

AWARENESS

Newer Horizons in Human Excellence



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Table of Contents

1. The Onslaught of Artificial Intelligence in Healthcare — Kanwaljeet J. S.Anand and Shaun P. Setty	1
2. Indian Jews:A Case Study of Unique Religious Tolerance — Nicole Hirsch Korn	7
3. IXOHOXI Magic Square in Pādūkā Sahasram by Sri Vedānta Desika — N Kannan, K Srikanth	15
4. Advancements and Challenges in AlGaN and Phosphor-Based Deep Ultraviolet LEDs: Towards Broader Applications and Higher Efficiencies — K Vineela, P.V.N.M Kaushik, K. Jayanthi	21
5. Emotional Freedom Techniques (EFT) and Dopamine Detox:A Neurobehavioral Tool for Stress Management — Rajeshwari Ullagaddi	39
6. Confidence in Connectivity: Tracing Government Commitment through India's UDAN Scheme — Jacob Arndt	53

Article

Confidence in Connectivity: Tracing Government Commitment through India's UDAN Scheme

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Abstract: Since its launch in 2017, India's Ude Desh ka Aam Naagrik (UDAN) scheme has attempted to enhance regional air connectivity by incentivizing airlines to fly to unserved and underserved airports. Current literature has focused mainly on the operational difficulties and infrastructure deficiencies of the scheme; however, comparatively less attention has been directed towards the evolution of government confidence in UDAN's original mission over subsequent rounds of implementation. This study examines that growth through a study of the ratio of awarded routes to achieve UDAN's mission of linking less inhabited smaller cities with more inhabited urban areas. Using city population to create a classification system as a tool to determine mission-aligned routes, this study employs linear regression analysis across all five UDAN rounds. The results demonstrate a statistically significant enhancement in mission-compatible trajectories, reflecting governmental self-assurance and strategic intent in augmentation over time. The outcomes add to end-to-end understandings of policy learning and adjustment in the public sector for large-scale regional development initiatives.

Keywords: UDAN Scheme, Regional Air Connectivity, Public Policy Evaluation, Government Scheme Confidence, Urban-Rural Linkages

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Introduction

Since the liberalization of India's economy in the 1990s, air travel has increasingly become a core tenet of national development alongside regional balance and economic integration. Although the nation's airline sector has consistently grown over the period, air transport has consistently been highly concentrated in only a handful of major metropolitan areas, keeping much of the country geographically and economically isolated in return. In response to the growing issue, the government launched the "Ude Desh ka Aam Naagrik" which translates as "Let the common citizens of the country fly," and is commonly

referred to as the UDAN scheme in 2017 under the National Civil Aviation Policy, specifically aiming to make air transport more affordable to the everyday citizen through the enhancement of regional air connectivity. Through the development of government subsidies, route monopolies, and price caps, UDAN aimed to create an incentive for airlines to fly routes that aim to connect unserved and underserved airports in India.

While the objectives of UDAN have been widely acknowledged, much of the current literature surrounding the scheme has been focused on its operational challenges and if it is possible to connect and reconnect regional airports. However, there has been comparatively less attention to how government confidence in the program has changed over iterative rounds of implementation, as the scheme has awarded route subsidies in groups (e.g., “UDAN 1.0,” “UDAN 2.0,” and “UDAN 3.0” reflect three different instances where routes were awarded). This evaluation is fascinating to analyze, as it offers insights into how large-scale public schemes adapt and mature over time in terms of strategic commitment to the government’s underlying goals.

This paper presents a method of quantifying the Government of India’s belief in UDAN by tracking the proportion of routes that fulfil the scheme’s intent of connecting underserved, low-density regions to larger hubs. Instead of measuring operational success or profitability of routes, this approach looks at intention embedded into the route subsidy itself. Using a classification system based on population density, this study analyzes the development of route patterns from UDAN 1.0 through UDAN 5.3.

This study hypothesizes that the faith the Government of India holds in the UDAN scheme will increase over time, reflected in the form of a higher percentage of mission-aligned routes. By employing official Ministry of Civil Aviation route data and performing a linear regression analysis, this study tests this hypothesis.

