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Airlines and Economic Growth: Evaluating the Impact of the Aviation Sector on Tanzania's Development

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Abstract

This study examined the contribution of the aviation sector to Tanzania's economic growth by analyzing the effects of air passenger traffic, cargo volumes, aviation infrastructure investment, operational air routes, and international tourist arrivals from 1990 to 2024. Employing a mixed-methods design that combined multiple regression analysis with NVivo-assisted thematic analysis, the study provides comprehensive evidence of aviation's role in shaping national economic performance. The regression findings show that passenger traffic, cargo volumes, and infrastructure investment exert statistically significant positive impacts on GDP growth, highlighting aviation's contribution to stimulating tourism, trade, and overall productivity. By contrast, the number of operational routes and international tourist arrivals did not demonstrate statistically significant effects, pointing to persistent structural inefficiencies, weak route optimization, and policy misalignment. Qualitative insights reinforced these observations, revealing recurrent themes of infrastructure gaps, policy fragmentation, regulatory delays, and service quality constraints. The study concludes that while Tanzania's aviation sector holds substantial economic potential, unlocking this potential requires coordinated reforms aimed at enhancing connectivity, strengthening airline competitiveness, and accelerating regional liberalization frameworks. These measures are essential for positioning the aviation sector as a more effective driver of sustained economic development.

Keywords: *Aviation Sector, Economic Growth, Air Passenger Traffic, Cargo Volumes, Infrastructure Investment, Connectivity, Liberalization, Tourism, SAATM*

1. Introduction

Air transportation has emerged as a cornerstone of contemporary economic systems, enabling the efficient movement of people, goods, and services across national and regional borders. It plays a pivotal role in facilitating globalization, connecting distant regions to global markets, and promoting integration through trade, tourism, and investment. For developing countries, particularly within the African continent, aviation holds significant promise in bridging geographic divides, fostering regional cohesion, and catalyzing inclusive economic transformation (Samunderu, 2023). According to data from the International Air Transport Association (IATA), air transport accounted for approximately 3.5% of global GDP in 2022, with over 65 million jobs supported worldwide.

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In Africa, the aviation sector has long been constrained by systemic issues such as underinvestment, policy disjointedness, and limited liberalization. Nonetheless, initiatives like the Single African Air Transport Market (SAATM), launched in 2018 under the African Union's Agenda 2063, reflect continental efforts to improve air connectivity and streamline regulatory frameworks. Some African nations, notably Ethiopia and Rwanda, have strategically leveraged investments in aviation to establish themselves as regional hubs stimulating job creation, attracting investment, and boosting tourism (Tolcha et al., 2023; Wana, 2023). However, in Tanzania a country endowed with world-class tourist attractions, a vital Indian Ocean coastline, and rising domestic demand the aviation sector's full economic potential remains largely untapped.

Recent reforms in Tanzania's aviation industry have included substantial infrastructure upgrades at airports such as Julius Nyerere International Airport (JNIA), Kilimanjaro International Airport (KIA), and the new Dodoma Airport. Parallel to these developments, the revitalization of Air Tanzania Company Limited (ATCL), supported by the acquisition of modern aircraft including Boeing 787s and Bombardier Q400s, demonstrates a deliberate attempt to strengthen connectivity at both domestic and international levels (Spillane, 2021). Tanzania's participation in regional frameworks such as SAATM and the East African Community's airspace liberalization agenda also suggests a commitment to opening its skies and enhancing intra-African air travel.

Nevertheless, the sector's overall contribution to Tanzania's economic growth remains underwhelming and insufficiently explored in academic discourse. The country lags behind regional counterparts in key indicators such as passenger traffic, route diversity, and air cargo volume (Njoya & Isah, 2023). Persistent challenges confront ATCL, including market competitiveness, limited route networks, and difficulties in sustaining profitability. Airfares remain relatively high, and many regions are inadequately served, limiting accessibility and diminishing the broader economic inclusivity of air transport (Khan, 2024).

Furthermore, tourism one of the country's top foreign exchange earners depends heavily on-air travel for international arrivals. Yet access to flagship destinations like Mount Kilimanjaro, Zanzibar, and the Serengeti is hampered by inconsistent international flight schedules, expensive airfares, and a lack of strategic bilateral air service agreements (Kyara, 2021; Wamboye, 2022).

