

The Search For African Airline Network Models: Contrasting With US Airline Network Models

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Personal Reflections

Contemplating the circumstances that envelop me has perpetually been a pursuit of my intellect. As I reflect upon my dwelling, a plethora of convictions arise. I endeavour to explore the complex relationships that make my residence perceptible within this framework and contemplate the factors that enhance its ostensibly perfect character. Ultimately, scholars endeavour to grasp the dissertation or thesis of the "Architect," I sometimes focus on exploring philosophy underlying the various methodologies of the thesis presented by the "Bricklayer".

Abstract

The recent African infrastructure developments such as construction of new airports, and improvements to existing airport infrastructure over the past decade suggest favourable prospects for the expansion of the continent's airline business. Despite positive and consistent growth projections for the African economy, the continent's airline flight network capacity falls short of their international counterparts. African airlines need to establish robust and resilient flight network models that incorporates enhanced partnerships and effective marketing strategies (Bofinger, 2017) essential for sustaining the airline business. The expansion of airline route networks is a critical aspect of the sector, vital for connectivity prospects of the African airline market. However, the existing networks do not offer a complete perspective on the viability of airline models within this region. The preceding analysis is further supported by numerous studies on the African airline markets, which present a concerning outlook on the overall effectiveness of established models for the African Airline Network. Nevertheless, the volume of air transport in Africa remains significantly lower than that of other global regions. Basing on data from the International Air Transport Association (IATA) and visible airlines data, the traffic density, as indicated by the seat capacity of African airlines, is a mere 2% (IATA, 2024) of the world's total passenger capacity. As of December 18, 2024, Africa's population was estimated to be about 1,531,226,940, accounting for approximately 18.3% of the global population. Africa is the second most populous region in the world, exhibiting a population density of 51 individuals per square kilometre. As of 1st July, 2024, the U.S. Census Bureau estimated the population of the United States to be 340,110,988 (Routley, 2024). The United States accounts for 22% of the African population. The preceding data further reveal a notable disparity in flight networks between the United States and Africa. Among the 49 global airlines with networks exceeding 100 destinations, US airlines exhibit a capacity of 1,521 destinations, accounting for 15.27% of the world average for airlines that share comparable coverage. Despite the foregoing, in Africa, most of these airline networks are strategically structured around areas with high to moderate population density within the African region (Figure 6), though sub-Saharan Africa has a good share on the existing flight networks. An illustrative representation of flightradar24 (Figure 5) depicting the current positions of aircraft in flight globally reveals the constrained aviation network and services within Africa. The existing airline networks appear to be methodically organized around areas in Africa that are both moderately populated and economically strong (Figure 8).

The nascent analysis indicates that the air transport sector in Africa is rapidly developing (Bofinger, 2017) and consequently, an effective airline business model is essential for the sustainable operations of any African airline aiming to manage its flight network strategies. The data on seat capacity and traffic density for African airlines, as previously illustrated by IATA, reveals a significant disparity between air travel volumes in Africa and those in other global regions, as evidenced by the notably lower seat capacity (Figure 1).

Notwithstanding the above, the "concept" of a national flag carrier is deeply embedded within the political framework of African society, such that the aviation industry is recognized as an essential element of individual states national identity and pride, despite its expensive nature and technical demands. The airline industry is regarded as a social privilege that governments should regulate for the common advantage of the continent, notwithstanding the frequent failures of national airlines resulting from diverse business management variables.

Some African national airlines have undergone restructuring through public-private partnerships, as demonstrated by the emergence of Air Senegal after the dissolution of Senegal Airways. In light of the preceding discussion, this study observed that a significant number of African governments continue to demonstrate a hesitance to:

- (a) completely transfer airlines to the private sector or go into Public Private Partnership (PPP) enterprise.
- (b) wholly depend on private airlines when a national carrier is economically unviable.

The airline industry often showcases a high level of technical expertise, leading to several and prominent African governments to adopt protectionist air regulations and skewed bilateral or multilateral agreements in a quest to protect an existing national airline. Nevertheless, this study strongly asserts that an airline's success is profoundly affected by effective and strategic management concepts that support its fleet and operational network. Despite the ongoing evolution of the global marketplace, research into the development of effective flight network models for African airlines holds significant potential for a promising future.

Considering the aforementioned, to more effectively investigate the distinct needs of the business models or route networks of African airlines, concepts and principles typically associated with North American and European contexts have been acknowledged or enhanced to create a platform for comparisons in order to investigate applicable flight network that aligns with the African airline landscape. The airline's approach to its network and fleet profoundly influences aircraft selection, route configuration, flight frequency, and overall fleet size. Ensuring the continuous profitability and sustainability of the airline is of paramount importance. The strategy regarding the network and fleet should align with the broader objectives, existing resources, and inherent strengths of the airline. The strategy ought to exhibit adaptability to respond to the continually evolving market dynamics. African Airlines have the potential to improve cost-effectiveness and profitability through the formulation of a network and fleet strategy that optimizes efficiency while maintaining reliable and secure service for clients. The preceding discussion delineates a concept that requires a common goal to be established between the airlines and the states, concentrating on the efficient execution of processes designed to cultivate sustainable flight network.

Key Words: African Airlines, Airline Networks, International Air Transport Association (IATA), Models, Marketing, African Population, US Population, Strategies, Economy, African States, Profitability, Sustainability, Flight Frequency, Public Private Partnership, National Airlines,

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- Stephan Heinz and John F. O'Connell: Air Transport in Africa: Advancing Sustainable Business Models for African Airlines,
- Gerald N. Cook and Jeremy Goodwin: A Comparison Of Hub-And-Spoke And Point-To-Point Systems
- Rob Finlayson: African Potential In Air Transportation, August 29, 2023
- Yuriy Tokarev : Vice President of Asset Management at Aerovista, October 9, 2022
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2nd ,To my Co-Author and Supervisor, Dr. Janis Kabwe, I am eternally grateful for your guidance in Research Philosophy coupled with your unwavering support and belief in the potential of my work to contribute meaningfully to the discourse of epistemology.

Dedication

The frequently overlooked pioneers of African aviation persist in obscurity, primarily owing to an absence of thorough documentation concerning their endeavours to advance the industry and attain acknowledgement as it fulfils its intended role for the public good. For the numerous African aviation pioneers and the current advocates of the "aviators", some narratives have unfortunately remained irrevocably silenced, never to coexist with us on this earth. The greater majority of these individual pioneers did not have the opportunity to articulate their experiences from a podium, as they were deemed insufficiently learned or rather skill based thus considered to have not met the expectations set for the academic presentations deserving such a platform.

Special Thanks

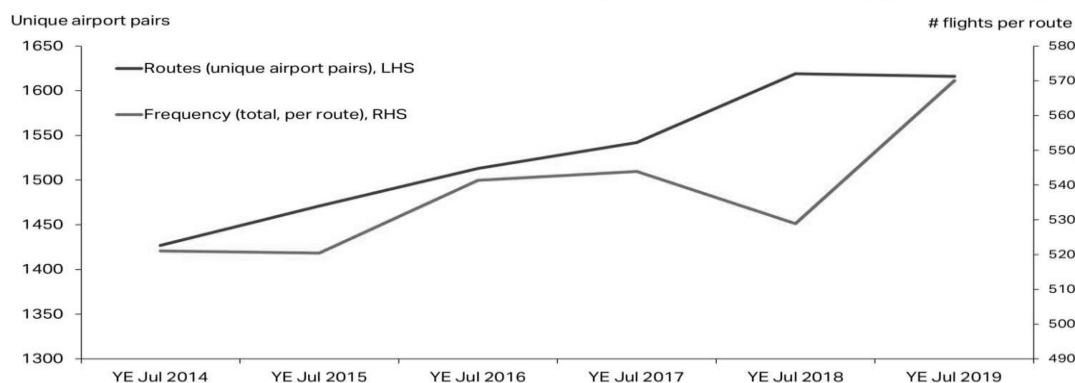
To my esteemed wife and partner, Faith Nawakwi, it is evident that no robust foundation exists for me without acknowledging the profound influence you have in shaping the intricacies of my daily existence.

1.0 INTRODUCTION

1.1 The General Business Outlook Of African Airlines

The contemporary African analysts on aviation development require substantial empirical data relevant to the growth and progress of the African economy as can be seen from Figure 1; the efficacy of African airlines in the civil aviation sector is crucial to the transport sector, making the success of the airline industry exceedingly significant. While the research (Pirie, 2016) acknowledges the significance of strategic business solutions that improve the performance of African airlines, it also notes that many business techniques adopted by certain airlines have proven ineffective, leading to a notable number of airline closures (Ojebode, 2022).

Intra-AFI Routes and frequencies... growing?



¹⁶ 30 July 2019

Source: IATA (2019)

FIGURE 1: IATA PROJECTIONS ON AFRICAN ROUTES AND FREQUENCIES PRE-COVID 19 PANDEMIC

The aviation sector has played a role in enhancing Africa's gross domestic product (GDP), though the magnitude of these contributions is largely limited by the insufficient capacity of existing local African airlines (Kalombe, 2023). The capacity of African airlines (Samunderu, 2023) has made considerable efforts to grow and expand; however, the outcomes have not met highly anticipated and projected expectations. This is particularly striking given the African aviation sector has exhibited potential for both competitive and comparative advantages, albeit these aptitudes appear to remain elusive for some African aviation industry corporations.

According to Czerny and Lang,(2019), some African airlines transferring from public to private corporate ownership may achieve efficiency, financial, and distributional goals (Vickers and Yarrow, 1991). The aims are interconnected, since the impact of privatization on company efficiency in comparison to public ownership may vary based on whether the businesses function in a monopolistic or competitive context. The efficiency impacts of privatization may be constrained in a competitive economy (Vickers and Yarrow, 1991). As a result, it has been noted that the majority of national airline privatizations efforts and evolution of private airlines in Africa as well as the airline market liberalization initiatives by the African Civil Aviation Commission (AFCAC) transpired simultaneously in the aftermath of the disintegration of socialist regimes across the continent. It is important to note that private ownership often entails local ownership, since cross-border airline investments are often limited by regulations or protections established by individual African states/regions as policies to protect sustainability of national/regional airlines (Walulik, 2016).

This study observed that within the current lucrative African route network, some renown African airlines have persistently faced difficulties in competing with international airlines, particularly the long-haul foreign

carriers. This attribute has an indirect impact on the reduced economic performance of the African aviation sector. Majority of the Foreign long-haul airlines achieve greater passenger yield load factors than most African-owned operators, leading to diminished total passenger yield figures for African airlines. This situation adversely affects overall inbound ticket sale revenues, which are crucial for the economic revenue of Africa.

