclical, growth and that it is underpinned by demographics and economy. And there is a critical paradox here: despite hosting nearly 20 percent of the world's population, India still produces only 4 percent of the total global air traffic. This is not a flaw but a strong signal for the huge growth that comes next when penetration of air travel takes off in the future in rapid growth due to rapidly increasing disposable incomes and burgeoning middle class. That optimism is bolstered significantly by international body projections.

According to the International Air Transport Association (IATA), it is estimated that India's total annual passenger traffic will triple over the next twenty years, indicating the country's emergence as a world aerospace powerhouse. Even though the domestic market will continue to be the leading growth engine, global connectivity will increase substantially, but so does the global network. By 2043, the nation will have seen an estimated 17.7 billion passenger traffic worldwide (17.7 billion by 2043 and 22.3 billion by 2053) and India as ranked in the top three markets, being consistently amongst the top three markets, top 3 amongst them United States and China.

In order to satisfy the skyrocketing demand, Airbus now forecasts that India will need 2,840 new planes in the next twenty years. That sustained and unprecedented want will be the engine of ambitious plans to improve national infrastructure and human capital.

The Airports Authority of India (AAI): The backbone of infrastructure and strategic enabler

Expand infrastructure and increase capacity

The Airports Authority of India (AAI) remains the backbone of India's civil aviation framework, encompassing the planning, construction, upgrading, operation, and maintenance of a vast network of airports across the country. One of the most significant achievements of the past decade has been the rapid expansion and modernization of airport infrastructure, with the number of operational airports increasing from 74 in 2014 to 164 in 2025. Infrastructure development has been pursued through a dual strategy—optimising existing brownfield hubs while simultaneously developing greenfield projects to meet future demand. The expansion strategies at Chennai International Airport and Kolkata's Netaji Subhas Chandra Bose International Airport exemplifies this balanced approach.

At Chennai Airport, a major brownfield modernization programme is underway, involving the reconstruction of the old international terminal and the construction of a new integrated terminal complex (T2), which will expand the airport's total handling capacity from approximately 23 million passengers per annum (MPA) to nearly 35 MPA by 2027. The project also incorporates advanced aerobridge systems, upgraded taxiway configurations, and an expanded apron area to improve airside efficiency and safety in line with ICAO Annex 14 standards.
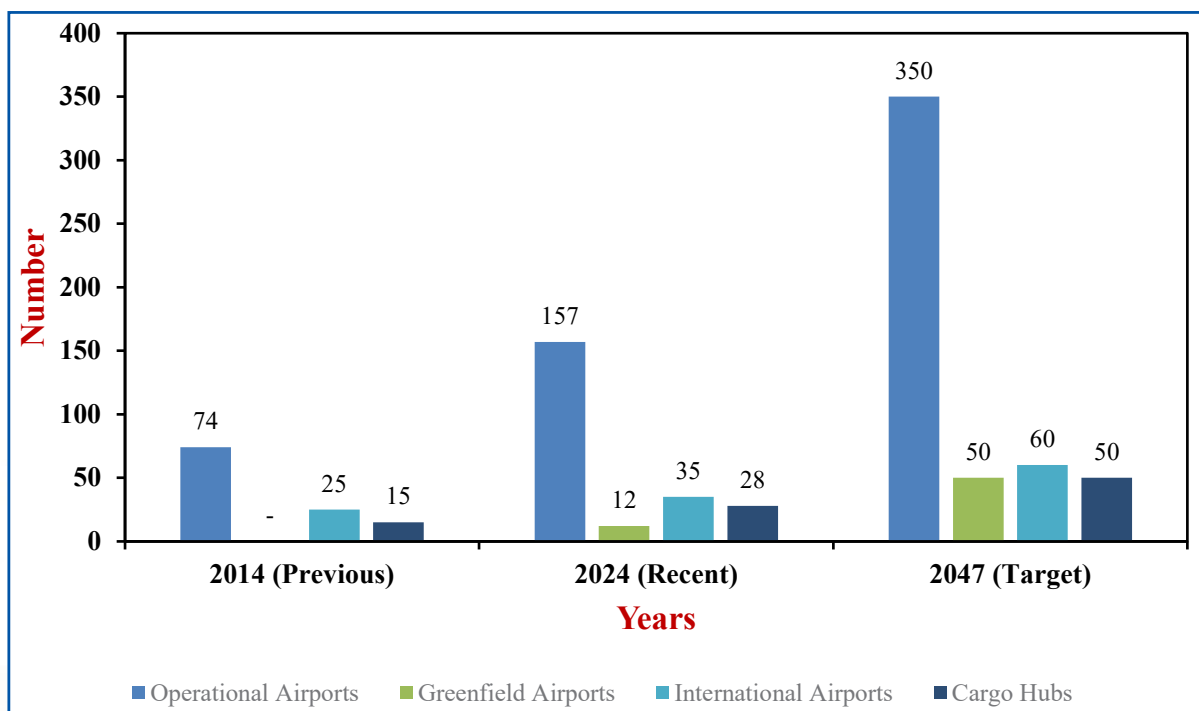
Simultaneously, Kolkata Airport is undergoing a comprehensive capacity enhancement initiative