Materials and Methods

This study draws on publicly available reports published by the Ministry of Civil Aviation (MoCA) that list routes awarded under the UDAN scheme. Data was compiled for each round of route awards, starting with UDAN 1.0 in 2017 through to UDAN 5.3 in 2024. For the sake of consistency and comparison between rounds, sub-rounds (i.e., UDAN 4.2 and UDAN 5.3) were recategorized under their parent round categories (UDAN 4.0 and UDAN 5.0, respectively); this is due to the notion that UDAN rounds 1.0 through 3.0 did not have any sub-rounds. This provides a more accurate longitudinal comparison, minimizing distortions caused by small or specialty sub-rounds.

Each awarded route included both the departure and arrival cities, the airline operating said route, and the date of commencement. To assess each connection, data from the most recent 2011 census was mapped onto each endpoint for all awarded routes rather than aggregating by state or union territory. By focusing on the population of the departure and arrival cities, the analysis captured whether connectivity improvements were directed toward smaller, less populous, communities aligning with the scheme’s regional equity objectives.

In order to determine if the awarded UDAN routes aligned with the regional connectivity objectives of the scheme, all departure cities and all destination cities were ranked by their total population. The cities were categorized into five groups according to the size of their population: cities that had fewer than 100,000 inhabitants were categorized as Sparse; cities that had 100,000 to 500,000 inhabitants were categorized as Moderately Sparse; cities that had 500,001 to 1,000,000 inhabitants were categorized as Moderate; cities that had between 1,000,001 to 3,000,000 inhabitants were

categorized as Moderately Dense; and cities with a population of more than 3,000,000 inhabitants were categorized as Dense. This setup allowed for implicit differentiation between severely underserved areas and larger, more urbanized cities.

Following the categorization of each city, awarded routes were evaluated by the population categories of their origin and destination cities. A route was categorized as Mission-Aligned if it connected a Sparse or Moderately Sparse city to a Moderate, Moderately Dense, or Dense city. Connections between two low-population cities, i.e., Sparse–Sparse or Moderately Sparse–Moderately Sparse pairs, were not included as Mission-Aligned, as these routes were not aligned with the program's strategic objective of linking remote areas to more densely populated urban hubs. This classification approach operationalizes UDAN's original mission by giving precedence to routes that increase access between small towns and large population centers, not simply connecting isolated or otherwise small areas to one another.

Although it is true that connections between two smaller or remote cities may contribute to regional development, this study defines "Mission-Alignment" narrowly in accordance with the UDAN scheme's emphasis on linking underserved regions with major urban centers as the the program's intent has been described as an approach to enhance accessibility by connecting unserved and underserved airports to larger markets, where passenger demand, infrastructure capacity, and network spillover effects are greater. Routes connecting two low-population cities, though potentially valuable for localized connectivity, generally do not advance this specific hub-linking objective that underpins the program's initial design. As such, these routes were excluded from the Mission-Aligned category to maintain fidelity to UDAN's stated goal of integrating smaller towns into the broader national air network rather than developing isolated regional pairs. Nevertheless, the potential developmental importance of remote-to-remote connections is acknowledged, and future research should expand such framework to evaluate their unique role in fostering intraregional accessibility. Once all routes were classified as Mission-Aligned or Not Mission-Aligned, the proportion of Mission-Aligned routes to each primary UDAN round was calculated. For an apples-to-apples comparison across rounds, all sub-rounds such as UDAN 4.2 and UDAN 5.3 were consolidated under their parent phases (UDAN 4.0 and UDAN 5.0, respectively). For each round, Mission-Aligned routes were enumerated and divided by the total number of routes allocated, producing a percentage that served as the key indicator of conformity with UDAN's regional equity goals.

To assess whether government confidence in the UDAN scheme increased over time, linear regression was conducted using the UDAN round number (coded as 1 through 5) as a continuous independent variable and the percentage of Mission-Aligned routes in each round as the dependent variable. This modeling strategy treats each round as a point on a temporal scale, enabling the analysis to test for a directional trend across iterations of the program rather than estimate round-specific differences. This decision reflects the research objective, which is not to compare each round individually, but to determine whether there is a systematic increase in alignment with UDAN's mission over time. The statistical significance of this trend was evaluated by analyzing the slope coefficient and its p-value. A positive and statistically significant slope would indicate that the share of routes adhering to the scheme's regional connectivity goals increased over successive rounds, which serves as a proxy for growing strategic confidence in the program by policymakers.