This study reveals that, despite the critical importance of airline operations, the industry has encountered several problems that hinder the formulation of dependable route network growth strategies. These strategies, maybe customized for African airlines that might serve as substantial project leaders for improving the flight route network as a business strategy. This research recognizes the inadequate empirical evidence regarding the fundamental economic assumptions on profit or loss statements articulated by some private African Airlines, as noted by Kalombe (2023). The study examines both historical and current declarations of the actual contributions of African airlines to the continent's GDP. The researcher observed a lack of sufficient and reliable data regarding the GDP contributions of certain African Airlines in the financial assessments of specific African governments. This situation results in an information deficit concerning the true financial impacts when evaluating the airline statistics in relation to GDP macro and micro-economic factors. The financial statements for certain African airlines are deficient in detailed information, which restricts their capacity to provide meaningful insights for government policy modifications and strategic planning concerning national budgeting statistics. This limitation is crucial for the integration of economic adjustments that aid various African countries in refining aviation policy within the aviation segment required budget presentations. The foregoing underpins this claim that adverse occurrences have obstructed the formulation of appropriate airline business strategies and models crucial for promoting economic progress. Additionally, a worldwide investigation indicates that the unforeseen COVID-19 epidemic precipitated the impending bankruptcy of many airlines (Amankwah-Amoah, 2020; Rosalsky, 2020). Currently, following the COVID-19 pandemic, A good number of airlines in the global aviation industry have financial agreements that extended invoicing deadlines, resulting in substantial payable debts as these invoices become due. This situation persists despite the ongoing challenges faced by surviving air operators due to the repercussions of the Covid-19 pandemic and worldwide lockdowns. Consequently, during the pandemic lockdowns, a number of Airlines globally underwent mandatory furloughs, causing an increase in worker turnover, and heightened complexity in aviation operations. Certain unpleasant measures were necessary to prevent a complete cessation of some African airlines. It is reasonable to claim that the incidence of employee furloughs increased during the Covid-19 pandemic, yet insufficient money generation led to compensation discrepancies (Amankwah-Amoah J. ., 2021).

Despite the lifting of global travel restrictions enacted by most nations in response to Covid-19 (Amankwah-Amoah J. ., 2021), for most African airlines, the repercussions persist owing to the cutting back on route networks and schedules resulting in diminished international passenger volumes. The preceding discussion highlights a discrepancy in capacity that favours foreign airlines, alongside the financial management measures implemented by most African Airlines. State controlled airlines and commercial air operators have experienced difficulties in fulfilling their financial obligations to other significant aviation stakeholders, including airport taxes, ground services charges, aircraft pool membership fees, and engine program deferrals. Regrettably, due to the African government's incomplete implementation of financial waivers (Nkengasong, 2020) (Wensveen, 2023) to support struggling AOC holders during the pandemic, it is plausible that African airline operators shall persist in voicing apprehensions about the long-term sustainability of expanding commercial aircraft operations.

Therefore, since competitive success is achieved via people, their abilities are vital (Pfeffer, 1994). Skilled aviators are the paramount asset of an air operator company. The substantial cost of specialized aviation and technical staff training is exacerbated by the predominance of outsourcing to foreign entities. This has resulted in an escalation of the operating costs for air operator services in Africa.

Despite the aforementioned points, a thesis by Danquah (2023) indicates that there are valid concerns regarding the underutilization of variables that are crucial for the growth of the airline industry in Africa. The

components include the effective management of aviation training expenditures, oversight of maintenance costs, fair pricing mechanisms for aviation fuel, and financial methods for health compliance. These elements should promote the airline sector (Danquah, 2023) development when managed with adequate technical assistance, stakeholder engagement, technological innovation, favourable local taxation, and reduced regulatory compliance costs. African airlines should evaluate marketing research and implement comprehensive marketing strategies that incorporate product life cycle models relevant to their specific fleet and route network. They should leverage modern aviation business technology (Wensveen, 2023), utilize up-to-date flight operations software, and continually enhance their existing systems to remain competitive in the global airline business. The successful execution of the aforementioned shall facilitate a decrease in total operating costs, which is crucial for the sustainability of the airlines within the African aviation landscape. The study also noted that disruptive technologies (Wensveen, 2023) and in general, rapid technological advancements has to some extent negatively affected the profit margins of airlines. As technological advancements become inevitable, African airline business operations are striving to surpass the current standards within existing requirements, it is apparent that such development often require substantial human, financial, and other related resources be allocated for training, even after the implementation of new technology (Wensveen, 2023). While skills incentives are established for airline workers, frequent training sessions can substantially reduce overall staff productivity, leading to potential financial losses within the airline model. This has prompted air operators to address a variety of new challenges with technological advancements.

This study assessed the influence of modern air travel options (Button, 2015) that offer diverse choices, affecting potential travellers, particularly those contemplating African airlines, in relation to itineraries involving travel to Africa. These options offer tourists a selection of trip packages to choose from (Button, 2015). It is prudent to consider that visitors might opt to avoid expensive air travel, indicating that local African airlines could be viewed as costly within the African aviation industry. Consequently, this leads to heightened and intense competition with foreign airlines.

1.2 Background Of The Study

This study provides concise analyses of the existing airline route network strategies that demonstrate potential for enhancing flight networks within the African market. Furthermore, observations were conducted (Samunderu, The Yamoussoukro Decision. A Perspective Analysis of the Single African Air Transport Market (SAATM), 2024) regarding the necessary evolving business practices for airlines that would further implement operational policies in alignment with the Single African Air Transport Market (SAATM), which has already received endorsement from the African Union (AU) which designated the African Civil Aviation Commission (AFCAC) to oversee this requirement. The strategic management of African airlines should be examined in conjunction with the development of civil aviation and the airline models present in various African regions (Chiedu, 2018). This study reveals that the nascent challenges encountered by many African airlines (Chiedu, 2018) were effectively analyzed through the lens of the Single African Air Transport Market (SAATM) and the competition introduced by foreign-based airlines operating in Africa.

Furthermore, It is crucial to acknowledge that the aftermath of the September 11, 2001, attacks on the World Trade Centre in New York, United States, along with COVID-19 and the effects of global standardization, have significantly impacted airline profitability. According to Zhou, (2022), in the aftermath of Covid-19 pandemic, many aviation companies implemented corrective actions in accordance with international health mandates whilst numerous governmental, quasi-governmental, international organizations, educational institutions, and other entities maintained operational continuity through internet connectivity, effectively enabling online meetings, summits, and training via virtual platforms (Zhou, Dzingirai, Hove, Chitata et al, 2022).

This study recognizes the presence of National Airlines in Africa and examines the concept of neopatrimonialism as discussed by Sindzingre (2013). Eisenstadt (1973) investigates traditional patrimonialism and modern neopatrimonialism, providing insights into the failure of national airlines in numerous African countries. Most failed African airlines had a same history, having been established as the African regional airlines by the colonial authorities as in the example of Nigeria Airways and Ghana Airways.

Following independence, they were estranged as separate entities, but both experienced significant political meddling, inadequate accountability and mismanagement, enormous indebtedness, and ultimate dissolution. This paper posits that the decline of national airlines can be attributed to their direct ties to domestic political structures, which subordinated the rational-legal bureaucratic relations typical of modern organizations to patrimonial relations, wherein politicians and those in power regarded these entities as personal fiefdoms. There was a definitive breakdown of control and accountability mechanisms in both Nigeria and Ghana airways.

Furthermore, this study presents several theories for business failure from a socio-political viewpoint having recognized that international business and leisure travellers planning to visit Africa have the necessary platforms to choose from various vacation packages that include flight travel (Bieger, Wittmer, 2006). African airlines encounter a competitive disadvantage in market share attributed to high airfare pricing. The elevated air fares observed among African airlines can be attributed to rising input costs and delivery expenses associated with the airline sector, which are recognized as obstacles to the advancement of African commercial flight carriers within regional travel packages. Publicly available information concerning various marketing platforms typically focusses on individual tourist budgets, highlighting the importance of reliable, cost-effective, and high-quality air travel services. Adopting effective management strategies and collaborating with African Civil Aviation Authorities is crucial for African Airlines to reduce operational costs, which shall enable them to offer competitive pricing for air travel.

1.3 Statement Of The Problem

This study scrutinized the various business variables and initiatives that pose challenges to the sustainability of flight network architectures for African airlines. The prospects of aviation in Africa are substantial albeit It represents 17% of the world population but only comprises 2% of travel activity (IATA, 2024). African airlines encounter a range of challenges (Samunderu, Challenges, complexities and opportunities. In African air transport management: Strategic analysis of African aviation market (pp. 151-187). Cham: Springer International Publishing., 2023) within the continent's aviation sectors, such as inconsistent taxation regulations, high technical expenses, substantial compliance costs, significant fixed expenditures, and fluctuating fuel prices. The complexities associated with aviation have significantly strained financial resources and liquidity, thereby influencing the marginal costs involved in the development of airline route networks across Africa.

This study further brings out the complexities faced by numerous African airlines, seeking to synthesize perspectives from the existing body of literature to categorize airline failures as a "General African Aviation Problem" (GAAP). The researcher acknowledged the historical context of unsuccessful airlines (Amankwah-Amoah, 2011) as possessing certain ineffective strategies that could significantly impact the current management challenges similar to those faced by other airlines in Africa. Airline management should proactively consider potential operational adjustments stemming from alterations in aviation policy enacted by various African nations, which are shaped by shifts in their governing administrations.

1.4 Main Objective

This study focusses on the factors that affect the expansion of aircraft route networks in Africa and their links to the global market. The researcher performed a comprehensive examination of African Airline's strategic policies in the African aviation sector, closely evaluating the different foundational elements of the business and State Safety Oversight. To draw informed conclusions regarding the future of African Airlines route network policies, the researcher identified the flight network models in the United States of America (USA) and conducted a comparative analysis of statistics within the African context. This analysis took into account the previously mentioned factors related to sustainability and the existing potential for growth in African flight destinations. Addressing these challenges could significantly improve the administration of civil aviation in Africa.

1.5 Specific Objectives

This study focused on the African airline flight network models, aiming to create a sustainable framework that promotes growth within the airline sector while addressing the management challenges commonly

encountered by various African airlines. The secondary objectives unveiled complexities within the existing route network of the industry that may necessitate significant intervention, especially in pivotal regions facing security issues. Consequently, it is anticipated that adopting a proactive and sustainable development strategic management policy of the African Civil Aviation industry shall foster a consensus to promote sustainable Airline business strategies, backed with explicit government support that aims at addressing sustainable airline flight network models.

1.6 Aim of This Research

This research aims to offer solutions to the African States and airlines in establishing a continent that is interconnected, marked by a diversified, safer, more efficient, and proficient flight network system. Consequently, this endeavour enhances the potential of aviation to generate economic and social opportunities. In order to effectively analyze the flight network gaps, the researcher investigated the evolution of airline route networks in North America, specifically within the United States, established by airlines following US deregulation. It aims to establish a validated framework for evaluating shortcomings in African airline business strategies concerning flight route networks and highlights the importance of airline marketing research for route network development.

In view of the above, this research seeks to uncover the potential for developing African airline route networks by analyzing the contextual responsibilities of airlines and government aviation technocrats in formulating significant civil aviation policies that enable the implementation of pertinent flight network models. This research further seeks to align the airline business management environment, which is responsible for identifying market gaps, thereby allowing airlines to develop strategies essential for executing a monitoring and analysis plan to meet flight route network marketing objectives. This research further evaluated the challenges encountered by African airlines in relation to compliance with regulations, particularly in the context of aviation route network regulations across the continent.