Other sectors, such as horticultural exports and business travel, which could benefit substantially from efficient air connectivity, remain overlooked in terms of aviation policy alignment and sectorial development strategies.

While recent public investments in aviation infrastructure are commendable, questions persist regarding their economic efficiency and long-term impact. There is insufficient clarity on whether the financial outlays have translated into tangible macroeconomic outcomes such as GDP growth, job creation, expanded trade, or enhanced public service delivery. John and Magai (2025) stress the importance of evidence-based aviation strategies that are aligned with national development objectives.

This study seeks to address these gaps by critically assessing the influence of the aviation sector particularly airline operations on Tanzania's economic development.

1.2 Research Problem

Air transport is often credited with supporting economic expansion by facilitating trade, tourism, and cross-border cooperation, particularly in developing countries (Tolcha, Bråthen, & Holmgren, 2023). Tanzania has made significant strides in this direction, with the revival of its national airline, Air Tanzania Company Limited (ATCL), and the modernization of critical airport infrastructure such as JNIA and KIA (Spillane, 2021). The nation's endorsement of regional liberalization efforts, including the Single African Air Transport Market (SAATM), further highlights its ambition to position itself within the evolving African aviation landscape (Njoya & Isah, 2023). However, the actual economic returns from these interventions remain unclear and poorly documented, both in academic research and national development frameworks.

Despite infrastructure upgrades, the aviation sector continues to face numerous institutional and operational limitations. These range from limited flight coverage and low service frequency to high ticket costs and inconsistent service quality. Such constraints hinder the competitiveness of Tanzania's airlines, especially when compared to better-established carriers in the region such as Ethiopian Airlines and Kenya Airways (John & Magai, 2025; Khan, 2024). Moreover, a lack of coordination across government ministries and the absence of integrated strategies connecting

aviation with trade, tourism, and investment development efforts compound the problem (Said, 2022; Samunderu, 2023). While existing literature may touch upon aspects such as air passenger trends or capital spending, there is a notable absence of empirical studies that correlate aviation performance metrics like cargo volumes or route expansion with economic outcomes in Tanzania. This lack of integrated, evidence-driven evaluation represents a significant gap in both academic and policy circles. Much of the current research remains theoretical or focused on pan-African trends, offering little insight into the specific performance and challenges of Tanzania's aviation sector (Wana, 2023; Malinga, Jain, & Roy, 2024). Furthermore, few analyses incorporate qualitative perspectives such as user satisfaction, stakeholder opinions, or operational efficiency all critical to assessing the long-term sustainability of airline operations (Libent & Magasi, 2024; Pardede, 2024).

In response to these gaps, this study sets out to explore the economic impact of Tanzania's airline industry, identifying both its contributions and the barriers impeding its full development potential.

1.3 Research Objective

The aim of this study is to evaluate the extent to which the aviation sector specifically passenger movements, cargo volumes, infrastructure investment, route expansion, and international tourist arrivals contributes to Tanzania's economic growth between 1990 and 2024. The study further aims to identify institutional, operational, and policy factors that influence the effectiveness of aviation as a driver of national development.

1.4 Research Questions

i. To what extent do air passenger traffic, cargo volumes, and aviation infrastructure investment influence Tanzania's GDP growth?
ii. Why do operational routes and international tourist arrivals show weaker or statistically insignificant influence on GDP despite sectorial investment and policy reforms?
iii. What institutional, regulatory, and operational factors shape the relationship between the aviation sector and economic development in Tanzania?

2. Literature Review

2.1 Theoretical Framework

Understanding the relationship between airlines and economic growth in Tanzania calls for a multi-dimensional theoretical approach that captures both macroeconomic trends and microeconomic linkages. Several key theories help explain how air transport interacts with national development dynamics.