Considerations and Potential Biases

While the classification framework based on city population provides a consistent and transparent way to interpret UDAN's regional connectivity mission, several potential sources of bias should be recognized. The use of the 2011 Census of India means that recent demographic and urban growth is not reflected in the dataset, which may slightly influence how certain cities are categorized. Population size alone may also not fully capture the complexity of being "underserved," since the UDAN scheme considers additional factors such as geographic isolation, previous levels of air connectivity, and regional economic disparity. Thus, the threshold values used to define population categories, although logically reasoned, introduce some arbitrariness for cities that fall close to category boundaries.

Despite these considerations, population remains the most appropriate and reliable variable for this analysis. Alternative indicators such as GDP per capita or income-based measures, while valuable, are not consistently available at the city level across India and often lack standardization for public use. In contrast, census population data are comprehensive, uniform, and accessible, providing a practical and credible foundation for large-scale comparative assessment of route patterns.

Literature Review

Since its launch in 2017, the UDAN scheme has created significant academic interest with researchers examining much of its impacts on regional connectivity, its policy structure, and infrastructure concerns. Much of the current literature acknowledges the intention of the scheme to level the playing field in accessing air travel across the subcontinent; however, evaluations vary depending on the study vantage point. Regardless of such vantage points, three prevailing strands of research have emerged.

First, several studies have focused exclusively on the economic and network viability of the scheme itself and analyzing if the structure of awarded routes promotes sustainable regional aviation networks. Second, there has been a critical assessment of the policy framework itself, which debates the effectiveness of the scheme's design and its alignment with greater national aviation goals and challenges that are encountered during implementation. Lastly, there has been a growing body of works that emphasize the barriers, both infrastructure and operational, that regional airports face that warn that connectivity goals may indeed falter without proper investment in physical and environmental sustainability.

This review synthesizes journal articles from all three of these themes in order to situate the current research within the broader academic literature on regional air connectivity in India.

Viability and Network Design for Regional Connectivity One of the most important issues in recent UDAN literature is the economic sustainability of regional air connectivity and the structural framework of the new route networks. According to current research by Sindhvani, Jayaram and Ivanov (2024), long-term sustainability of regional connectivity efforts depends on balancing economic profitability with broader social viability goals.¹ Through the examination of the network structure of UDAN, authors argue that even though the scheme efficiently caters to unserved areas, it is jeopardized when routes become disconnected from hubs or have limited feeder traffic. Their findings demonstrate that a stronger hub-and-spoke strategy with well-performing airports as bases would increase resilience in regional connectivity formed under UDAN.

Similarly, another study by Jose and Ram (2019) examines the effect of UDAN on the structure of India's airport network.² They construct the Community Index and the Hubbing Potential Index as tools to evaluate how additional new routes enhance airport connectivity. They summarize that UDAN has had a modest positive impact on regional accessibility but note that the network density still remains high around extremely few dominant hubs. The study substantiates the worry that without strategic alignment into existing airport networks, many new UDAN routes are likely to be operationally exposed when subsidies expire.

Together, these pieces point to a general tension at work in UDAN: the program attempts to make access more popular, but its viability depends on its ability to move successfully through India's aerial network along economic and territorial lines. These findings inform the present study's emphasis on patterns of route selection as a proxy for government learning through strategy over the long-term.

Policy Design, Implementation, and Challenges

Apart from network design, a considerable volume of literature has critically examined UDAN's policy framework and its overall alignment with national aviation goals. Research by Iyer and Thomas offers a critical evaluation of the scheme, arguing that while the policy was novel in the way it sought to address market failures, its design introduced a series of operational risks.³ They highlight that the viability gap funding mechanism, though necessary to stimulate airlines, also created dependency relationships, making the majority of routes non-viable without continued government subsidy. Furthermore, the authors refer to administrative delays, such as slowness in airport readiness and subsidy payment delays, which undermined initial momentum for the scheme.

To this, one study situates UDAN within India's National Civil Aviation Policy (NCAP) and positions its framework in the context of global trends in aviation liberalization.⁴ Vivek (2024) argues that UDAN exhibits a hybrid model, blending market incentives with state intervention, but cautions that lopsided implementation and divided regulatory authority have undermined its success. His analysis suggests that while the theoretical foundations of UDAN are aligned with best practices in spurring regional aviation, its success remains ultimately hostage to more consistent intergovernmental coordination and a more effective feedback loop between policy formulation and ground realities.

In conjunction, these writings place UDAN not simply as a technocratic solution to boost connectivity, but as a multi-dimensional policy experiment that embodies the challenges of organizing massive government programs that balance market logic with developmental objectives. Their critiques highlight the importance of examining how state commitment to UDAN's goals has evolved over time, an emphasis at the center of the present research.