1.7 Research Questions

In order to assist the researcher in concentrating on the growth and sustainability of African airline route networks, the constructs of the Conceptual Theorem were examined to formulate questions that are relevant for effective primary data collection, as detailed below:-

- 1.7.1 What capabilities do African airlines possess in applying marketing management skills to ensure that flight route network sustainability is in harmony with modern aviation management practices?
- 1.7.2 What changes do African states anticipate in the flight network outlook for Africa following universal adherence to the Single African Air Transport Market, considering its implications on states Air Law and Civil Aviation Requirements on Airline Standards?
- 1.7.3 How can African nations and airlines implement strategies that ensure the effective integration of Direct Aviation Economic Input Factors into airline cost management practices, taking into account the various components of aircraft operating costs pertinent to acceptable airfares on flight route networks in Africa?
- 1.7.4 Where should African airlines concentrate on enhancing flight route networks, crew route network training, and network safety, given the competitive landscape of aircraft operating expenditures and operational frameworks in global aviation, while also providing more affordable airfares throughout their networks?
- 1.7.5 How can African nations and airlines adeptly navigate global disruptive technologies to enhance maintenance safety standards, given the constraints of OEM availability in Africa, while simultaneously optimizing operating expenses to broaden and sustain flight route networks?
- 1.7.6 What can African nations do to contribute to the enhancement of maintenance safety standards for airlines, given the limitations of OEM availability within the continent, while simultaneously optimizing maintenance operational costs to support the growth and sustainability of flight route networks for African carriers?

1.8 Significance Of The Research

This study examined the challenges associated with the variables presented by selected African airlines. It also explores various constructs within airline operations, focusing on identifying gaps in factors and solutions critical to the sustainability of airline route network operations. Additionally, the study investigates existing and potential barriers to the market sector expansion. This paper analyses how addressing these barriers may significantly contribute to effective African Airline Business Strategic management. Furthermore, it is reassuring for this research that the majority of data collected from literature reviews have some common indicators that African airline strategies show prospects of success which intertwine with African Regional Economic Community (RECs) Policies

1.9 Scope Of Research

The researcher compared statistics within the African context to the flight network models in the United States of America (USA) in order to generate educated conclusions about the future of African Airlines route network policies. In conducting this research, the study considered the aforementioned sustainability considerations as well as the potential for expansion in African flying destinations. This study further conducted a comprehensive review of the literature concerning 989 African destinations and the airline networks of 31 African airlines, along with their respective sizes. The analysis indicated that the selected 31 airlines collectively served 1261 destinations globally. This study also examined 49 international airlines, each providing over 100 destinations, resulting in a total of 9,956 destinations. Ethiopian Airlines was the sole African airline to achieve a service to 155 destinations, resulting in a percentage score of 1.556%. United Airlines dominated the market with a total of 371 destinations globally. In view of the foregoing, the analysis was performed meticulously, resulting in a qualitative conclusion that corroborates the outcomes of this case study. The characteristics of a flight network, including the type of equipment (includes aircraft) utilized, provide important insights into the classification of business models adopted by airlines, essential for comprehending the structure and composition of the African airline markets. After conducting a cluster analysis, Heinz and O'Connell (2013) stated that their research compared the products and organizational structures of eight different airlines. While much of Africa seems to follow predictable patterns, unexpected twists and turns are possible. The vast route network of regional and African airlines is full of vitality and importance (Heinz, O'Connell, 2013). The research was also agreeable on the assessment that the existing African regulatory body (CAAs) and the management of the African Airlines businesses may provide a variety of input data that can be correlated with both business operational and administrative experience to yield reliable information.

1.10 Delimitation Of The Study

Some critical respondents expressed concerns regarding privacy and the scarcity of literature on specific African airlines necessitated a review of data that proved challenging to adopt. Additionally, the limited willingness of respondents to provide critical primary data without involving third parties further complicated the process. Although information is readily available on numerous public media platforms, the study faced significant challenges in obtaining verification of primary data from recognized CEOs and senior management of the relevant airlines. The primary data source concerns were mitigated by the researcher's assurances that the collected data would be handled with utmost confidentiality and access to the submitted information would be restricted solely to the researcher's use.

1.11 Structure Of The Research

Chapter 1 serves as a fundamental element of this research, summarizing the complete study. This section outlines the objectives, rationale, and significance of the research and thus provides the essential pointers for understanding the investigation. The fundamental components identified through the research offer advantages to both the audience and fellow aviation scholars. This chapter analyses the significant contributions of effective business management strategies within African flight network models, as well as certain US airline flight network strategies, and evaluates their impact on relevant stakeholders.

Chapter 2 evaluates pertinent literature, integrating insights from multiple researchers regarding aviation and airline flight network models. This section elucidates the problem and associated concepts, integrating

critiques from various researchers and authors to deepen comprehension and underscore the scarcity of published academic studies concerning African airline flight networks and aviation business strategies. The review highlights the challenges present in the African airline sector and emphasizes the importance of operational management in the adoption of sustainable flight networks. A viable approach to address this literature gap involves integrating external sources and extending the literature review timeframe in relation to pertinent aviation studies.

Chapter 3 delineates the conceptualization of this case study and the theoretical frameworks employed to guide the researcher in the investigation. This approach facilitates the identification of airline network management constructs that are distinctive to this study, thereby defining the current airline network and the anticipated models for the African airline network. The conceptual analysis illustrates insights categorized as topics, where strategic management plays a crucial role in navigating challenges defined by airline constructs. The constructs are further broken down into constructs which serve as essential tools chosen by the researcher to manage airline networks, potentially leading to significant impacts on the development of interconnected African aviation markets.

Chapter 4 stipulates this research as having employed a unique methodological framework grounded in the principles of qualitative research methodology, within the context of case studies. This study breaks down the suitable methodology, following a thorough examination of the critical data and relevant analytical concepts, highlighting the various research philosophy briefs applicable to different aviation and airline research. This study intentionally correlates research philosophy types with a special emphasis on African aviation research, while observing rigorous criteria for this case study. The investigative framework outlines the researcher's approach, detailing the methodology, methods, and anticipated outcomes, while integrating all pertinent qualitative research instruments and techniques applicable to the case study. Furthermore, it establishes parallels with essential research ontologies in application.

Chapter 5 analyzed the data and classification of this investigation as an exploration of a case study in airline flight route network management. The research methods used in data analysis significantly impacted the study's results, leading the investigator to assess information obtained from both primary and secondary sources. This study included content analysis, vignettes, and thematic analysis utilizing Microsoft's Delve software was significant for the analytical process undertaken by this researcher. This research implemented the various suitable types of case study data analysis methods to effectively meet its objectives.

Chapter 6 presents a summary of the research findings along with a set of recommendations. This study advocates for African airlines and governments to establish effective and strategic alliances aimed at tackling the business and management challenges encountered by the aviation sector in developing sustainable flight network systems and models. A collaborative partnership can yield both direct and indirect economic benefits through the multiplier effect. The researcher advocates for a cohesive strategy to address the challenges as a result of the constructs within the African airline industry, including stakeholder businesses, governments, civil aviation authorities, the public and other non-governmental stakeholders impacted by airline fleet networks.

2.0 LITERATURE REVIEW

2.1 A Brief Overview Of Airline Deregulation In The United States

The study according to Cook,(2008) indicated that before 1978 and previous to the deregulation of US airlines, the Civil Aeronautics Board (CAB) was tasked with granting airline operating licenses, assigning routes, and regulating ticket pricing. Air routes were initially linear, mirroring railway lines that linked major cities. Following World War II, the Civil Aeronautics Board (CAB) authorized regional flights to link underserved rural cities with larger cities serviced by major airlines. The geographical coverage increased; nonetheless, the essential connections were sometimes poorly arranged, difficult, and necessitated many flight transfers. The CAB limited route competition, sometimes regulated by monopolies and duopolies, to comply with regulatory mandates designed to promote competition and reduce harmful activities. Mileage-based pricing shifted the competition's focus to product qualities.

As a result, linear route networks prevailed throughout the period of regulation. Nonetheless, several airlines systematically cut their connecting flights. Delta and Eastern Airlines were significant in Atlanta, United in Chicago, American in Dallas, and Allegheny in Pittsburgh (Button, 2002). The oil embargo, economic slump, and rapid deployment of new widebody aircraft in the early 1970s reduced passenger demand and led to significant financial deficits by the mid-decade.

The success of unregulated intrastate airlines in California and Texas, which offered vital services at competitive costs, prompted experts and politicians to conclude that industry regulation was no longer beneficial to the public. The 1978 Airline Deregulation Act emancipated airlines from forty years of economic regulation (Cook, 2008).

In view of the foregoing, Cook, (2008) further states that the US Airline Deregulation Act was adopted by Congress and signed by President Carter in 1978, after a comprehensive assessment of regulatory measures during the last forty years. This legislation sought to eliminate the governmental safeguards that had traditionally shielded the sector from market competition and completely dismantle the Civil Aeronautics Board by 1985. The regulatory architecture of the Civil Aeronautics Act of 1938, preceding the Federal Aviation Act of 1958, illustrates that Congress recognized the burgeoning air transport industry and indicated that unrestricted competition may impede its optimal development. The current air mail law was seen to negatively affect the industry. Furthermore, Congress sought to create a regulatory framework akin to that employed for "public utilities" to mitigate the detrimental impacts of fierce, inefficient, destructive, excessive, and unregulated competition, along with the economic instability that had significantly impacted the rail and motor carrier industries.

The implementation of this system was anticipated (Cook, 2008) to enhance economic stability and foster the development of air transport. The aviation sector was seen to possess significant potential for national economic growth, hence ensuring service provision to rural areas and protecting the interests of smaller airlines. A controlled competition framework was considered unlikely to hinder the entry of new carriers. The regulatory framework was seen as guaranteeing adherence to the utmost safety standards, fulfilling the needs of commerce, public welfare, and national security. Before the implementation of this transformative law, the Civil Aeronautics Board, under Chairman Alfred E. Kahn, had already made significant advancements in the internal deregulation of US airlines, independent of legislative guidance. Kahn, as the CAB chairman, was invited to address airline executives at an exhibition featuring recently purchased European aircraft. He conveyed his hesitation, asserting: "I cannot differentiate one aircraft from another; to me, they are simply marginal costs with wings."

2.2 Prevalent North American(USA) Airline Network models

The Hub and Spoke (H&S) vs point-to-point (P2P) network architecture became prevalent in North America region following deregulation of the US airlines in 1978 (Cook, 2008). Due to its efficacy across wide areas with numerous destinations, the H&S became much more popular with large network airlines. The H&S *modus operandi* is that after arriving at the hub, passengers from non-hub cities to other spokes transfer to a second aircraft for their ultimate destination. This method reduces routes and aircraft for any destination frequency and volume. After deregulation, major North American airlines quickly increased routes and coverage, enhancing mobility, connectivity, and asset utilization. After deregulation, major airlines rerouted routes to match travel demand with most or all network destinations. In contrast to the intricate H&S system, the point-to-point design is simpler. As is typical with point-to-point carriers, this entails nonstop flights between the two locations, which streamlines the procedure. The most cost-effective option to serve destinations with sufficient demand for larger aircraft is via direct trips. Lott (2005) estimates a 30% savings by doing away with the intermediate stop that connects the hubs. There are further benefits to the point-to-point method besides the large savings.