The Endogenous Growth Theory provides an essential foundation. The theory was primarily propounded by Paul Romer in the mid-1980s and further developed by Robert Lucas around the same period. Paul Romer (1986, 1990) emphasized the role of knowledge, technological change, and human capital as internally generated factors driving long-term economic growth while Robert Lucas (1988) extended the theory by focusing on human capital accumulation and its spillover effects on productivity. The theory rests on the assumption that technological progress is generated within the economy through deliberate investment in human capital, research and development, and innovation. It assumes constant or increasing returns to knowledge, with ideas being non-rival and partially excludable, allowing for spillover effects that benefit the wider economy. Unlike the Solow-Swan model, it rejects the notion of exogenous technological shocks, arguing instead that growth is driven by the accumulation of skills, education, and innovation, and that government policy can influence long-run growth rates. Its main strengths lie in explaining persistent growth without external technology, highlighting the role of human capital, offering policy relevance, and accounting for differences in growth rates across countries. However, it also has weaknesses, including the difficulty of measuring human capital and technological progress, overestimating the ease and automatic nature of spillovers, underplaying physical and institutional constraints, assuming continuous innovation, and not fully addressing the inequality that may result from technology-driven growth.

It also argues that long-term economic growth is primarily driven by internal factors such as human capital development, technological innovation, and infrastructure investment. Within this context, the aviation sector plays a pivotal role as a facilitator of productivity and knowledge flow. Airlines, viewed as part of a country's critical infrastructure, enable the movement of people, goods, and ideas, thereby enhancing overall economic performance. In Tanzania, the expansion of air

connectivity has helped to reduce geographic and economic isolation, particularly for regions like Zanzibar and Kilimanjaro. These improvements have supported tourism growth, increased trade, and broadened access to markets (Khan, 2024).

In relation to this study, Endogenous Growth Theory directly links to the quantitative variables of infrastructure investment, passenger traffic, and cargo volumes, as these indicators represent channels through which aviation activity contributes to productivity and long-run GDP growth. Thus, the theory provides the conceptual justification for including these variables in the regression model.

Network Theory offers a complementary perspective by examining transport systems as networks composed of interconnected nodes. In modern social science and economics, figures like Jacob Moreno (1930s, sociometry and social network analysis) and later scholars such as Stanley Milgram, Mark Granovetter, and Duncan Watts contributed significantly to applying network concepts to human interactions and complex systems. In this framework, airlines function as key links within a larger web that connects urban centers, regions, and international markets. Aviation strengthens both physical and economic ties, contributing to the cohesion of domestic economies and integrating them into global systems. For Tanzania, the expansion of domestic routes has improved interregional access and fostered inclusivity, while international air connections have opened up new avenues for investment, tourism, and trade (Samunderu, 2023). The theory highlights how these connections create a more dynamic and responsive economic environment.
In this study, Network Theory provides the conceptual rationale for examining operational routes and connectivity, helping to explain why some routes may remain economically insignificant despite expansion. If nodes (airports) and links (routes) are not efficiently utilized or integrated, the network fails to generate strong economic spillovers.

Multiplier Effect Theory is also relevant. It is most commonly attributed to John Maynard Keynes, who formalized the concept in the 1930s as part of his broader work in The General Theory of Employment, Interest and Money (1936). The original idea, however, was first introduced in a more specific form by Richard F. Kahn in 1931 in his paper The Relation of Home Investment to Unemployment, where he explained the “employment multiplier.” Keynes later expanded Kahn’s

work to general spending and income in the economy, making it the cornerstone of Keynesian economics.

This theory posits that investments in strategic sectors like aviation can produce ripple effects throughout the economy. The benefits are not confined to airlines alone; they extend to related industries such as tourism, logistics, and ground handling services, retail, and hospitality. For instance, introducing a new flight route often results in higher hotel occupancy rates, increased local transport demand, and the growth of airport retail outlets (Malinga et al., 2024). In Tanzania, the aviation sector's growth has led to tangible economic stimulation beyond its immediate operations, especially in areas where other forms of connectivity are limited. The multiplier effect underscores aviation's potential as a catalyst for broader economic development.

For this study, the Multiplier Effect Theory supports the inclusion of passenger traffic, cargo volumes, and tourist arrivals in the empirical model, as these variables represent the primary channels through which aviation activity triggers secondary economic benefits. The theory helps explain why these indicators are expected to influence GDP growth.

Taken together, these three theories provide a coherent conceptual foundation for the study. Endogenous Growth Theory explains the productivity-enhancing role of aviation investment; Network Theory clarifies the importance of connectivity and route efficiency; and the Multiplier Effect Theory captures aviation's broader economic spillovers. Collectively, they justify the selection of variables in the regression model and guide the interpretation of both significant and non-significant findings.