Chennai Airport

to address rapid traffic growth in eastern India. The planned expansion includes the addition of a new integrated terminal building, expansion of the cargo complex to handle over 0.25 million tonnes of cargo annually, and airfield upgrades to increase runway throughput to 65 movements per hour. The introduction of a dedicated General Aviation enclave and the proposed Maintenance, Repair and Overhaul (MRO) facility will further strengthen its role as a regional aviation hub.

Together, these developments reflect AAI's forward-looking strategy—grounded in ICAO's global frameworks for sustainable airport infrastructure planning—to create a balanced ecosystem of high-capacity metropolitan hubs and regionally connected airports, ensuring resilience, inclusivity, and long-term operational excellence.

Strategic Land Planning for Next-Gen Aircraft

The most vital resource is forward-looking land planning in the competitive arena of global aviation. India's focus on aviation is making an important pivot for the country; one that knows that airports must be designed to address the needs of aircraft and innovative mobility concepts that will pervade what they can do tomorrow. Our brownfield hubs already scarce, and at least some of them severely stretched, are what the basic challenge is to build upon. In these older sites, changes to integrate and accommodate these new wide-body jets such as the Airbus A350 and Boeing 777X lead to an extremely complex and expensive reengineering process, involving a long runway or extended taxiway, that obviously only leaves them with a limited future of modernization.

That limitation is precisely what legitimises the national focus on greenfield development. A new airport is not just a substitute; it's a blank canvas on which genuinely future-proof design can be written. Beginning from a clean slate, planners can bake in agility for technologies that are only recently transitioning from concept to reality. Navi Mumbai International Airport's master plan guarantees that airside infrastructure—and its numerous planned runways—are certified for the largest wide-body aircraft of its kind at an early stage, cementing NMIA's status as one of the most important international gateways for the coming few decades. More critically, the planning has included purpose constructed, dedicated real estate for air platforms of the future. The conscious provision of a new GA terminal and a new heliport is an intelligent assertion that the future of flying air traffic will be multimodal. This mix will be designed with a focus on a hybrid approach combining static fixed-wing operations with the developing arena of Urban Air Mobility (UAM), enabled by eVTOLs (electric Vertical Take-Off and Landing vehicles).

In designating these specialized zones from the start, NMIA avoids the expensive modifications that older airports will inevitably have to adapt towards such as in order that they might be fully integrated with air taxis and other new forms of last-mile connectivity—which ensures that India's new-generation airports will be built to ensure they take full advantage of the revolution-oriented economic opportunities that the next chapter of flights offers.

The most critical criterion for success in modern airport planning is not merely the number of flights handled, but the seamless integration of airports within the wider network of urban, regional, and national transport systems. India's contemporary aviation development strategy recognises this, placing a strong emphasis on multimodal synergy as a cornerstone of national logistics efficiency; where the coordinated flow of passengers and cargo enhances both connectivity and economic productivity.

This comprehensive vision is exemplified by ongoing initiatives at Chennai and Kolkata airports. The Chennai Airport Multimodal Integration Plan, being implemented in coordination with the Chennai Metro Rail Limited (CMRL) and Indian Railways, aims to establish direct connectivity between the airport terminals, metro lines, and suburban rail systems. This will reduce transfer times, streamline passenger interchange, and promote greater use of public transport-a key sustainability objective endorsed by ICAO's Global Air Transport Connectivity Framework.

Similarly, at Kolkata, plans are underway to strengthen multimodal access by integrating the airport with the New Barrackpore–Airport–New Garia Metro Corridor, alongside upgraded road linkages via the Eastern Metropolitan Bypass. These interventions are designed to ensure that the airport functions not as an isolated transport node but as a multimodal hub within the broader

Kolkata Airport

urban mobility ecosystem, supporting the rapid expansion of trade, tourism, and regional development in eastern India.

Such integration embodies the global best practices advocated by ICAO-focusing on connectivity, operational efficiency, and environmental sustainability. The strategic alignment of aviation and surface transport infrastructure serves a triple mandate: to optimise system utilisation, enhance the passenger experience through seamless movement, and position the airport as a nucleus of urban and economic transformation. An airport should not function just as a terminus but as a central and connected point of connection among the entire logistics matrix of the nation.