2.3 An Analysis Of Hub-And-Spoke And Point-To-Point Systems In The United States

The proponents of US Deregulation (Cook, 2008) anticipated the industry would implement a uniform countrywide linear and point-to-point routing system including cheap, uncomplicated rates, similar to intrastate carriers such as Pacific Southwest in California and Southwest in Texas (Bailey, 1995) .

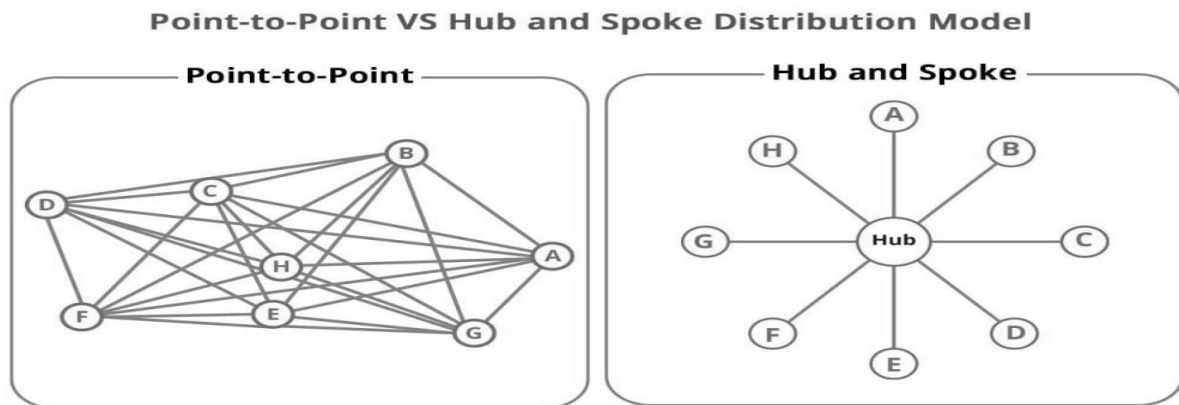
Notwithstanding these anticipations, the former trunk carriers rapidly established hub-and-spoke (H&S) route networks via growth, mergers, and acquisitions to draw passengers from origin to destination. Despite affordable rates and point-to-point systems, most new airlines failed. Constructed trunk carriers like as Eastern, Pan American, and Braniff collapsed, but those that established H&S networks and survived the first industry shake-out were poised to dominate (Borenstein, 1992). Southwest Airlines' consistent growth from Texas challenged the Hub and Spoke model.

In view of the foregoing, the low-cost airlines were recognized for their inexpensive fares, frequent services, and absence of in-flight facilities. Initially disregarded, ticket-less travel and Internet distribution in the mid-1990s initiated industry upheaval, which was further expedited by the dot-com bubble collapse and the decline in demand after September 11, 2001. The larger airlines have been derided as legacy carriers since 2001 (Cook, 2008), having incurred losses exceeding \$40 billion narrowly averted bankruptcy with a last-minute pilot concession. Four of the six big airlines declared bankruptcy. Southwest, JetBlue, and other low-cost carriers grew consistently but irregularly. The financial difficulties of legacy carriers are often ascribed to variances in route construction, according to industry analysts. The H&S system has faced criticism from scholars (Cook, 2008) and the media for being either defunct or severely impaired (Legacy Carrier Challenge, 2004; McDonald, 2002; Tretheway, 2004). The selection of route architecture is essential for an airline's offering. Most major airlines use a hybrid of the two designs. The route network of the Hub and spoke Vs Point to Point network are shown in Figure 2 below.

In a hub and spoke system, all passengers, except for those originating from or destined for the hub, are required to transfer at the hub for their next flight to the destination (Cook, 2008). Each system has benefits suited to certain markets, making the supremacy of any one system improbable.

Markus (2017) consequently showed that the Hub and Spoke (H&S) design emerged as the predominant network architecture post-deregulation for many reasons. This approach is effective for extensive areas with several destinations. Passengers travelling from non-hub cities to other spokes are first conveyed to the hub, where they then transfer to a second aircraft for their final destination. Passengers may travel between any two route cities with a single hub stop. The capacity to transition "from anywhere to everywhere" (Hansson, Ringbeck, & Franke, 2002, p. 1). To optimize connection time, the scheduling and synchronization of incoming and leaving planes are meticulously executed (McShan & Windle, 1989). In comparison to other architectures, H&S provides network destinations with a reduced number of pathways. A hub-and-spoke system connecting five places, consisting of one hub and four spoke cities, requires just four routes. A point-to-point system necessitates 10 paths to link the same endpoints. Consequently, the H&S system requires the minimum number of aircraft for any given frequency and number of destinations (Button, 2002). Major commercial aircraft may exceed \$35 million in cost, presenting a significant challenge for carriers. Prominent airlines rapidly saw the advantages of expanding their destinations and coverage area after deregulation. Expansion enhances mobility, connection, and asset utilization (Gillen & Morrison, 2005).

Major airlines promptly restructured their routes (Cook, 2008) after deregulation by expansion, acquisition, and consolidation. All origins to all potential destinations. Integrating the travel demand of each speaking city with the majority or whole of the network's destinations yields advantages for the H&S system. Augmented passenger volumes and expanded network dimensions enhance supply and demand owing to economic advantages.



Source: Research Gate
 Accessed December 2024

FIGURE 2: HUB-AND-SPOKE VS POINT-TO-POINT

Operating in many cities of differing sizes provides an airline with a competitive advantage, since customers like to use a single carrier for their whole journey. Connecting flights at the hub airport provide meticulously timed departures, a unified check-in process, enhanced accessibility to gates and amenities, and reduced incidence of baggage loss. Determining an airline's service to a destination minimizes search and transaction costs.

A thorough understanding of the airline's services alleviates concerns and fosters loyalty, particularly via incentive programs. Certain multi-hub routes need passengers to transfer at two hubs. Flight frequency may increase as destinations broaden and more individuals use the hub. The increased frequency of flights enables customers to choose itineraries that align with their schedules (Gillen, 2005). Prominent network providers facilitate over ten connections each day. Enhanced site coverage and elevated flight frequency enable more expenditure on advertising and promotions. One advertisement displays 50 locations rather than a limited number.

Frequent flyer programs and enhanced Seat mile costs on the supply side are advantageous because of the economies of traffic density (Cook, 2008). With the increase in passenger volume on routes, bigger aircraft may be used. Seat mile costs diminish as the increase in aircraft seating capacity outpaces operating and capital expenses. These cost reductions allow lower rates or increased business margins. To include a city in the network, create a new route using the hub facilities. This may give new services to all network cities. A network with few destinations cannot serve smaller, low-demand areas. Weakly linked city-pair demand patterns evenly disperse demand, enhancing capacity utilization. The increase in east-west summer travel offsets the decline in winter travel (Cook, 2008).

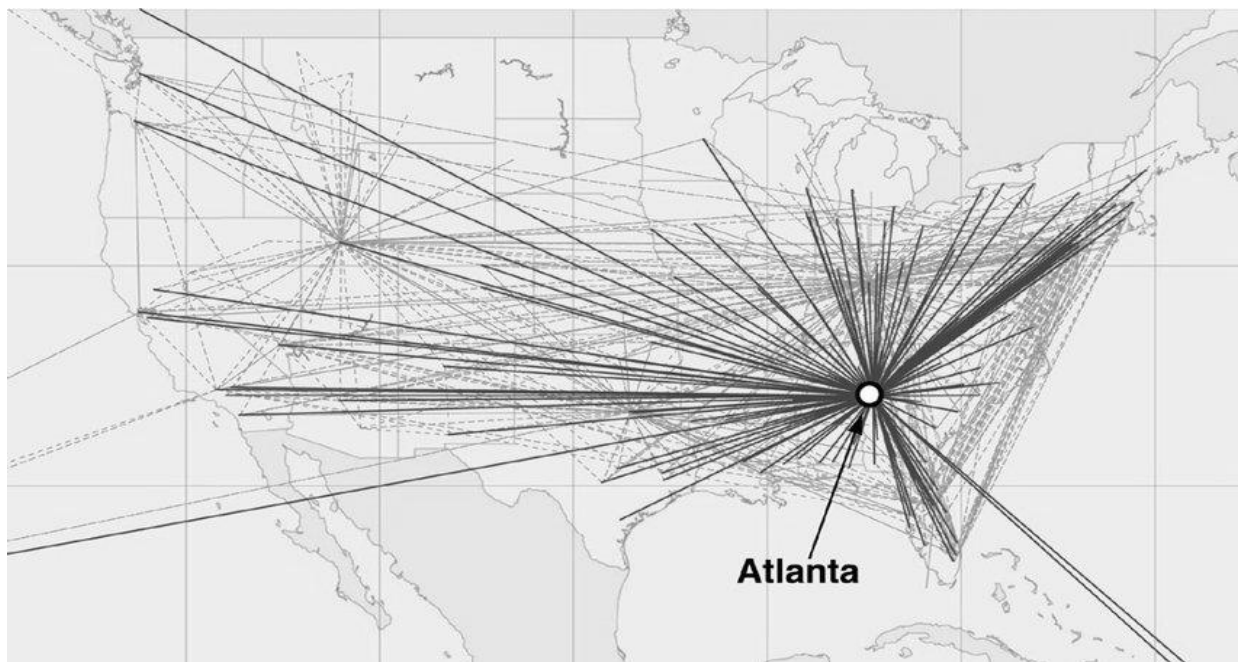
In hub cities like Atlanta, where Delta Airlines has its main base of operations as shown in network on Figure 3 below, the leading network providers exert significant influence primarily due to their market dominance. The airline can implement higher ticket prices for flights to and from its hub, as its dominant position allows for the elimination of potential competitors through effective resource allocation and the application of assertive or predatory tactics (Oster, 2001).

The growth of the network in the first two decades after deregulation was propelled by an increase in destinations, passengers, and income. Each airline sought to link all major domestic markets to a hub.

2.3.1 H&S Cost And Complexity

The H&S system for passenger collecting and distribution has several benefits, but it has high operational expenses. The H&S model's flaws have been more apparent in the recent decade, and its key premises have been questioned, contrary to assumptions (McDonald, 2002). About 40% of network carrier passengers start

or end in the hub. To link outbound, the remaining segment navigates the hub(s). Transporting numerous passengers requires extensive infrastructure and a large team.



Source; Research Gate
 OAG data(2020)
 (Courtesy of R. John
 Hansman)

FIGURE 3: DELTA AIRLINES HUB AND SPOKE ROUTE NETWORK

Donoghue (2002) claims that in H&S, passenger service agents, gates, lounges, baggage facilities, ramps, and maintenance staff for direct flights are superfluous. The hub stop needs extra departure and arrival, which incurs landing and facility fees. Road topography also raises costs. The hub may directly align with a few origin-destination markets. All additional passenger routes need indirect routing to the centre hub, increasing flight duration and expense. Both flight segments between a passenger's origin and destination are shorter than a non-stop travel.

Swan (2002) claims shorter flights have greater operating expenses per mile. Due to extended taxi and takeoff and landing manoeuvres, aircraft slow down. Long flights at low altitudes use more gasoline. Block time raises flight crew pay and maintenance expenses. flying cycles dictate many costs, not flying duration (Halloway, 2003). The impact on spoke capacity utilization is unclear, although network growth raises prices significantly. Hub scheduling congestion is the main cause. Aircraft delays rise as the airport fills. The number of runways limits arrivals and departures. Inclement weather requires increased aircraft separation, especially during landing. When weather allows only instrument approaches, some airports' arrival rates drop 50%. Congestion plagues taxiways and gates. Terminal space is limited in old structures.