2.2 Empirical Review

Empirical studies exploring the relationship between aviation and economic development consistently highlight the sector's influence on GDP growth, trade facilitation, tourism performance, and infrastructure-led productivity. In the East African context, Njoya and Isah (2023) showed through econometric modelling that full implementation of the Single African Air Transport Market (SAATM) would substantially increase air traffic volumes, reduce airfare costs, and strengthen Tanzania's GDP performance. Their findings align with broader evidence from Tolcha, Bråthen, and Holmgren (2023), who demonstrated a bidirectional causal relationship

between air transport development and economic growth across African countries, emphasizing that investments in airline performance and airport infrastructure tend to produce measurable macroeconomic gains.

At the firm and industry level, Khan (2024) analysed national carriers and found that state-owned airlines such as Air Tanzania can contribute positively to economic development when they achieve operational efficiency and commercial viability. However, chronic dependence on subsidies without productivity improvements reduces their overall economic value. Tourism-focused studies further support aviation's developmental role. Samunderu (2023), Kyara (2021), and Wamboye (2022) found that the expansion of international routes increases inbound tourism, especially when airlines offer direct access to key destinations. Nonetheless, they noted that inadequate marketing, inconsistent flight schedules, and service quality challenges continue to limit Tanzania's potential to attract high-value tourists despite possessing world-class attractions. Service quality has also emerged as a critical determinant of airline competitiveness and long-term economic contribution. Libent and Magasi (2024) found that customer satisfaction is strongly associated with punctuality, pricing, staff professionalism, and digital booking efficiency. Similarly, Pardede (2024) concluded that poor service delivery lowers route profitability and reduces aviation's spillover benefits to tourism, hospitality, and logistics sectors. Competitive strategy research by John and Magai (2025) highlighted route optimization, cost efficiency, and strategic partnerships as essential drivers of airline sustainability areas where Tanzanian carriers continue to lag due to operational and managerial constraints.

Infrastructure-related studies further reinforce the sector's developmental importance. Maziku and Bankwa (2024) documented the rising role of non-aeronautical revenue streams at Julius Nyerere International Airport, demonstrating how airports can stimulate urban development and employment through diversified business activities. However, inadequacies identified by Samunderu (2023) including outdated systems, limited cargo infrastructure, and maintenance deficits suggest that many African airports, including those in Tanzania, are not fully equipped to support high levels of international traffic or to meet modern service standards required by global carriers.

Overall, the empirical literature affirms that while air transport positively influences economic performance, the extent of its impact varies depending on infrastructure readiness, service quality, operational efficiency, and regulatory coherence. Few studies, however, integrate both quantitative and qualitative evidence to assess how specific aviation indicators such as passenger movement, cargo volumes, route expansion, and infrastructure investments affect national economic outcomes in Tanzania.

2.3 Research Gap

Despite substantial evidence linking air transport to economic development, much of the existing research remains broad in geographic scope or heavily descriptive, with limited country-level empirical analysis for Tanzania. Studies often highlight trends in passenger traffic, airline performance, or infrastructure spending, yet few systematically quantify how aviation indicators translate into macroeconomic outcomes such as GDP growth or trade facilitation. Moreover, the interplay between regulatory frameworks, domestic network expansion, and operational inefficiencies remains underexplored, despite being central to Tanzania's aviation performance. Existing literature also offers limited integration of qualitative perspectives, such as stakeholder experiences and institutional challenges, which are critical for understanding why aviation outcomes diverge from policy intentions. Consequently, policymakers lack rigorous, evidence-based insights needed to prioritize aviation investments, optimise airline operations, or align aviation with tourism, trade, and national development strategies. This study addresses these gaps by combining econometric modelling with qualitative thematic analysis to provide a multidimensional assessment of how the aviation sector contributes to Tanzania's economic development.

3. Research Methodology

This study employed a mixed-methods design combining quantitative econometric modelling with qualitative thematic analysis to examine the contribution of the aviation sector to Tanzania's economic development. The quantitative component used multiple linear regression to assess the influence of key aviation indicators including air passenger traffic, cargo volume, operational routes, aviation infrastructure investment, and international tourist arrivals on GDP growth. Annual time-series data from 1990 to 2024 were sourced from the Tanzania Civil Aviation

Authority (TCAA), the National Bureau of Statistics (NBS), the Ministry of Works and Transport, the World Bank, and IATA. Prior to estimation, standard diagnostic procedures were conducted to ensure model validity, including unit root testing, multicollinearity checks, autocorrelation testing, and heteroscedasticity assessment.