A New Era of Regulation: Fostering Innovation and Safety

The Six-Groups Paradigm

India's regulatory approach to future aviation is marked for its forward-looking nature and systematic thinking. The Directorate General of Civil Aviation (DGCA) has established itself as an increasingly forward-looking authority, with six teams dedicated to developing requirements and guidance for Advanced Air Mobility (AAM). This is an integrated strategy to ensure the effective adoption of these technologies, before they are put to broader use in commercial markets. These groups' attention will cover the entire ecosystem of AAM, all the way from the airframe to the ground structure.

The working groups work to:

→ **Type Certification**: Formation or design of airworthiness standards for new vertical take-off and landing capable aircraft (VCA).

→ **Crew Licensing**: Creating new standards and training pathways for pilots of these new aircraft.

→ **Air Operator Permits**: Obtaining the appropriate permits for commercial AAM traffic. · UAS Traffic Management (UTM): Designing applications to allow drone and eVTOL traffic to integrate safely into the national airspace, separate from conventional air traffic.

→ **Maintenance, Repair and Overhaul (MRO)**: Developing the framework for MRO required of this new fleet.

→ **Vertiports**: Providing guidance on the design, operation, and authorization of the necessary landing infrastructure.

The multi-pronged, concurrent evolution of this technology serves as a clear signal to global technology innovators and investors that India is

going to be far more than a market for innovative future types of aviation machines; it's a partner in designing laws that will ensure their safe, effective applications.

Integration of Drones, eVTOLs and Emerging technologies

India will no longer be just dependent on steel and concrete to realize the country's ambition to be a leader in global aviation, but will rather be able to do so through a proactive regulatory approach to prepare for what flight would mean in the future. The Government has been rushing to reform the regulations in the fields of drones, Electric Vertical Take-Off and Landing (eVTOL) vehicles and so forth.

The Drone (Amendment) Rules, 2024, are a huge liberalization of regulations. Through simplifying registrations and the elimination of the passport, the government has democratized drone technology. Acceptance of alternatives provides such tools for a much wider audience as alternative government-issued identification, to a very large extent, particularly in rural areas. This shift is essential to unlock the enormous use of drones in agriculture, targeted logistics, surveying, and emergency response in the rest of the country.

File photograph of eVTOLs

Importantly, the government is taking a step ahead of the next wave of aerial mobility by establishing the ground rules for eVTOLs. The Directorate General of Civil Aviation (DGCA) has written guidance for the specification of type certification of VTOL-Capable Aircraft (VCAs) and for the designing and operation of "vertiports" as well. This pre-emptive rulemaking marks an important policy milestone, enabling India to align its regulatory framework with emerging global standards under the International Civil Aviation Organization (ICAO). By formulating clear and forward-looking rules governing new categories of aircraft-including those designed for powered-lift operations and advanced air mobility (AAM)-India, is positioning itself to ensure operational safety, certification integrity, and seamless integration within the evolving international aviation ecosystem. India is ensuring that, on this new technology's development stage, the regulatory pathway for it being rolled out will be well set once it gets its feet firmly planted, ready to launch such flying vehicles into the nation's airspace.

The Era of a Modernizing Airspace Management

India's airspace management modernization is an ongoing, tech-enabled endeavour to improve on and enhance safety, capacity, and operational efficiency through continuously updating the infrastructure. At the core of this evolution is the adaptation and deployment of the GAGAN (GPS-aided Geo-augmented Navigation) system, a collaborative effort of partnership between the AAI, ISRO, and BEL. GAGAN revolutionizes navigation to scale over the whole ecosystem and supports a more accurate and effective flight path. Outside of navigation, a variety of activities are being executed including the deployment of FUA (Flexible Use of Airspace), a more advanced type of system that will help to optimize the use of high-volume civil and military air traffic. Also,

Unmanned Traffic Management (UTM) systems are essential to safely incorporate new aerial technologies such as drones and eVTOLs. Remote/digital ATC & real-time analytics data collection will be the future of air traffic control (ATC) and will make it possible to make rapid and data-driven decisions to guarantee that the ATC is robust and prepared for future projects.