Airport Infrastructure, Sustainability, and Barriers

A third important strand of UDAN research addresses the infrastructural and environmental concerns limiting the program's long-term viability. One study draws attention to the persistence of deficits in airport infrastructure, particularly at regional and remote airports.⁵ Sarkate (2024) recognizes that various airports included under UDAN lacked major operational preparedness at the time of route awards, resulting in frequent delays or cancellations of subsidized flights. Sarkate contends that absent parallel investment in airport facilities, safety standards, and supporting logistics, even connectivity efforts that are well-intentioned risk unsustainability after government incentives dwindle.

Additionally, while other studies focused mainly on network viability, one has identified infrastructure as an underlying variable in regional aviation success.¹ Their research shows that poorly developed ground facilities at smaller airports not only affect short-term operating efficiency but also discourage passenger take-up, undermining route load factors and commercial viability over the long term. They emphasize that infrastructure deficiencies add to the challenge of balancing commercial viability with social equity objectives in regional air transport.

When viewed together, these writings underscore that achieving UDAN's goals requires more than subsidy-driven route growth. Physical infrastructure, operational consistency, and long-term viability planning are fundamental determinants of whether or not regional connectivity programs can genuinely democratize air travel. Their work supplements the present study's notes on the way government strategy has evolved—not merely in the quantity of routes granted, but in the strategic confidence placed in routes most directly consonant with regional growth aspirations.

Results

The proportion of Mission-Aligned routes was calculated for each large UDAN round to calculate the path of government confidence over time. Outcomes are displayed to have a rising trend consistent with the stated objectives of the scheme. Volatility across rounds was seen, although the long-term trend shows a rising emphasis on building underserved cities with the key urban centers.

Some 51.8% of routes granted under UDAN 1.0 were Mission-Aligned. This percentage declined to 44.5% under UDAN 2.0 but picked up significantly to 59.4% under UDAN 3.0. The following rounds also saw a similar trend with 57.0% routes being Mission-Aligned under UDAN 4.0 and 60.4% under UDAN 5.0. Although the first round witnessed a decline during the initial phase, the data show that more percent of routes sequentially depicted the regional equity mission of the scheme as the program advanced.

Table I. Classification Metrics per UDAN Round

Departure	Arrival	UDAN-Aligned	UDAN 1.0	UDAN 2.0	UDAN 3.0	UDAN 4.0	UDAN 5.0
Sparse	Sparse	No	0	22	4	18	16
Sparse	Moderately Sparse	No	1	9	5	8	5
Sparse	Moderate	Yes	1	3	5	10	5
Sparse	Moderately Dense	Yes	1	7	7	7	6
Sparse	Dense	Yes	7	7	9	3	4
Moderately Sparse	Sparse	No	1	9	5	8	5
Moderately Sparse	Moderately Sparse	No	2	8	8	6	2

Moderately Sparse	Moderate	Yes	0	6	4	3	3
Moderately Sparse	Moderately Dense	Yes	2	4	13	13	8
Moderately Sparse	Dense	Yes	4	7	11	3	6
Moderate	Sparse	Yes	1	4	5	10	5
Moderate	Moderately Sparse	Yes	0	6	4	3	3
Moderate	Moderate	No	0	0	2	0	2
Moderate	Moderately Dense	No	2	4	6	7	3
Moderate	Dense	No	5	2	6	1	3
Moderately Dense	Sparse	Yes	1	7	7	6	6
Moderately Dense	Moderately Sparse	Yes	2	4	13	13	8
Moderately Dense	Moderate	No	2	4	6	7	3
Moderately Dense	Moderately Dense	No	4	16	15	2	0
Moderately Dense	Dense	No	3	5	2	0	0
Dense	Sparse	Yes	6	7	9	3	4
Dense	Moderately Sparse	Yes	4	7	11	3	6
Dense	Moderate	No	5	2	6	1	3
Dense	Moderately Dense	No	2	5	2	0	0
Dense	Dense	No	0	0	0	0	0