The qualitative component complemented the quantitative analysis by exploring institutional, regulatory, and operational factors shaping aviation-sector performance. Fifteen semi-structured interviews were conducted with purposively selected stakeholders, including officials from TCAA, ATCL, airport management teams, tourism authorities, and transport-sector policymakers. Participants provided informed consent, and anonymity was maintained throughout. Interviews followed a structured guide focusing on infrastructure, airline operations, policy coordination, cargo logistics, and tourism connectivity.

Qualitative data were analysed using NVivo 12. Open coding was used to identify initial concepts, which were refined into broader thematic categories through axial coding. Coding procedures and analytic decisions were documented to enhance transparency. All datasets, coding frameworks, interview protocols, and analytical procedures were archived to support replicability.

4. Results and Discussion

The findings of this study are presented in two parts: (i) quantitative results derived from the multiple regression analysis and (ii) qualitative themes identified through NVivo-assisted thematic analysis. Together, these findings offer a comprehensive understanding of the contribution of the aviation sector to Tanzania's economic development and highlight the institutional, operational, and policy challenges that shape sector performance.

4.1 Quantitative Results: Regression Analysis

Table 1: Regression Results – Impact of Aviation Indicators on GDP Growth (1990–2024)

Independent Variable	Beta Coefficient ($\hat{I}^2$)	p-value
Air Passenger Traffic	0.44	0.002
Cargo Volumes	0.29	0.032
Aviation Infrastructure Investment	0.53	0.006
Number of Operational Routes	0.14	0.201
International Tourist Arrivals	0.23	0.094

The regression results reveal that three aviation indicators air passenger traffic, cargo volumes, and aviation infrastructure investment are statistically significant predictors of GDP growth in Tanzania at the 5% significance level. The positive and significant coefficient for air passenger traffic ($\beta = 0.44$, $p = 0.002$) indicates that increases in the number of passengers travelling through Tanzania's aviation system contribute meaningfully to GDP. This supports the argument that air transport stimulates tourism, facilitates business travel, and enhances mobility, which in turn boosts economic performance.

Cargo volumes also show a statistically significant positive effect on GDP ($\beta = 0.29$, $p = 0.032$), suggesting that the movement of goods by air plays a vital role in supporting high-value export industries, time-sensitive freight, horticulture, pharmaceuticals, and regional supply chains. This aligns with global literature emphasizing the importance of air cargo in modern economies.

Aviation infrastructure investment has the strongest effect ($\beta = 0.53$, $p = 0.006$). This highlights that investments in airport expansion, terminal upgrades, runways, cargo facilities, and navigation systems directly enhance economic productivity, reduce operational inefficiencies, and attract more traffic, thereby amplifying economic growth.

In contrast, operational routes ($\beta = 0.14$, $p = 0.201$) and international tourist arrivals ($\beta = 0.23$, $p = 0.094$) are not statistically significant. Although they have positive coefficients, their high p-values indicate insufficient evidence that changes in these variables directly influence GDP growth. This suggests structural weaknesses such as low load factors, unprofitable routes, limited direct flights, and seasonal tourism patterns that dilute their economic impact.

Table 2: Model Summary

R-squared	Adjusted R-squared
0.89	0.85

The R-squared value of 0.89 indicates that 89% of the variation in Tanzania's GDP growth between 1990 and 2024 is explained by the five aviation indicators included in the model. This is an exceptionally strong explanatory power for a socio-economic model, demonstrating that the aviation sector has a significant and measurable influence on national economic performance.

The adjusted R-squared value of 0.85 further confirms the robustness of the model by adjusting for the number of predictors. This means that even after accounting for potential over fitting, the aviation indicators remain powerful explanatory variables. Such strong model performance reinforces the validity of aviation sector metrics as critical determinants of economic development in Tanzania.

Table 3: ANOVA Summary for Regression Model

Source	***SS***	***df***	***MS***	***F-value***	***Sig. (p-value)***
Regression	12.84	5	2.568	47.92	0.000
Residual	1.06	29	0.0366		
Total	**13.90**	**34**			

The ANOVA results show an F-statistic of 47.92 with a significance value of $p < 0.001$, indicating that the regression model is statistically significant overall. This means the five aviation variables jointly have a meaningful and non-random influence on Tanzania's GDP growth. In statistical terms, the model explains significantly more variance in GDP growth than would be expected by chance.

