

Impact of Covid-19 on Air Cargo Movement in India

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Abstract

The Covid-19 pandemic caused the most severe disruption ever experienced by India's air cargo sector. The suspension of passenger flights in March 2020 eliminated approximately 60-70% of international cargo capacity overnight, while demand for medicines, PPE, and essential goods surged simultaneously. This paper examines how the pandemic affected air cargo movement in India, covering operational disruptions, freight rate volatility, cargo volume changes, government response, and recovery strategies. A case study of Blue Dart Aviation, India's only dedicated freighter airline, is used to illustrate how a prepared, infrastructure-rich operator navigated the crisis. The study is based entirely on secondary data: DGCA statistics, IATA reports, Ministry of Civil Aviation publications, and academic literature. Findings reveal a 22% decline in total cargo volumes in FY 2020-21, a 200-400% freight rate surge on international routes, and lasting structural changes including accelerated digital adoption, cold chain investment, and growth of dedicated freighter capacity.

Keywords: Air Cargo, Covid-19, India Aviation, Blue Dart Aviation, Freight Rates, Lifeline Udan, Belly Cargo, Supply Chain Disruption, Preighter Operations, Cold Chain Logistics

I. INTRODUCTION

Aviation has long served as a backbone of global trade and connectivity. Over two decades, India has emerged as one of the fastest-growing aviation markets, with the air cargo sector growing steadily at 6-8% annually. While air freight accounts for approximately 2% of total freight by weight, it handles nearly 35% of India's trade value, underscoring the high-value nature of goods transported.

India's air cargo network spans approximately 35 airports, with major hubs at Delhi, Mumbai, Chennai, Bengaluru, Hyderabad, and Kolkata. The sector comprises belly cargo operations, dedicated freighter services, and express logistics companies. Key operators include Blue Dart Aviation, Air India Cargo, IndiGo Cargo, and several foreign carriers. Blue Dart holds a unique position as the only Indian airline operating a wholly-owned dedicated freighter fleet.

When Covid-19 led to nationwide flight suspension in March 2020, approximately 50-60% of India's air cargo capacity disappeared almost overnight. Simultaneously, demand for medicines, PPE, ventilators, and essential goods surged dramatically. This mismatch created a critical crisis: international freight rates shot up 200-400%, terminals congested, perishable goods spoiled, and pharmaceutical exporters struggled to secure cargo space.

A. Objectives of the Study

This study aims to: (1) examine pre-pandemic air cargo operations in India; (2) identify the nature and scale of Covid-19 disruptions; (3) evaluate government and industry responses; (4) analyse recovery strategies adopted; (5) assess long-term structural changes; and (6) offer recommendations for building resilience against future disruptions.

II. LITERATURE REVIEW

Carter [1] found that airlines with dedicated freighter capacity recovered significantly faster than those dependent on belly cargo. Gonzalez [4] documented that 40-60% of global cargo capacity was lost due to passenger flight suspensions in 2020. Liu [10] demonstrated through time-series analysis that international cargo rates rose over 200% at peak crisis levels.

Kumar [8] analysed DGCA data and found that Indian air cargo volumes dropped 22% in 2020 before a strong recovery driven by e-commerce in 2021. Mitchell [13] and Singh [17] showed that proactive government schemes, including dedicated cargo flights, were among the most effective tools for reducing supply chain disruption. India's Lifeline Udan scheme was specifically cited as one of the more proactive policy responses among emerging market governments.

Chen [2] established that e-commerce emerged as the primary driver of air cargo recovery, accounting for over 30% of volume growth post-lockdown. Roy [15] noted that cold chain infrastructure became a strategic investment priority at Indian airports following vaccine distribution. Despite growing global literature, there remains a gap in research specifically focused on India's unique characteristics: heavy pharmaceutical export dependence, limited dedicated freighter infrastructure, and specific government interventions implemented.

III. RESEARCH METHODOLOGY

The study employs a combination of descriptive and exploratory research using a case study design supplemented by secondary data analysis. Blue Dart Aviation was selected via purposive sampling as India's only dedicated freighter airline, offering a clear view of cargo-focused operator experience during the pandemic.