The hub airline schedules extra flights into each terminal, increasing traffic. However, airport facilities may stay essentially empty (Franke, 2004). Airline congestion is reduced by extending flight and connecting times, reducing resource efficiency. The H&S system works for cities of all sizes and demand. Thus, many aircraft types are needed to match capacity with air traffic volume.

A big network airline's fleet typically has 50–350 seats (Cook, 2008). Reduced fleet commonality raises expenses for pilot and technician training, component inventory management, and fleet-specific support

equipment. As the fleet gets more complex, scheduling aircraft and people becomes more difficult and restrictive. Lethargic learning curves are not fully utilized. These characteristics complicate network carrier construction and administration. Management scientists have focused on aviation applications. Ultimately, H&S systems are delay-prone. Due to incoming flight delays, departing flights may be delayed accommodating connecting passengers. Hub disruptions, especially weather-related ones, as well as radar or computer faults, quickly spread throughout the aircraft operation. The existence of many hubs allows for problem-solving. Wide service and higher cost. city distances from the centre. To match the flight schedule, close flights should wait for distant flights to return. These delays reduce aircraft and flight crew efficiency due to scheduling constraints. Scheduling methods reduce resource inefficiencies, especially for carriers with several link complexes, although limitations remain (Cook, 2008).

During connection phases, hub staff and facilities are actively utilized, but otherwise remain idle. Asset utilization decreases (Berdy, 2002). Its location is primarily determined by the hub airport. H&S networks serve many markets but are complicated and expensive. Network carriers provide a wide range of services to enhance profitability. Business travellers benefit from network systems' high frequency and wide geographic reach. Business travellers pay more for full service, especially for flexible ticketing and last-minute reserved seats (Lott, 2006). Leisure travellers get a large discount on excess capacity owing to demand mismatches. Over time, advanced revenue management systems exploit customers' changeable desire and capacity to pay for air travel to improve airline network revenues. In the late 1990s, as network airline crew expenses skyrocketed, business ticket prices sometimes outpaced reduced rates by a factor of 10. These differences upset corporate travellers, forcing major airlines to restructure in the early 2000s (Hansson, 2002).

2.4 Point To Point Airlines

The point-to-point architecture contrasts with the intricate H&S system (Cook, 2008). This entails direct flights between sources and destinations, streamlining the procedure, typical of Point-to-Point airlines. The travel distance from the hub to the spokes significantly exceeds the direct distance between the spokes, rendering some city pairings unfeasible (Cook, 2008). The whole travel duration may thus become disadvantageous for certain aircraft operating costs and similarly concern a segment of airline passengers over the entire trip length. Regional jets allowed airlines to reach regions that were too remote for turboprops or too expensive for larger jets in the early 1990s (Feldman, 2000). Hub expansion incurred operational expenses. Direct routes become the cheapest way to service locations if accompanied with enough demand for bigger aircraft. Eliminating the connecting hub intermediate stop reduces costs by over 30% (Lott, 2005). Although the savings are considerable, the point-to-point system has other advantages:

2.4.1 P2P Airlines: Fast And Cheap

The absence of intermediate stops and roundabout routes, coupled with increased aircraft speed, effectively reduces journey time on point-to-point flights, leading some travellers to favour the more direct option (Cook, 2008). In the absence of interconnected facility scheduling constraints, it is plausible that aircraft turnaround times could be reduced. Improving aircraft utilization could potentially increase revenue, thereby enabling boarding gates to manage a greater number of operations daily. Here are a few advantages and disadvantages of P2P: -

- 2.4.1.1 The effect of good P2P network also results in effective airport services in that full deployment of airport personnel may occur throughout the day.
- 2.4.1.2 The productivity of flight crews may increase; however, the lack of connecting flights could influence scheduling, especially within irregular flight systems.

2.4.2 Constraints of P2P To Principal Markets

The inability to channel traffic from diverse sources into a single pathway constrains the economic viability of direct flights connecting different city pairs (Cook, 2008). Many small and mid-sized cities lack sufficient demand to sustain continuous flights to a variety of destinations. Less than 20% of the 400 commercial airports in the United States accommodate more than 50 passengers per route on a daily basis (Lott & Taylor, 2004). A study revealed that merely 5% of internal city routes exhibited sufficient passenger demand to warrant direct flights. The largest markets within the nation represent a substantial 75% of the overall traffic.

Consequently, they ignite intense competition (Lott, 2003). The intensification of price competition is particularly evident among low-cost carriers. Consequently, the profits in the primary market remain minimal (Lott, 2006). Should they be present, (Cook, 2008) Low-Cost Carriers (LCCs) rarely venture into expensive, underdeveloped areas. Low-cost carriers ought to engage in competition with traditional airlines as well as among themselves to foster development.

Additionally, markets with limited populations may be adequately served by smaller aircraft. Regional jets were designed to circumvent hub airports. Regional aircraft exhibit seat-mile costs that exceed those of low-cost carriers operating Boeing 737 or Airbus A320 series flights by more than a factor of two. The operating fares of regional aircraft are prohibitively high, hindering the potential for traffic growth in a sustained point-to-point service. Regional aircraft facilitate the movement of passengers from smaller airports to major hub airports, particularly for prominent airlines (Savage & Scott, 2004).

The collapse of the airline, Independence Air exemplified an attempt to transcend a mere feeder role, highlighting the challenges airlines face in reconciling capacity with the ever-changing dynamics of demand, which varies by time, week, and season (Cook, 2008). The demand for air travel is interrelated; nonetheless, the network carrier can mitigate a decline in demand for specific city pairs by capitalizing on increased demand for alternative routes. Point-to-point carriers possess the capability to adeptly navigate fluctuations in route demand without necessitating the interconnection of traffic. In order to align capacity with demand, adjustments are made to frequency, aircraft size, or seasonal routes (Cook, 2008).

A comparative analysis of two route systems should be conducted utilizing a diverse set of criteria in the summary (Cook, 2008). The analysis encompasses aspects such as scope, connectivity, dependence, demand, market size, frequency, pricing, asset utilization, operating expenses, fleet requirements, and hub-and-spoke optimization. The hub-and-spoke system is enhanced through the integration of services across an extensive region and numerous destinations. The majority of travellers navigate through central hubs to arrive at their intended destinations within this framework. Every route within this system is intricately dependent on others for the facilitation of passenger connections. The demand for travel between specific city pairs is subject to fluctuation; however, alternative markets may serve to offset these variations. This system caters to urban areas of varying scales and provides robust daily frequency for every destination. Conversely, the point-to-point system caters to a single city-pair for each route. Certain pathways may conclude.

No connections are provided; nonetheless, "rolling hub" connections are frequently observed (Cook, 2008). The demand for alternative routes does not influence the traffic on the primary routes. Only adjustments in frequency and pricing can effectively address fluctuations in demand. It is essential to establish high-density marketplaces that feature at least one origin or destination characterized by significant demand. The frequency is diminished, contingent upon the nature and density of the market. Individuals engaged in both business and leisure pursuits tend to prioritize frequency and coverage, particularly when they exhibit sensitivity to pricing, especially concerning premium business fares. The interplay of network geography, temporal factors, and hub congestion imposes constraints on connectivity. The presence of hub connections increases the cost per seat mile, although the utilization of larger mainline aircraft provides some mitigation. An extensive seating capacity is essential to align capacity with traffic demands, necessitating multiple fleets.

2.5 Discount Carriers Vs. Point-To-Point

The assertion "This arbitrary phrase conceals the reality that the majority of low-cost airlines in the US employ point-to-point routes" is not exactly precise. Although several low-cost carriers (LCCs) use a point-to-point approach, others argue that the differentiation between LCCs and network airlines is becoming ambiguous.

2.6 Hub-And-Spoke And P2P Route System Characteristics

Wanting unlimited network use, low cost per available seat mile for each city-pair, and fleet compatibility. Many hybrid and combination route systems exist between these extremes. According to Cook,(2008), a research by Button (2002) and Lederer & Mambinadom (1998) results showed that Southwest's system is

linear. An aircraft travelling a route collects and discharges passengers at each stop, like a bus or train. Southwest Airlines has enough flights at its locations for good connections. However, these exchanges are not always timely.

Southwest Airlines' linear system combines point-to-point and hub-and-spoke elements (Cook, 2008). Network airlines avoid hubs by flying point-to-point in main markets. JetBlue's hub-and-spoke, point-to-point, and linear route network are unique. These route system architectural differences are prevalent but seldom noticed.

After airline liberalization in 2001, H&S route networks improved (Cook, 2008). These improvements included roads to major cities. Each airline expanded their networks mostly around their hubs. Acquisitions and mergers often eliminate competition (Borenstein, 1992). As expected, the continuing growth required includes destinations already served by other airlines owing to their strategic positions. Airlines competed for market dominance, giving customers more affordable alternatives. By 2000, fourteen Midwest transport hubs competed for east-west traffic. This caused fierce rivalry for connecting flights, which were seldom profitable. Legacy carriers have reorganized over the recent years due to competition from low-cost carriers (LCCs), Internet distribution, ticket-less travel, a decline in demand after the Internet bubble burst, and, most importantly, 9/11 (Cook, 2008).

Four airlines declared bankruptcy to cut expenses and boost efficiency, while American and Continental did so without legal action (Cook, 2008). It is further revealed by Cook, (2008), that common steps taken by each carrier include reduction in labor costs from concessionary agreements with labor unions or imposition where employees were not represented; retirement of older, less efficient aircraft; renegotiation of aircraft leases; reduction in product attributes such as meal and inflight services; and an increase in operational efficiencies, notably the implementation of "rolling hubs." Delta, United, and US Airways terminated their traditional defined benefit pension plans while in bankruptcy leaving the liability to the Pension Benefit Guarantee Corporation and the taxpayer. The result is a legacy carrier group far more cost competitive with LCCs. Legacy labour costs per available seat mile, for example, has fallen from 4.4 cents in 2000 to 3.5 cents by the third quarter of 2005. This compares with 2.8 cents for the LCCs (Meehan, 2006). Cost improvements such as Delta and Northwest work through bankruptcy shall likely to narrow this gap further. Legacy carriers increased operational efficiencies in many ways, but one method is especially applicable to a discussion of route systems. Convenient and timely flight connections result from tightly scheduled complexes but come at the expense of poor asset utilization. American was the first to implement "depeaking" or the "rolling hub" at its Chicago O'Hare hub. Rather than closely timed arriving and departing banks, with a rolling hub flights are scheduled into and out of the hub evenly throughout the day (Flint, 2002).