Table 2. Analytic Measures for All Rounds

Metric	Value	Unit of Measurement
Slope	0.029704	Percentage points per UDAN round (Change in % of mission-aligned routes per round)
Intercept	0.457108	Proportion (i.e., 45.7%) (Estimated % mission-aligned routes when round = 0)
Standard Error (Slope)	0.0167	Percentage points per UDAN round (Uncertainty in the slope estimate)
Standard Error (Intercept)	0.055388	Proportion (Uncertainty in the intercept estimate)
R ² (Coefficient of Determination)	0.513288	Proportion (unitless) (Share of variance explained by the model)
Standard Error of the Y Estimate	0.05281	Proportion (Average error between predicted and actual % mission-aligned routes)
F-statistic	3.163747	Unitless (Compares model fit vs. a null model)
Degrees of Freedom (df)	3	Count (Sample size minus number of estimated parameters)
p-value (Slope)	0.008823	Probability (0–1) (Likelihood the slope is due to chance)
p-value (Intercept)	0.008367	Probability (0–1) (Same as above, for intercept)

A linear regression test confirmed the presence of a statistically significant positive trend. The slope of the regression line was +2.97 percentage points per round of UDAN, with an R² of 0.513, indicating a moderate strength of association. The p-value for the slope was 0.0088, verifying that the trend is statistically significant at $\alpha = 0.01$. These results support the study hypothesis that the government's confidence in the objectives of UDAN grew over time, as reflected in the trend shift in route awards.

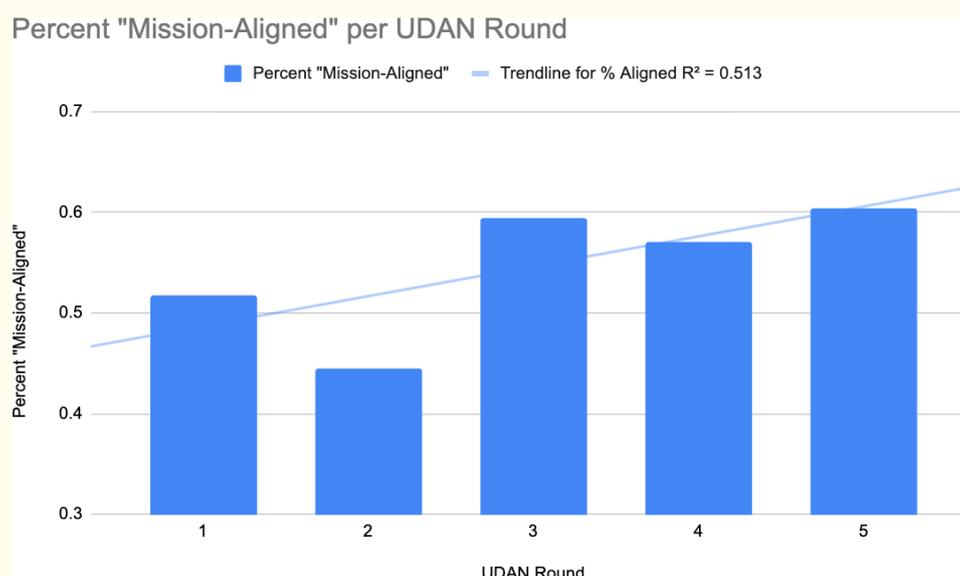


Figure 1: Chart displaying the percentage of Mission-Aligned routes per UDAN Round with trendline.

Discussion

The results of this study verify a statistically significant rise in the proportion of Mission-Aligned routes under allocation in the UDAN scheme, supporting the hypothesis that government confidence in the initial targets of the program grew over time. Although from the first round to the second and from the third to the fourth, there were minor falls, other rounds showed a transparent trend of rising proportions of routes connecting smaller, unserved towns to larger urban cities. This trend suggests that there was heightened sharpening of strategic priorities as the government progressively preferred routes matching the scheme's regional equity targets as implementation went on. However, it is important to also notice the decline observed in UDAN 2.0, followed by steady rebound in later rounds, which likely reflects early implementation challenges rather than a shift away from the program's regional equity goals. Prior research has shown the effects of administrative delays in airport readiness, limited airline participation, and the need to stabilize the viability gap funding process, of which the analysis performed in this study solidifies such comments. Though as the program matured, these logistical and policy bottlenecks appear to have eased, enabling later rounds, particularly UDAN 3.0 and 5.0, to reflect a more confident and strategically refined approach to mission alignment.