Secondary data sources include: IATA World Air Transport Statistics and Cargo Market Analysis Reports (2019-2022); DGCA Monthly Traffic Statistics Reports (2019-2022); Ministry of Civil Aviation Annual Reports (2019-20 and 2020-21); Airports Authority of India Cargo Traffic Data; Blue Dart Aviation Annual Reports (2019-2022); and peer-reviewed academic journals in aviation and logistics management.

The research is structured around three analytical phases: (1) impact analysis of pandemic effects on cargo operations; (2) response evaluation of government and industry interventions; and (3) recovery assessment measuring effectiveness of responses and lasting structural changes. Analysis tools include document analysis, comparative statistics, and thematic analysis of recovery strategies.

IV. AIR CARGO OPERATIONS IN INDIA

Prior to the pandemic, Indian airports handled approximately 3.41 million metric tonnes of cargo in FY 2018-19, dipping slightly to 3.31 million metric tonnes in FY 2019-20. International cargo consistently accounted for 55-58% of total volumes. The sector operated through four principal models: belly cargo on passenger aircraft (the dominant mode), dedicated freighter operations, express cargo services, and cold chain services for temperature-sensitive goods.

Major airports, particularly Delhi IGIA and Mumbai CSIA, had invested in modern cargo terminals with automated handling systems and pharmaceutical zones. However, pre-existing structural weaknesses included: limited dedicated freighter capacity relative to competing Asian hubs, slower customs clearance compared to Singapore and Dubai, and patchy cold chain infrastructure outside major airports. These gaps, manageable under normal operations, became critical vulnerabilities when the pandemic struck.

TABLE I. KEY AIR CARGO STATISTICS - INDIA (2018-2022)

Year	Total Cargo (MT)	Intl. Cargo (MT)	Dom. Cargo (MT)
2018-19	3.41 million	1.93 million	1.48 million
2019-20	3.31 million	1.85 million	1.46 million

2020-21	2.58 million	1.40 million	1.18 million
2021-22	3.25 million	1.78 million	1.47 million

Source: DGCA Monthly Traffic Statistics Reports (2019-2022)

V. COVID-19 IMPACT ON AIR CARGO MOVEMENT

A. Capacity Collapse

When the national lockdown was announced on 24 March 2020, international cargo capacity fell by an estimated 60-70% almost overnight due to passenger flight suspensions. Domestic capacity declined similarly. The only operators relatively unaffected on the capacity side were those with dedicated freighter aircraft, primarily Blue Dart domestically and Air India Cargo on international routes.

B. Freight Rate Surge

With capacity collapsing and demand surging, international rates from India rose 200-400% above pre-pandemic levels at the peak in April-May 2020. The cost of shipping pharmaceutical goods from India to Europe or the United States increased multiple times within weeks. Rate volatility continued through most of 2020 and into 2021, creating severe cost burdens for exporters and importers.

C. Volume Decline and Sectoral Impacts

Overall air cargo volumes fell approximately 22% in FY 2020-21 compared to the prior year. International cargo saw a sharper percentage decline than domestic. Pharmaceutical and medical cargo experienced demand surges with priority handling requirements. E-commerce grew strongly in the post-lockdown period. Industrial goods, automotive components, and perishable cargo experienced severe disruption.

TABLE II. COVID-19 IMPACT BY CARGO CATEGORY

Cargo Category	Impact During Pandemic
Pharmaceutical/Medical	Demand surge; 200-400% rate increase; priority handling required
E-commerce/Courier	Strong growth; became structural demand driver post-lockdown
Industrial/Engineering	Sharp decline due to factory shutdowns and trade restrictions
Perishable/Agricultural	Severe disruption; significant spoilage losses at terminals
Automotive/Electronics	Major decline due to global supply chain disruptions

D. Operational and Financial Challenges

Ground handling staff faced movement restrictions. Social distancing requirements reduced terminal processing capacity, creating backlogs. Documentation and customs clearance slowed due to reduced staffing and additional health checks. Passenger carriers including Air India, IndiGo, and SpiceJet reported large losses. One positive outcome was the acceleration of electronic documentation adoption: e-air waybills and digital customs clearance advanced more during the crisis than in years of gradual rollout.