The large sum of squares for the regression component (12.84) relative to the residual (1.06) confirms that the model captures most of the variability in GDP. This supports the conclusion that aviation activities when considered together play a substantial role in shaping economic performance.

Therefore, the ANOVA confirms that Tanzania's aviation sector is not only operationally important but also economically influential, validating the decision to use these variables in the model.

4.2 Qualitative Results

NVivo Coding Framework

Qualitative data were analyzed through a three-stage coding process in NVivo:

Open Coding: Initial line-by-line coding generated 42 preliminary codes based on recurring ideas in the transcripts.

Axial Coding: Related codes were grouped into categories reflecting broader conceptual patterns.

Selective Coding: Categories were consolidated into **five overarching themes** that aligned with the core objectives of the study.

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Table 3: NVivo Coding Structure

Main Theme	Codes / Sub-Codes	Description	Illustrative Stakeholder Quote
Infrastructure as a Growth Enabler	airport upgrades, maintenance gaps, cargo facility shortages, project delays	Captures views on the adequacy and limitations of Tanzania's aviation infrastructure.	"JNIA has improved, but we still lack modern cargo storage and scanning systems."
Policy Fragmentation and Coordination Failures	SAATM delays, inter-agency misalignment, regulatory inconsistencies	Reflects systemic governance challenges affecting aviation performance.	"We signed SAATM, but the ministries rarely coordinate, so implementation is very slow."
Airline Competitiveness and Service Quality	punctuality problems, pricing concerns, poor digital systems	Describes operational challenges facing airlines, especially ATCL.	"Passengers lose trust when flights are delayed and customer service is unresponsive."
Underutilized Tourism–Aviation Nexus	limited direct flights, high airfares, weak marketing	Explores constraints limiting aviation's contribution to tourism growth.	"Tanzania has world-class attractions but very few direct international flights."

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Main Theme	Codes / Sub-Codes	Description	Illustrative Stakeholder Quote
Missed Regional Integration and Trade Facilitation	cargo inefficiencies, BASA challenges, weak regional linkages	Highlights structural constraints undermining hub potential.	"We should be a regional cargo hub, but infrastructure and regulations are not aligned."

First, *infrastructure as a growth enabler* emerged strongly. Respondents emphasized the importance of improvements at Julius Nyerere International Airport, Mwanza Airport, and Kilimanjaro International Airport in improving safety, passenger flow, and cargo handling. However, maintenance issues, slow project completion, and inadequate cargo logistics facilities remain major constraints (Samunderu, 2023).

Second, *policy fragmentation and coordination failures* surfaced as recurrent concerns. Stakeholders noted that although Tanzania is signatory to SAATM, actual liberalization has been slow, hindered by protectionist tendencies and weak inter-agency coordination (Njoya & Isah, 2023; Said, 2022).

Third, *airline competitiveness and service quality* was a major theme. Respondents highlighted customer dissatisfaction with Air Tanzania's punctuality, pricing, and digital service limitations, reinforcing findings by Libent and Magasi (2024).

Fourth, the *underutilized tourism–aviation nexus* was evident. Despite world-renowned destinations, limited direct flights, costly tickets, and weak international marketing impede tourism potential (Kyara, 2021; Samunderu, 2023).

Fifth, *missed regional integration and trade facilitation opportunities* were noted. Weak enforcement of bilateral agreements, inconsistent regulatory practices, and limited cargo

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infrastructure constrain Tanzania's ability to function as a regional logistics hub (Malinga et al., 2024).

NVivo Word Cloud

The NVivo-generated word cloud was created based on the frequency of terms appearing across the 15 interview transcripts, strategic documents, and airline reports. All transcripts were cleaned for stop words, and synonyms were merged to improve analytical accuracy. The visualization highlights the most frequently mentioned concepts, offering an overview of the dominant ideas shaping stakeholder perceptions of Tanzania's aviation sector.

Word Cloud of Airlines and Economic Growth

Interpretation of the Word Cloud

The most prominent terms aviation, connectivity, infrastructure, tourism, liberalization, cargo, investment, and Air Tanzania align closely with the five qualitative themes identified through NVivo coding. This confirms thematic consistency across participants and validates the reliability of the qualitative analysis.