Development of Regulatory Framework

Apart from the management of airspace, the civil aviation regulatory bodies are also undertaking major reforms to enhance overall aviation safety and professional oversight. As an immediate answer to the aviation industry concerns, new and phased-in revisions are being rolled out in order to ensure appropriate crew rest and greater safe performance of safer practices for industry and piloting in the field in the flight safety of Flight Duty Time Limitations (FDTL) for pilots; the revised FDTL will be established by way of proposed changes through a phased process. The certification process of the Radio Telephone Operators (RTO) has also been refreshed so that all communications staff have been officially trained and equipped for air traffic exchange. Furthermore, the government has introduced the Aircraft Accident Investigation Bureau (AAIB) as an independent agency to bring it consistent with international best practices and ICAO Annex 13 standards. This vital part has the effect of separating the role of accident investigation from that of regulatory oversight; to maintain objectivity and transparency in safety reviews. This dedication extends to building human capital and technical excellence.

Leading the Green Aviation Transition

India's commitment to environmental sustainability is a defining characteristic of its modern aviation strategy. The nation has emerged as a global leader in the adoption of green energy in airport operations, with 73 airports now operating on 100% green energy. This initiative positions India at the forefront of sustainable aviation practices.

The success of this strategy is best exemplified by the achievements of the country's major hubs. Delhi's Indira Gandhi International Airport (IGIA), for instance, has achieved Net Zero Carbon Emission Airport status (Level 5) under the Airport Council International's (ACI) Airport Carbon Accreditation (ACA) program, well ahead of its 2030 target.

This achievement was a result of several key initiatives, including the installation of a 7.84 MW solar power plant, the adoption of electric vehicles and TaxiBots, and the implementation of an ISO 50001:2018 Energy Management System. Major airports like Delhi, Mumbai, Hyderabad, and Bengaluru have all achieved Level 4+ ACI Accreditation, reaching carbon neutrality status and demonstrating their commitment to reducing their environmental footprint.

Conclusion & Recommendations: A Blueprint for a Global Aviation Hub

India's aviation sector is more than just a mode of transport; it is a powerful economic engine and a strategic enabler of national prosperity. The journey from 74 operational airports in 2014 to 164 in 2025, with a vision to reach 350-400 by 2047, is a clear demonstration of the transformative power of a well-articulated strategic vision and sustained investment. The sector's substantial contribution of $54 billion to the GDP and the generation of 7.7 million jobs underscores its critical role. The sector's future growth is not speculative but is grounded in the reality of a massive, under-penetrated domestic market and a proactive policy framework designed to foster innovation and inclusivity.

The Airports Authority of India (AAI) is actively fulfilling its dual role as both developer and

operator in the nation's infrastructure drive by undertaking multiple greenfield airport projects. These new-build projects, located on undeveloped sites, are crucial for expanding the national aviation network beyond congested metro hubs, especially in underserved regions. By leveraging its extensive experience in Air Navigation Services (ANS) and airport management, AAI ensures these greenfield facilities are designed with modern, future-proof capacity, directly supporting the government's mandate for rapid, inclusive regional connectivity under the UDAN scheme.

India's aviation sector is more than just a mode of transport; it is a powerful economic engine and a strategic enabler of national prosperity. The journey from 74 operational airports in 2014 to 164 in 2025, with a vision to reach 350-400 by 2047, is a clear demonstration of the transformative power of a well-articulated strategic vision and sustained investment. The sector's substantial contribution of $54 billion to the GDP and the generation of 7.7 million jobs underscores its critical role. The sector's future growth is not speculative but is grounded in the reality of a massive, under-penetrated domestic market and a proactive policy framework designed to foster innovation and inclusivity.

The strategic blueprint for the future is clear. It requires a continued focus on future-proofing infrastructure through a hybrid model of brownfield optimization and greenfield development, as seen in the ambitious plans for Delhi and Mumbai. It demands a forward-looking regulatory approach that pre-emptively addresses the challenges of new technologies like drones and eVTOLs, as demonstrated by the Civil Aviation Regulatory Body's six-group paradigm earlier. Most importantly, it calls for a candid recognition of key strategic gaps, particularly in the MRO and FTO sectors, which, if bridged, would unlock significant economic value and enhance India's self-reliance.

To solidify this vision, comprehensive Master Plans have been prepared for all operational airports, setting a clear roadmap for 2047. This extensive exercise aligns perfectly with the Prime Minister's dream of a 'Viksit Bharat' ensuring that aviation becomes a cornerstone of national development. The strategy emphasizes not just major hubs, but also connecting Tier-2, Tier-3, and remote cities through schemes like UDAN, promoting small aircraft operations, and developing heliports. By focusing on this last-mile connectivity, we share the vision of democratizing air travel, making it affordable and accessible to the 'Aam Nagrik', and transforming once-remote areas into vibrant economic centres by the centenary of our independence.

भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

Source of data- Open internet platform & AAI records.