E. Government Response

The Government of India responded with several targeted measures. The Lifeline Udan scheme, launched in late March 2020, contracted airlines to operate special cargo flights on routes that had lost commercial connectivity, focusing on medicines, food, and essential supplies. The Ministry of Civil Aviation facilitated priority customs clearance for emergency imports including ventilators and PPE. The DGCA authorised airlines to use passenger aircraft as temporary freighters (freighter operations).

VI. RECOVERY STRATEGIES

A. Freighter Operations

The most immediate response to capacity collapse was converting passenger aircraft for cargo-only operations (freighters). With DGCA approval, Air India, IndiGo, SpiceJet, and Vistara loaded cargo not only in belly holds but also in passenger cabins and overhead bins. Though expensive per cargo unit and requiring additional regulatory approvals, freighter operations provided meaningful capacity relief during the acute shortage and generated revenue when passenger income had ceased.

B. Dedicated Freighter Investment

The structural lesson of belly cargo vulnerability prompted Indian carriers to explore freighter operations more seriously. IndiGo and Air India Express announced steps toward dedicated cargo capacity. This long-term shift represents a fundamental change in how the sector approaches resilience planning.

C. Digital Transformation and Cold Chain Development

The pandemic accelerated digital adoption beyond what prior initiatives had achieved. Cargo booking platforms, automated tracking, electronic documentation, and demand forecasting analytics became essential tools. India's role in global vaccine distribution created urgent pressure to improve cold chain capabilities. Chennai, Hyderabad, and Bengaluru airports significantly improved pharmaceutical handling zones meeting GDP (Good Distribution Practice) standards, strengthening India's position as a pharmaceutical logistics hub.

TABLE III. AIR CARGO RECOVERY STRATEGIES

Strategy	Purpose
Freighter Operations	Increase cargo capacity using passenger aircraft cabins
Dedicated Freighter Investment	Build passenger-independent permanent cargo capacity
Digital Cargo Platforms	Improve booking efficiency and operational visibility
Lifeline Udan Scheme	Maintain essential cargo connectivity to underserved regions
Cold Chain Investment	Support pharmaceutical and vaccine logistics growth
E-commerce Integration	Capture structural growth in domestic express demand

VII. CASE STUDY: BLUE DART AVIATION

Blue Dart Aviation Limited, founded in 1983 and majority-owned by DHL since 2002, is India's only scheduled airline operating a wholly-owned dedicated cargo fleet. Operating Boeing 757-200 freighters from its Chennai hub with nightly services to Delhi, Mumbai, Kolkata, Bengaluru, and Hyderabad, the company serves over 35,000 locations. Its hub-and-spoke model and DHL global network integration provide a structurally distinct operational model compared to belly-cargo-dependent carriers.

A. Pandemic Response

Blue Dart's express logistics were classified as an essential service, requiring continued operations throughout the lockdown. The company rapidly implemented health and safety protocols: PPE distribution to frontline staff, sanitisation routines across all sites, temperature screening, and modified shift patterns to reduce crowding. Its Boeing 757 freighters continued flying when passenger services were suspended, making Blue Dart one of very few operators that could reliably offer cargo capacity during the crisis.

B. Capacity Advantage and E-commerce Surge

Owning its own fleet provided operational flexibility unavailable to belly-cargo-dependent competitors. Blue Dart optimised schedules,

added extra flights on high-demand routes, and adjusted routing to prioritise critical shipments. The pandemic-driven surge in e-commerce, as consumers shifted to online shopping during lockdowns, created substantial demand for express delivery. Blue Dart leveraged automated sorting systems and close coordination with e-commerce platforms to manage this volume increase.

C. Pharmaceutical and Vaccine Logistics

Blue Dart's pre-existing pharmaceutical logistics capabilities, including temperature-controlled vehicles, monitored warehouses, and trained handlers, positioned it to manage the surge in medical cargo and later support Covid-19 vaccine distribution under strict cold chain conditions. Its financial performance during the pandemic reflected these advantages: revenues held up relatively well while passenger-focused carriers posted historic losses, as sustained e-commerce and pharmaceutical demand combined with elevated freight rates to support revenue.