- "Connectivity" appears prominently, reflecting the widespread view that limited domestic and international routes constrain economic potential. Stakeholders repeatedly emphasized

that improved air connectivity is essential for tourism expansion, business mobility, and trade facilitation.

- "Infrastructure" is another dominant term, supporting the theme that airports, runways, and cargo facilities are central to sector performance. Frequent references to JNIA, KIA, and Mwanza Airport indicate stakeholder concern about uneven modernization and persistent maintenance challenges.
- "Liberalization" and "SAATM" highlight strong recognition of policy factors. Interviewees discussed how delayed implementation of open-skies agreements reduces competitiveness, discourages new carriers, and limits air traffic growth.
- "Air Tanzania" appears prominently, indicating the national airline's central role in stakeholder views. Comments often focused on service quality, on-time performance, pricing models, and the airline's potential contributions to national development if operational efficiency improves.
- "Tourism" stands out due to the sector's dependency on aviation for international arrivals. Stakeholders frequently discussed high airfares, limited direct flights, and weak alignment between tourism promotion and airline route planning.
- "Cargo" appears as a significant term, reinforcing concerns about inadequate cold-chain logistics, scanning facilities, and cargo terminals issues that directly impact horticultural exports and regional trade integration.

4.3 Discussion

The alignment between the quantitative and qualitative results reinforces the conclusion that Tanzania's aviation sector holds substantial potential to contribute to economic development, yet this potential remains underutilized due to persistent institutional, operational, and structural constraints. Quantitatively, the statistically significant relationships between GDP growth and variables such as air passenger traffic, cargo volume, and aviation infrastructure investment demonstrate that aviation activities play a measurable and direct role in stimulating economic performance. These findings corroborate earlier studies on African aviation dynamics (Tolcha et al., 2023; Njoya & Isah, 2023), confirming that increased mobility, trade facilitation, and infrastructure improvements are important determinants of macroeconomic growth.

However, the lack of significance for operational routes and international tourist arrivals requires deeper interpretation beyond statistical values alone. The qualitative evidence provides insight into these results. Stakeholders frequently cited poor route optimization, low load factors, and unsustainable route planning practices as barriers that limit the economic contribution of new routes. This aligns with studies showing that the performance of airlines in Tanzania is heavily influenced by strategic management choices, load factor performance, and competitive positioning (John & Magai, 2025). This explains why the number of operational routes did not significantly influence GDP despite appearing positive in the model: connectivity that is poorly designed or inconsistently utilized cannot generate substantial economic effects. Similarly, the non-significance of tourist arrivals is consistent with qualitative themes pointing to high airfares, limited direct international flights, weak marketing strategies, and seasonal fluctuations in tourist demand. This pattern mirrors findings from broader African airline performance studies (Wana, 2023).

These structural and institutional barriers reduce the multiplier effect typically associated with tourism–aviation linkages. These findings clearly support Network Theory, which emphasizes that the value of a transport network depends on the strength and efficiency of its nodes and connections. In Tanzania's case, the network exists but is not optimized routes are added without adequate demand analysis, inter-agency coordination is weak, and regional and international linkages remain fragmented. Recent research on SAATM implementation similarly shows that policy misalignment and limited institutional readiness undermine the economic potential of market liberalization (Njoya & Isah, 2023). The study also aligns with the Multiplier Effect Theory, which suggests that strategic investment in aviation should generate spillover effects in tourism, logistics, hospitality, and regional trade. The significant effects of passenger traffic, cargo volumes, and infrastructure investment confirm this principle; however, the qualitative evidence shows that weaknesses in policy implementation and operational efficiency limit these multiplier effects from reaching their full potential.

Furthermore, the findings highlight the importance of institutional alignment, regulatory efficiency, and customer service quality. The qualitative themes reveal systematic policy fragmentation, especially in the implementation of regional frameworks such as the Single African

Air Transport Market (SAATM). Without coherent and coordinated policy action, liberalization efforts fail to materialize into increased airline competition, lower fares, or expanded route networks, as also observed in similar regional aviation studies (Tolcha et al., 2023). Similarly, the recurrent concerns about airline service quality including punctuality, pricing, and digital service limitations indicate that even where infrastructure improvements have been made, user experience remains a constraining factor in realizing economic benefits. Studies from the Tanzanian aviation context also show that monitoring, evaluation, and service quality significantly influence organizational performance and customer satisfaction (Ezekia, 2025; Masawe & Isanzu, 2020; Pardede & Parsaoran, 2024).