Due to the extensive number of flights, connections to all spokes remain accessible; however, the duration of connection times may differ. The analysis revealed that the average total trip time for passengers in America has risen by 10 minutes; however, the operation of 330 daily flights necessitated 5 fewer aircraft and 4 less gates. There was an increase in employee productivity ranging from 4 to 5% (Gillen & Morrison, 2005). The average turnaround times were reduced by 5 minutes at O'Hare and by 8 minutes at the spokes (Flint, 2002). Consequently, American Airlines reduced the prominence of its Dallas and Miami hubs, mirroring Delta's actions at Atlanta. Legacy carriers have come to the realization, albeit somewhat tardily, that the substantial and growing price premiums imposed on business travellers during the late 1990s are no longer viable. The introduction of Simplifares by Delta in January 2005 was typically emulated by other legacy carriers. During that period, the maximum allowable fare for domestic one-way coach tickets was set at \$499, significantly lower than the prior unrestricted walk-up fares that often surpassed \$1,000 (Lott, 2005a). The \$499 cap, while exceeding the conventional LCC maximum fare of \$299, exemplifies the imperative to engage in competition for the patronage of business travellers through attractive pricing strategies.

In 2006, both legacy and low-cost carriers (LCCs) elevated their self-imposed fare ceilings (Cook, 2008) in response to increasing fuel expenses. Rather than adhering to a conventional business model, these airlines have chosen to distinguish their offerings. JetBlue has introduced complimentary television as part of its in-

flight offerings. With the exception of Southwest, the majority of airlines provide the option for advanced seat selection.

JetBlue operates primarily from New York Kennedy, with Boston Logan serving as an additional focus city. AirTran's operations are centred in Atlanta, while Frontier has established its hub in Denver. Southwest continues to prioritize secondary airports while also maintaining operations at numerous primary airports (Cook, 2008). Recently, operations commenced from the main airports in Denver, Philadelphia, and Pittsburgh. However, LCCs are arguably most recognized for their role as point-to-point carriers. Although this has historically been an overstatement, its veracity is diminishing further. AirTran, America West (prior to its merger), and Frontier primarily operate as H&S carriers. Among the least expansive of the low-cost carriers, Spirit Airlines exemplifies the quintessential model of a pure point-to-point airline. In the past year, it has swiftly evolved its system into a hub and spoke model, facilitating connections from the Midwest and Northeast to the Caribbean via Ft. Lauderdale. The flight schedule of Southwest is not explicitly designed to facilitate connections; rather, connections emerge due to the substantial number of flights operating in various cities. The aforementioned connections were referred to as rolling hubs (Cook, 2008) prior to the initiation of "depeaking" at American's Chicago O'Hare hub. The financial benefit that was previously afforded to low-cost carriers through a straightforward point-to-point routing system and associated offerings has notably decreased (Cook, 2008). By means of strategic restructuring, traditional carriers have enhanced operational efficiencies and reduced labour expenditures. Low-cost carriers recognized and capitalized on neglected and overpriced markets several years ago, and now they face growing competition from both traditional legacy airlines and other low-cost carriers. In pursuit of a sustainable advantage, they have diverged significantly from the initial Southwest low-cost model, introducing a diverse array of products (Cook, 2008).

As a result, the differentiation between low-cost carriers and traditional airlines is becoming increasingly blurred (Cook, 2008). Should the newly formed US Airways, which presents itself as the inaugural nationwide low-cost carrier, be taken into account, the differentiation dissipates. The current landscape in the United States features a spectrum of service-price offerings, with each carrier striving to leverage its unique strengths to cater to various passenger segments. While this range of product offerings aligns with established marketing principles, it presents an added layer of complexity for analysts and scholars within the airline sector. Although considerable emphasis has been placed on route structure (Cook, 2008) in recent years, point-to-point routes generally do not serve as the primary defining feature of low-cost carriers. JetBlue, which, prior to its recent reversal, was frequently referenced as a significant contributor to the evolution of the US domestic industry, serves as a compelling case study. The route structure integrates substantial elements of point-to-point, H&S, and linear concepts. Amidst the financial turmoil that engulfed the industry post-2001, numerous analysts likely concurred with Jay Brueckner from the University of Illinois, who remarked, "Ultimately, we will witness a blend of low-cost, point-to-point airlines alongside network carriers that will appear significantly altered." (Levins, 2004, BOI). This straightforward bifurcation now appears to be less probable. Low-cost carriers, assuming the term retains its relevance, are developing an intricate amalgamation of route frameworks and offerings, whereas traditional legacy carriers are streamlining theirs (Cook, 2008).

2.7 Ethnography of Route Network Terminology

The inability to differentiate between the components of business models and route structures clouds the fundamental characteristics of both. Aviation experts examine the comprehensive performance and future prospects of airlines, considering them as interconnected factors that depend on the strategic importance of route design. The study notes that there has been terminology use of Low-Cost Carriers and point-to-point carrier interchangeably (Cook, 2008). A low-cost carrier (LCC), usually referred to as a budget or discount airline, is an airline that prioritizes the reduction of operational expenses. It forgoes certain conventional airline amenities in exchange for lower prices. To compensate for the income lost due to reduced ticket prices, the airline may impose additional costs, such as for carry-on luggage.

The word originated in the airline sector (Cook, 2008), denoting airlines having a more economical operational cost structure compared to their rivals. The word is often used to describe any airline that offers cheap ticket rates and restricted services, irrespective of their operational methods. Low-cost carriers should neither be conflated with regional airlines that provide short-haul flights without amenities, nor with full-service airlines that provide some discounted tickets.

Certain airlines market themselves as low-cost while offering amenities often linked to conventional mainline carriers. These offerings include designated seats, culinary services, varied luxury cabins, satellite or terrestrial Wi-Fi connectivity, and in-flight audio and visual entertainment. The term ultra low-cost carrier (ULCC) is used, especially in North America and Europe, to denote airlines that forgo various services and facilities (Cook, 2008).

2.8 The African Airlines Business Models-National Airlines

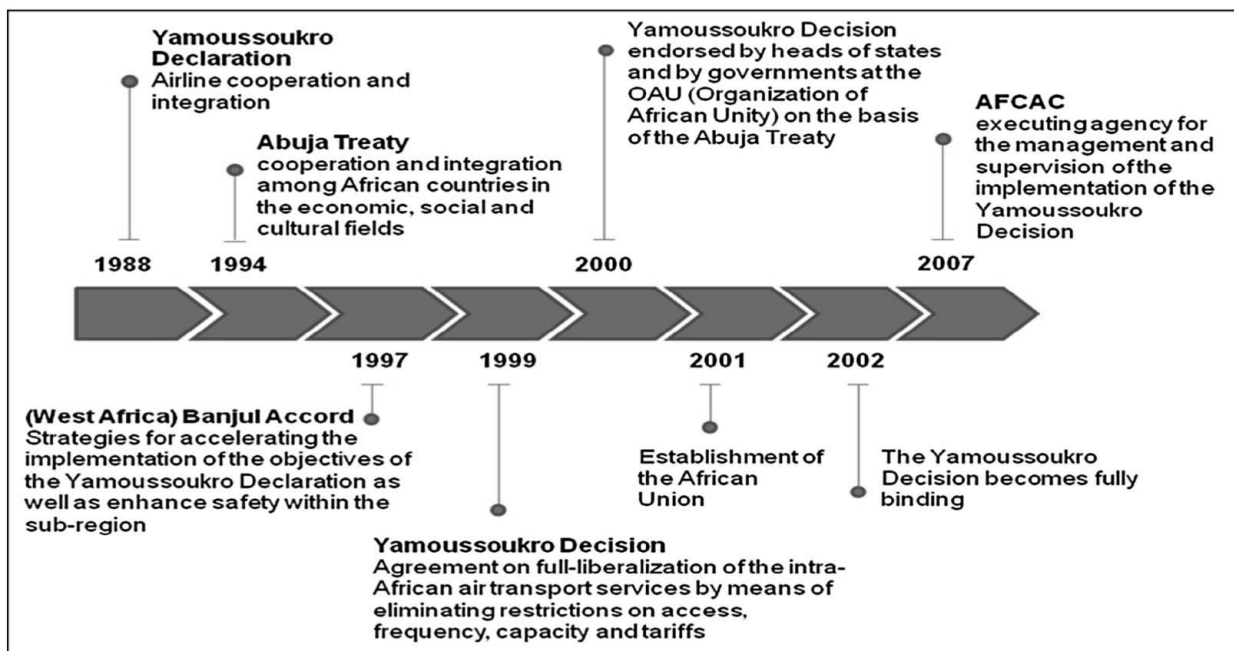
This research (Tsamenyi, 2011) investigated that the foremost obstacle facing the business strategies of African Airlines partly arises from the collective national aviation policies enacted by African governments after independence. The situation underscores a broader issue, as many airline enterprises encountered failures attributed to Neopatrimonialism and the inadequacies of control and accountability mechanisms within state institutions in developing nations. This is exemplified by the experiences of Ghana Airways, Nigerian Airways (Tsamenyi, 2011),¹ Time airlines, South African Airways (Previously in placed in accountability), and Zambia Airways (in liquidation). The study investigated the issue of current African government policies regarding a presumed "national aviation policy," taking into account the necessary inputs for airlines, with the aim of identifying various underlying factors to draw conclusions about the long-term sustainability of airlines. The investigation of the strategic management of the African civil aviation sector might be advantageous for all African aviation stakeholders by elucidating the fundamental challenges that African airlines struggle to surmount.

According to Sergio R. Jara-Díaz,(2013), the alterations in the configuration and dimensions of African airline networks have not been elucidated well from a cost standpoint, considering the observed growing returns to density for certain route patterns and constant returns to scale for changing network size. This study critically assessed the estimates offered by various authors regarding the global airline industry's prospects by employing scale and scope indices. It identified shifts in route architecture and other spatial economies that had not been quantified before, including the contributions to GDP based on network size, domestic/local route network services, and domestic-international services. The findings provide novel insights into the influence of cost incentives on the observed alterations and trends within the airline sector.

This study recognizes Ethiopian Airlines (ET) as a notable example of a highly successful airline within the African aviation sector, managing to handle about 80% of intercontinental traffic within its network capacity. This achievement is particularly notable when contrasted with other African national airlines, which often depend on government funding ,protected from YD policies albeit face various flight network expansion challenges. African airlines are therefore encouraged (Meichsner, 2018) to build on potentials developed by ET except the individual African states need to remove the aviation policy obstacles that limit airline growth: The study by Meichsner, (2018) noted that the previous 10-15 years had seen notable growth for ET.

2.9 Prospects For African Airline Deregulation

According to IATA,(2024), the report on the potential of aviation in Africa highlights that the continent represents 17% of the global population, yet only contributes 2% to travel activity. The collaborative initiative, Focus Africa, which includes AFCAC, AFRAA, and AASA (Airlines Association of Southern Africa), is addressing critical aviation challenges across the African continent in a structured manner. The objective is to create a continent characterised by enhanced safety, efficiency, and connectivity, propelled by a varied and proficient workforce to leverage the capabilities of aviation and to unveil economic and social prospects. This study acknowledges that the city of Yamoussoukro in Côte d'Ivoire is renowned for a declaration that once had great promise for African aviation, although there has been inadequacies of significant advancements, Its connection to the African airline business remains somewhat tenuous (Chiedu, 2018).



Source: Njoya (2016)

FIGURE 4: SAATM AGENDA SYNOPSIS

However, according to Samunderu,(2024), further research agrees that initiation of the Single African Air Transport Market (SAATM) in January 2018 represented a constructive advancement; albeit, without collaboration between the airlines and governments to address the challenges hindering Africa's potential, it risks becoming yet another incomplete (Chiedu, 2018) African project with a missed objective in the continent's aviation narrative.