TABLE IV. BLUE DART AVIATION RESILIENCE MECHANISMS

Mechanism	Role During Pandemic
Dedicated Freighter Fleet	Maintained cargo capacity independent of passenger suspensions
Cold Chain Facilities	Supported pharmaceutical and vaccine cargo under strict conditions
Integrated IT Platform	Enabled real-time tracking and automated routing at high volume
DHL Global Network	Provided international connectivity and operational best practices
Business Continuity Plan	Guided health protocols, staffing, and operations from day one

VIII. DATA ANALYSIS AND FINDINGS

DGCA traffic statistics confirm total cargo volume declined from 3.31 million metric tonnes in FY 2019-20 to approximately 2.58 million metric tonnes in FY 2020-21, a fall of roughly 22%. International cargo fell more steeply than domestic cargo, reflecting the more severe disruption to international services. Recovery began in FY 2021-22, when total volumes returned to approximately 3.25 million metric tonnes, driven largely by e-commerce growth and resumption of international services.

IATA freight market analyses confirm extraordinary rate volatility. International rates from India surged 200-400% above pre-pandemic levels at the April-May 2020 peak, remaining elevated through most of 2020 before gradual normalisation through 2021. The capacity analysis reveals the clearest quantitative story: the suspension of international passenger flights in March 2020 eliminated 60-70% of international cargo capacity at Indian airports within days, not weeks.

TABLE V. IMPACT ANALYSIS OF COVID-19 ON AIR CARGO

Impact Area	Effect
Cargo Capacity	60-70% decline in international capacity at peak (March 2020)
Total Cargo Volume	Approx. 22% decline in FY 2020-21 vs. prior year
Freight Rates	200-400% surge on international routes (Apr-May 2020)
Pharmaceutical Cargo	Demand surge; significant logistics complexity and rate burden
Impact Area	Effect
Perishable Cargo	Severe disruption; significant spoilage losses at terminals

E-commerce Cargo	Strong growth; became a structural demand driver post-pandemic
Workforce	Operational challenges; increased costs from health protocols
Airport Operations	Reduced capacity; cargo backlogs at major hubs

The assessment of government interventions confirms the Lifeline Udan scheme as the most impactful policy response, maintaining connectivity to regions that would otherwise have been isolated. Authorisation of freighter operations and priority customs clearance for emergency imports also made tangible differences.

The contrast between Blue Dart's experience and belly-cargo-dependent operators represents the single most important structural lesson of the pandemic for India's air cargo sector.

IX. CONCLUSION AND RECOMMENDATIONS

The Covid-19 pandemic exposed India's air cargo sector's fundamental structural vulnerability: overwhelming dependence on passenger belly cargo capacity. When passenger services stopped, the majority of cargo capacity disappeared simultaneously, while demand for essential goods surged. The combined effects of capacity collapse, 200-400% freight rate spikes, 22% aggregate volume decline, and severe operational difficulties at cargo terminals represent the most severe disruption ever experienced by the sector.

Several responses proved effective. The Lifeline Udan scheme maintained critical supply chain connectivity. Freight operations restored some acute-phase capacity. Blue Dart Aviation demonstrated that a dedicated freighter fleet, strong technology infrastructure, and established pharmaceutical capabilities provide structural resilience against passenger aviation collapse.

A. Recommendations for Airlines and Cargo Operators

Operators should prioritise investment in dedicated freighter capacity through direct acquisition or long-term leasing. Business continuity plans must specifically address pandemic-type scenarios involving prolonged passenger service suspension and extreme demand volatility. Digital transformation should be treated as a strategic priority: operators with strong digital infrastructure adapted faster and emerged more competitive.

B. Recommendations for Government and Regulatory Bodies

A formal Air Cargo Emergency Response Framework should be established with pre-approved protocols for essential cargo operations during national emergencies, building on the Lifeline Udan model. Regulatory reforms to accelerate paperless customs clearance should continue. Fiscal incentives for cold chain infrastructure investment at airports, particularly in pharmaceutical zones meeting GDP certification, should be implemented.

C. Recommendations for Airport Operators

Airport operators should expand dedicated pharmaceutical zones meeting GDP standards, cold chain infrastructure for temperature-sensitive goods, and automated cargo handling systems to reduce labour dependency. Contingency plans for cargo backlog management during reduced-capacity periods should be standard requirements. The sector that exists in 2026 is better equipped for future disruption than the one that existed in 2019, but further development of dedicated freighter capacity, cold chain infrastructure, and digital capability is still required before India's air cargo network matches leading global aviation markets.

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