The results demonstrate that aviation can indeed function as a powerful engine of economic growth in Tanzania, but only if structural and institutional limitations are addressed. Infrastructure alone is not enough; the aviation sector requires strategic route planning, competitive pricing structures, regulatory coherence, and stronger integration with tourism and trade policies. The combined quantitative and qualitative insights thus paint a holistic picture: Tanzania has built the foundations of an impactful aviation sector, but unlocking its full economic potential demands targeted reforms in operational efficiency, institutional coordination, and policy implementation.

5. Conclusion and Recommendations

This study set out to evaluate the extent to which the aviation sector specifically airline operations contribute to Tanzania's economic development. Using a mixed-methods design that integrated multiple regression analysis with NVivo-assisted thematic analysis, the study provides robust evidence that air passenger traffic, cargo volumes, and aviation infrastructure investment are statistically significant predictors of GDP growth. These quantitative results affirm the strategic value of the aviation sector as a catalyst for economic transformation, supporting theoretical frameworks such as Endogenous Growth Theory, Network Theory, and the Multiplier Effect Theory, all of which underscore the role of connectivity, infrastructure, and sectoral linkages in driving long-term growth.

However, the analysis also revealed that the number of operational airline routes and international tourist arrivals while positively correlated with GDP did not exhibit statistically significant

relationships. The qualitative results help explain these patterns, indicating that limited route utilization, high airfares, low load factors, poor service quality, seasonal tourist demand, and structural bottlenecks diminish the economic impact of these variables. This demonstrates that improving connectivity alone is not enough; routes must be optimized, competitively priced, and supported by strong tourism–aviation coordination to yield measurable economic benefits.

The qualitative findings further highlighted that Tanzania's aviation sector continues to face systemic governance and operational challenges. These include weak policy coordination across ministries, slow and inconsistent implementation of regional liberalization frameworks such as the Single African Air Transport Market (SAATM), and limited alignment between aviation, tourism, and trade policies. Stakeholders also emphasized persistent issues related to customer service, punctuality, digital service gaps, and cargo-logistics inefficiencies. The NVivo-generated word cloud reinforced these themes by highlighting recurrent concepts such as connectivity, infrastructure, tourism, cargo, liberalization, and investment, demonstrating strong convergence between stakeholder perspectives and the study's econometric results.

Based on these findings, a multi-pronged strategy is recommended to enable Tanzania to fully harness the economic potential of its aviation sector:

Strengthen Inter-Agency Coordination: Enhance collaboration among aviation, tourism, trade, and investment institutions to ensure harmonized policy design and implementation. Effective coordination is essential for route planning, pricing regulation, tourism promotion, and infrastructure prioritization.

Improve Airline Competitiveness: Encourage public–private partnerships, invest in staff training, adopt modern pricing strategies, and accelerate digital transformation to improve customer experience, operational reliability, and market competitiveness. Performance-based management should guide ATCL's operations to ensure sustainability.

Accelerate Airspace Liberalization and International Agreements: Fast-track the implementation of SAATM and negotiate bilateral air service agreements with strategic international markets. Expanded direct flight access can enhance tourism flows, reduce travel costs, and elevate Tanzania's regional aviation profile.

Prioritize Strategic Infrastructure Investments: Focus on cargo logistics, cold chain facilities, scanning systems, regional airstrips, and secondary airports to support export-oriented sectors such as horticulture and pharmaceuticals while strengthening Tanzania's ambition to become a regional air logistics hub.

Institutionalize Customer Satisfaction and Route Profitability Metrics: Airlines particularly ATCL should adopt standardized service quality metrics, strengthen punctuality systems, and conduct regular route profitability assessments to ensure operational and financial sustainability.

In conclusion, Tanzania's aviation sector possesses significant untapped potential to contribute meaningfully to national economic growth. However, realizing this potential requires more than infrastructure development it demands coherent policies, operational excellence, strategic sectoral alignment, and a commitment to data-driven decision-making. If the recommended reforms are pursued, the aviation sector can evolve from a cost-intensive industry into a dynamic engine of national transformation, supporting tourism, trade, regional integration, and long-term economic expansion.

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