Following its early potential, SAATM has been unjustly equated with the Yamoussoukro Decision, which sought to liberalize African aviation. Despite the existence of SAATM for a number of years now , its aspirations for African aviation though very optimistic still remain unfulfilled (Chiedu, 2018) as can be seen from the synopsis in Figure 4 above.

2.10 Existing African Airline Models

This research presentation seeks solutions to improve the advancement of African airline networks by comparing them with studies on US airline networks developed as hub-and-spoke and point-to-point route systems. It examines economic and operational factors to illustrate how route design influences competitive advantage. This is largely about airline and transportation economics. According to Bofinger,(2017), the African governments' s aviation policies may impact sustainable policies that promote air traffic and tourist development by altering the internal regulatory and economic framework, therefore useful in establishing a conducive atmosphere for a successful airline business model. Bieger and Wittmer (2006) contend that a well-defined airline strategy and air access plan are crucial for the strategic development of airline destinations. African Airlines should then assess and understand the business models of destinations (Anon., 2015).

Research by Bofinger (2017) indicates that an assessment of the top 10 African airlines by Meichsner (2017) shows that only Ethiopian Airlines, Royal Air Maroc, and EgyptAir exhibit financial sustainability. Arik Air has recently merged with Aero Contractors, with support from a financial assistance entity provided by the Nigerian Government. The research noted that Air Mauritius and South African Airways entered administration although both airlines are operating with fleet and schedule adjustments. The analysis indicates that Air Algerie, Kenya Airways, TAAG, and Tunis Air obtained governmental support in response to

the challenges presented by the COVID-19 pandemic. Additionally, Bofinger,(2017) revealed that Several critical aspects influence the understanding of the history, present, and prospective future trajectory of airlines in Africa.



Source (FlightRadar24 ,2024)

FIGURE 5:FLIGHT RADAR TRAFFIC FLOW IN AFRICA

A basic depiction of flightradar24 on Figure 5 above, illustrates the real-time locations of aircraft (Andersson A. a., 2021)currently in flight globally. This image depicts the limited airline network and services available in Africa. Consequently, the research observed that a significant portion of the African airline sector has encountered challenges in embracing sustainable and contemporary methodologies for airline marketing management and the optimization of flight operations route networks.

Sub-Saharan Africa has 104 million seats across all route categories, markedly behind Brazil (Bofinger, 2017), which has 120 million seats, almost 100 million of which are allocated to domestic traffic exclusively. Other analogies are also remarkable. In the Washington, DC area, inconsequence all three airports (Reagan National Airport, Dulles International Airport, and Baltimore/Washington International Airport) served 68.5 million passengers in 2015, corresponding to 90 million seats at a load factor of 76 percent. The distribution of this capacity is substantial: the principal air transport corridors traverse the East , from South Africa to Kenya and further north to Ethiopia, with all three acting as vital hubs. The flight network patterns in North Africa, West Africa including the Sahel region exhibit a diverse array, characterized by a notable concentration of routes within the Algerian, Moroccan and Nigerian region, whereas Central Africa offers a comparatively limited level of service.

2.11 Hub-and-Spoke Route Network Operators in Africa

This study has noted that Ethiopian Airlines and Kenya Airways function hub-and-spoke (H&S) networks throughout Africa. H&S, the network airlines for American and United (Cook, 2008), provide nonstop flights from New York to Los Angeles from their respective hubs. The route structure is a significant strategic choice; nonetheless, it is just one aspect of an airline's economic model and is seldom executed well.

2.12 The African Airline Business Environment

This study achieved an in-depth knowledge of the African aviation industry through extensive literature study. Subsequently, an environmental study was conducted to examine the past and present of airline business models. The premise around which this study was built so that an inventive framework or business strategy would benefit from including a unique set of procedures tailored to the diverse African environment. Air Operating Certificates (AOCs) is a formidable task since the same standards apply to all airline operations, regardless of their size. African airlines should resolve all regulatory obstacles to sustain Airline economic viability.

Heinz, (2013) further revealed that a cluster exercise analyses 57 African airlines based on their network and size, resulting in diverse groupings that reveal their current business strategies. Eight airlines, selected based on cluster analysis groups, were subsequently chosen for the study of Product and Organizational Architecture framework. Africa adheres to established paradigms, yet certain changes are evident. In Africa, full-service network carriers and regional carriers are the most recognized and stable entities. The low-cost carrier model was extensively tested in Africa, yielding varied results. The report (Heinz, 2013) emphasized network density and connectivity as essential components of business models for earnings in Africa.

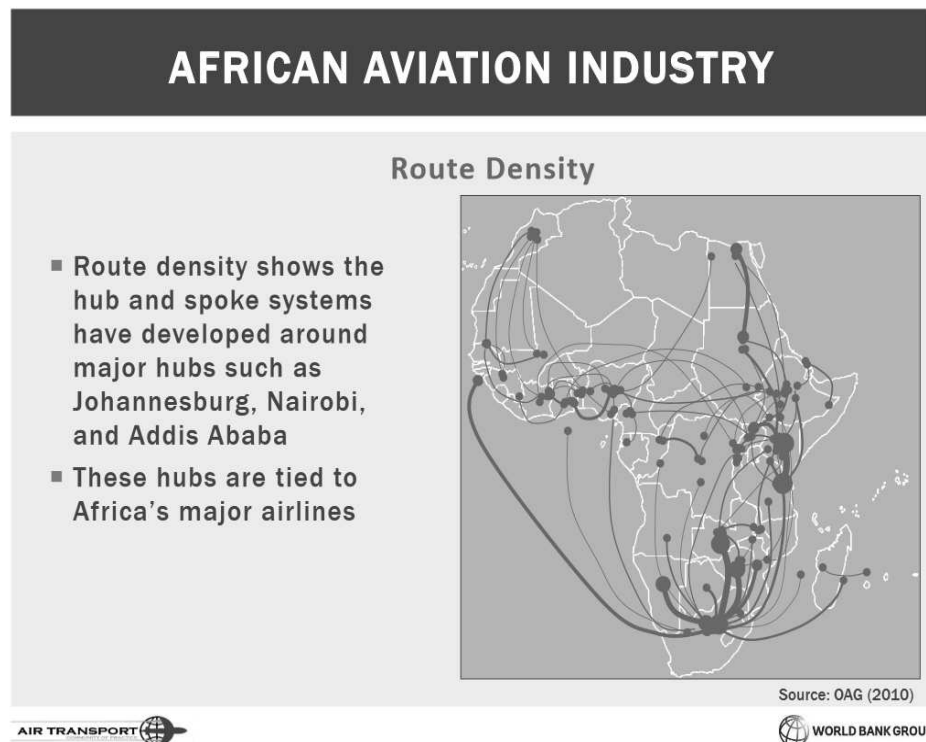
According to Tolcha, (2024), the air transport sector in Africa is regulated and lucrative for licensed airlines. Bilateral air service agreements (BASAs) primarily dictate the framework for airline competition, although various sub-regional liberalization. Conversely, this competitive environment has also not been well explored. This study examines market concentration in the African aviation industry and its impact on the operations of African airlines. The results (Tolcha, 2024) of the panel regression analysis demonstrate a nonlinear link between market concentration and airline production. Intense rivalry may limit the production capacity of airlines, while high market concentration might foster a dominating airline or an alliance that serves as a barrier to admission or retention for other airlines.

This study further noted that according to Tolcha, (2024), the Herfindahl-Hirschman index was used to assess competitiveness at the airport level. Between 2015 and 2019, panel data were gathered from 54 countries, 339 airports, and 221 airline firms. Figure 6 below depicts a world bank survey for 2010 as provided by AOG on African flight route density. Kernel density estimation has shown that the air transport services market in this region is fragmented (Tolcha, 2024), characterized by several smaller carriers. Major hub airports, those situated near tourist attractions, and important airports located far from larger African hubs are more prone to experience fierce rivalry. Conversely, markets often cluster in regions where predominant and safeguarded flag carriers operate. Moreover, competition is often weak or constrained at small airports that provide a limited number of flights.

Nonetheless, this study also reiterated according to Abate, (2016) on sustainability impacting the outcomes of airline strategy. Most African airlines are confronted with a number of challenges as a result of intervention, corruption, poor productivity, excessive workforce, outdated aircraft, and inadequate funding. Despite the significant need for aviation services in a variety of rapidly developing industries, the number of aircraft that are actively used by state-operated airlines to fulfil the demand for aviation services is decreasing.

Hope may be found in the fact that there are now a number of respectable travel agency networks that are now in business. In an economy that is dominated by monetary transactions, a limited internet connection may have an effect on the tendency to make bookings at the eleventh hour. It is possible that those who have disabilities shall have difficulties with this. A wide variety of African airlines are confronted with a number of persistent obstacles, some of which include high input costs, inadequate safety measures, and difficulties connected to governance (Heinz, 2013).

The research further relooked in the process of acquiring Air Operating Certificates (AOCs) across most Civil Aviation Authorities in Africa as being considerably a demanding experience (Heinz, 2013). Airline AOC applicants encounter the notion that the “size and complexity of the operation” is typically not regarded as a determinant for the type of AOC required but Instead, the same criteria are uniformly applied to nearly all commercial aircraft activities, irrespective of the operational scope. It is imperative that African aviation authorities handle common regulatory obstacles and package requirements differently to suite smaller commercial aircraft operations in order to ensure the continued sustainability of African airlines. This investigation placed a strong emphasis on sustainability, which had an impact on the findings of the sustainable airline strategies.

**FIGURE 6: AFRICAN AVIATION ROUTE DENSITY**

2.13 The Ethiopian Airlines (ET) Success Story

Ethiopian Airlines is entirely owned by the Ethiopian government (Meichsner, 2018), although since Girma Wake and Tewolde Gebremariam were appointed in the early 2000s, the company has operated autonomously. They returned from Bahrain and New York demanding complete independence between ET and the government (Oqubay A., 2019) with a strong Addis Ababa hub and continued intra-African and global expansion, the team secured all facets of a high-quality aviation service. In addition to its standard airline route network, Ethiopian Airlines manages the following business divisions under the ET Group umbrella (Oqubay, 2019):-

- 2.13.1 Freight Business
 - 2.13.1 Aviation Academy
 - 2.13.2 Advanced Maintenance Facility
 - 2.13.3 Innovative Aircraft
 - 2.13.4 Modern services and infrastructure
- Meichsner (2018)

Additionally, Meichsner, (2018) researched that ET first considered regional carrier partnerships and investments. Ethiopian Airlines' 40% equity stake in Lomé-based ASKY airline helps it enter the West African market, while its 49% stake in Malawi Airlines and Zambia Airways, helps it develop in Southern and East Africa routes. In an interview on February 10, 2021, Group CEO Gebremariam (Bofinger, 2017) detailed the changes in ET airline's pandemic strategy, noting that ET operated 12 aircraft, including 10 dedicated B777 freighters and two B737 freighters, with some passenger aircraft temporarily converted to freighters by removing the seats. ET successfully completed the conversion of 25 aircraft into freighters, enhancing freight capacity at an opportune moment. The ET yields were elevated due to strong demand. Following the transition to cargo aviation, ET sustained a robust cash flow and expanded its freight operations across Europe, the Americas, and China (CAPA, 2019).