Such findings align with broader theory of policy learning and institutional response that assumes many government programs improve progressively over time cycles of feedback and experience, not by dramatic success. Early scholarly criticisms of UDAN, such as those by Iyer and Thomas (2020) and Vivek (2024), pointed to operational implementation challenges and policy fragmentation that undermined the initial rounds of the scheme. However, the shifting pattern of route awards observed in this study suggests that these early challenges did not result in abandonment of the scheme's mission but instead appear to have initiated a learning and improvement process. Rather than opening access indiscriminately, further rounds of UDAN route awards now look more strategic and confident in balancing regional coverage with the imperatives of sustaining new routes.

In referencing the shaping of awarded routes as a surrogacy indicator of government confidence, this study brings new insight to common judgments of UDAN, whose earlier measurements have tended to be in terms of operational feasibility or demand. It indicates that intent — as encoded in programmatic decisions — can itself evolve meaningfully over time, even without complete operational success. But one shortcoming of this approach is that it measures strategic intent and not outcomes realized. Without being privy to comprehensive post-award operational information, it is not possible to know how many of these Mission-Aligned tracks ultimately became commercially sustainable or sustained passenger demand. Future research could build on this study by tracking the operational life of successful routes, analyzing how initial confidence was translated into long-term success or failure across India's evolving regional air network.

Furthermore, the increasing share of Mission-Aligned routes across UDAN rounds carries important implications for future iterations of the scheme and for regional connectivity policy more broadly. The upward trend suggests that stakeholders have progressively refined their understanding of how to balance regional inclusion with network sustainability. Future UDAN rounds could build on this trajectory by embedding clearer evaluation frameworks that link route selection with measurable social and economic outcomes. More consistent post-award data collection, specifically on factors such as passenger demand, subsidy dependence, and route longevity, would allow the government to better calibrate incentives and identify which types of connections generate the greatest long-term regional impact. Beyond UDAN, these findings highlight the value of iterative policy design for large-scale public programs. As governments pursue similar connectivity initiatives in aviation, rail, or digital infrastructure, adopting a learning-based approach that continually aligns implementation choices with original equity goals can enhance both efficiency and developmental reach.

Limitations

While this study provides insight into the evolution of government confidence in the UDAN scheme, it is constrained by the limits of publicly available data. The Airports Authority of India releases detailed route award lists for each UDAN round, but many important complementary datasets are not accessible to the public. Information such as the specific subsidy amounts allocated per route, the duration and renewal terms of those subsidies, and the operational status of routes over time is either incomplete or unpublished. While partial amounts of such data may be publicly accessible, specifically airline-specific data voluntarily submitted to the Standard Schedules Information Manual ("SSIM"), the vast majority of smaller airlines do not voluntarily submit information to such centralized locations. Thus, the absence of this data restricts the ability to evaluate the financial or operational outcomes associated with each route and limits the analysis to government intent as expressed through route allocation patterns.

Similarly, post-award monitoring data, such as passenger load factors, route profitability, cancellation rates, or airport utilization statistics, are neither systematically released publicly by airlines nor to the SSIM. These data would allow for a fuller understanding of how initial government confidence translated into long-term operational success or failure. Without access to such information, this study cannot assess whether Mission-Aligned routes sustained operations, achieved financial independence, or advanced regional equity outcomes beyond their initial designation.

Despite these limitations, the publicly available UDAN route data remain a valuable and legitimate basis for analyzing the evolution of strategic intent within the program. By focusing on route award patterns rather than post-operational results, the study offers a replicable and policy-relevant lens through which to understand how large-scale government initiatives mature over multiple phases of implementation.

Conclusions

This study examined the evolution of government confidence in India's UDAN scheme through tracking the percentage of route awards that fell in line with the program's early regional equity objectives. Using a systematic classification of city sizes and statistically testing trends across five large UDAN rounds, the findings affirm the hypothesis that government confidence in the scheme evolved over time. A growing share of assigned routes prioritized connections among unserved communities and more heavily populated urban areas, indicative of rising strategic sophistication as the program aged.

The conclusions of this study offer more aggregate observations on how public programs develop in implementation. Even amid the challenges of operating and initial opprobrium, the UDAN scheme demonstrates that repeated rounds of policymaking can sharpen institutional intent to fundamental goals. Through examination of the design of successful routes as distinct from outcomes after operation, this study suggests that programmatic intention itself is a central—and measurable—dimension of public sector formation.

Future research could expand on this by integrating performance metrics regarding operations, measuring not only whether approved routes contributed to mission objectives but whether they remained viable in practice. Tracking route sustainability, passenger uptake rates, and economic effects locally would further develop the way early confidence resulted in long-term success in regional aviation within India.

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