Bofinger (2017) noted that ten respondents expressed agreement with Tewolde's emphasis on the African Union and the African Continental Free Trade Area (AfCFTA) that ET serve as a primary supporter of the AfCFTA. ET partnered with the African Union to launch free trade with Swaziland, now referred to as eSwatini, starting the process on January 1, 2021. The majority of African nations have recognized this significant milestone, and ET conveyed enthusiasm regarding the advancement. This AfCFTA development is expected to boost intra-African trade, which is currently minimal. Only 16% of global trade passes through Africa. Thus, 84% agrees with China, Europe, and others. (CAPA, 2021). The researcher observes that due to the favourable advancement of African market potentials, ET achieved 4-Star Airline status (Bofinger, 2017) and formed a partnership with Star Alliance (Lufthansa/United).

2.14 African Airline Failures

As per Heinz and O'Connell (2013) report that 37 airlines were formed in Africa from 2000 to 2010; however, the research also found that an equivalent number of airlines (37) subsequently terminated operations, reflecting a regrettable trend. Africa's aviation industry now faces significant challenges (Mara, 2012) that pose a severe threat.

The unified national aviation regulations established by African countries post-independence provide the greatest obstacle to the business strategies of African Airlines (Tsamenyi, 2011). This underscores a broader issue, such as Neopatrimonialism and deficiencies in state institutional control and accountability in developing nations that resulted in several airline disasters. Ghana, Nigerian Airlines, 1 Time Airlines, South African Airways (Previously under Accountability), and Zambia Airways (in-liquidation) exemplify this situation. The study analyzed current African governmental policies about a proposed "national aviation policy," including airline perspectives to identify fundamental factors influencing airline profitability. Examining the strategic management of the African civil aviation sector might assist all stakeholders by uncovering the fundamental challenges confronting African airlines.

Nonetheless, in a study conducted by Ojebode, (2022), a comprehensive analysis was conducted on 31 defunct African airlines using archival documents, complemented by insights from 32 aviation workers gathered through a semi-structured questionnaire. The former data set was analyzed through meaning-making, whereas the latter was analyzed using frequency counts and percentages. The findings indicate that the primary causes of airline decline in Africa are various forms of mismanagement, including fraud, as well as unfavourable government policies and indirect interference. The atrophy pattern indicates a high failure rate within the initial five years, with airlines that endure this critical phase exhibiting a tendency to develop resilience that sustains their operations. The integration of innovative and structured management, supportive government policies, and a strong capital base would contribute to mitigating the atrophy rate in Africa (Ojebode, 2022).

2.14.1 African Airline Failures-Zambia Airways (in Liquidation)

According to Kalombe, (2023), Zambia Airways (In-liquidation), which was established in 1967, offered domestic flights within Zambian towns as well as international flight network to various destinations including Botswana, Kenya, Liberia, Mauritius, South Africa, Swaziland, Tanzania, Cyprus, Germany, the United States, and eleven other internal locations (Kalonde, 2018). The airline operated as the national carrier for a duration of 27 years before its discontinuation by the MMD(Movement For Multi-Party Democracy) administration in 1994 (Anon., 1987). Despite the differences in the growth of civil and military aviation, the African government (United National Independence Party or UNIP, Socialist Policies) strategically reassigned essential military aviation experts with specialized expertise to support the establishment of a sustainable flight network.

The creation of an extensive flight route network, which included both domestic and international links, played a crucial role in the development and advancement of the Zambian economy since the country achieved independence in 1964. Nonetheless, In 1994, the Movement for Multi-party Democracy (MMD) government made the decision to dissolve Zambia Airways (Szeftel, 2000), which led to a significant downturn in the domestic commercial air transport and tourism sectors (Anon., 1994). The evidence indicates that the country's privatization initiatives culminated with the emergence of the MMD

administration in 1991. The newly formed government commenced the shift from the socialist principles established by the United National Independence Party (UNIP) administration towards a free market economy. Zambia Airways (In-Liquidation) serves as a case study of a governmental strategy focused on the potential privatization or closure of state enterprises, motivated by issues related to the performance of specific underperforming entities. Following the national airline's halt in operations at the start of December 1994, several private entities initiated the establishment of private airlines to address the gap left by the closure of Zambia Airways (In-Liquidation). The majority of these airline initiatives had shown a significant lack of effectiveness, leading to a high rate of airline closures. The airline industry and its associated flight route network have played a role in Zambia's gross domestic product (GDP), though the degree of this contribution remains limited, primarily due to the constrained capacity of locally registered Air Operator Certificate (AOC) holders.

The capacity of AOC holders in the Zambian airline business has consistently been low over time; however, the last five years have shown a period of stability, which can be linked to the efforts of Proflight Zambia and Zambia Airways (2014) (operated in collaboration with Ethiopian Airlines). The observable potential for both competitive and comparative advantage within the aviation sector seems somewhat distant, yet it remains entirely attainable for Zambian airlines as a unified entity.

2.15 Profit Outlook For African Airline Markets

2.15.1 IATA Financial Projections

According to Highlights of the 2024 Financial Outlook by IATA, African airlines are anticipated to realize a net post-tax profit of \$100 million, marking the second consecutive year of profitability after the COVID crisis (IATA, 2024). The research acknowledges the projections by IATA below:-

Per Passenger Profit: The anticipated profit per passenger is projected to be USD 0.9, which represents a significant increase from the 2023 figure of \$0.5. This change indicates enhanced operational efficiency and rising demand, although it remains considerably lower than the global average of \$6.14.

Profit as a Percentage of Revenue: The expected profit margins are projected to increase to 0.6% of revenue, rising from 0.4% in 2023. This is notably below the global net profit margin of 3.1%.

Revenue Passenger Kilometres (RPK) growth stands at 8.5%, suggesting a sustained robust demand for passenger travel throughout the region. This, however, falls short of the anticipated capacity growth of 9.1%.

Load factor is expected to reach 61.9%, slightly exceeding the breakeven load factor of 59.8% for African Airlines. Nonetheless, in 2023, U.S. airlines documented a passenger load factor of 83.53 (Bureau of Transportation Statistics, 2024) percent for domestic flights throughout the United States. The load factor registered was marginally below the 84.32 percent observed in the previous year. The passenger load factor is calculated by taking the ratio of revenue passenger miles to available seat miles for a specified reporting period.

Nonetheless, according to Samunderu, (2023) (Samunderu, Challenges, complexities and opportunities In African air transport management, 2023) The contemporary African air transport sector has witnessed a decrease in profitability attributed to challenges such as particularly high operating costs associated with low revenues and, in certain instances, unsustainable marginal costs. This study shall aid airlines in formulating and executing strategies to tackle challenges associated with problematic constructs in choosing a network model. For African airlines to attain significant sales volumes and authentic profits on a selected network model, maintaining an uninterrupted operational flow is cardinal although may be difficult without the necessary incentives from African governments to address specific challenges identified in the study.

The prior discourse becomes clear when one scrutinizes the operational requirements of African Airlines in the aviation industry, highlighting the essential need for proficient pilots, engineers, cabin crew, and dispatchers. It is imperative to require continuous retraining to maintain crucial safety standards, whereas limited capacity or subpar training facilities result in increased training costs. Essential aviation training,

Aviation benefits in Africa

Air transport supports 6.2 million jobs and \$55.8 billion in African economic activity. That is 1.8% of all employment and 2.6% of all GDP in African countries.

Jobs and GDP supported in Africa

JOB TOTAL		GDP TOTAL
6.2 m		\$55.8 bn
4.9 m	Tourism catalytic	\$35.9 bn
248,000	Induced	\$2.8 bn
601,000	Indirect	\$6.8 bn
415,000	Aviation direct	\$10.3 bn



Source: IATA(2019)

FIGURE 7: CONTRIBUTION OF AFRICAN AIRLINES

including Soft Skills development, results in variable costs for airlines, which are then passed on to clients. This results in increased prices and high airfares for air transport services, consequently reducing passenger sales volumes, demand, and profit margins as was illustrated according to IATA,(2019) in figure 7 above.

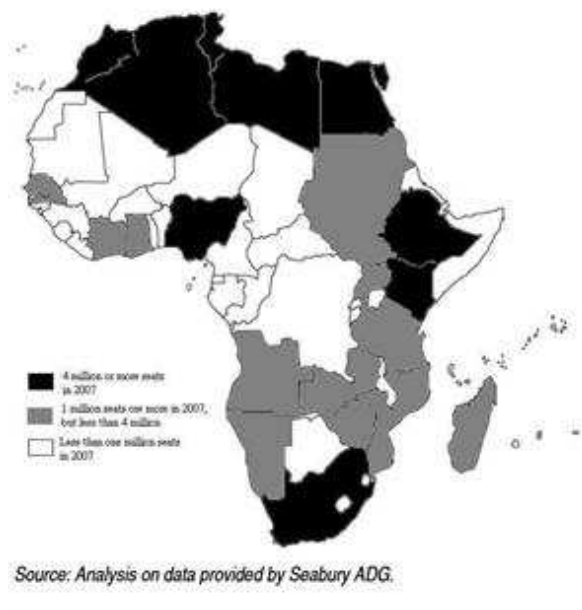


FIGURE 8:2007 PROJECTIONS ON AFRICAN AIR TRANSPORT CAPACITY

2.16 Estimates of Airline Route Network

The majority of empirical analyses (Sergio R. Jara-Díaz, 2013) about the structure of the global airline industry have used estimates of cost functions, from which economies of density (RTD) and economies of scale (RTS) may be derived. RTD focusses on output growth while maintaining a consistent network size and route configuration, while RTS takes into account variations in network size. Utilizing these principles, specialized literature has examined possible cost savings resulting from production and/or network expansion, with the

majority of writers seeing an increase in RTD and a practically constant RTS. Previous research, based on the definitions of both have shown that cost benefits emerge from augmenting the flow while maintaining a fixed network size (raising traffic density), and that enterprises do not have cost advantages while running bigger networks. The airline flight networks appear to be systematically organized, with the availability of airline seats in Africa each year following a sequential pattern. This pattern corresponds to regions in Africa that demonstrate a blend of moderate population density and economic strength, as depicted in Figure 8 below. Nonetheless, the conduct shown in the sector has not adhered to these tendencies. Following deregulation, first in the United States and then globally, the industry's concentration and network scale have expanded via mergers, acquisitions, and partnerships. Mergers are often seen as a means for airlines to enhance marketing management and establish anti-competitive monopolistic power in pricing. The pursuit of increased profits driven by demand has undoubtedly influenced this evolution, while cost analyses have sought to elucidate network expansion and the development of hub-and-spoke operational frameworks via RTD and RTS (Sergio R. Jara-Díaz, 2013).

2.17 Economies Of Densities

In (Shah, 2011) microeconomics, economies of density refer to cost efficiencies derived from the geographical closeness of suppliers or providers. Economies of density are anticipated to occur following costs decrease when airlines augment flights on a route or enhance capacity in current markets by deploying bigger aircraft (Shah, Brueckner, 2012, for an analytical model). Generally, increased population densities facilitate synergies in service delivery, resulting in reduced unit costs. In the presence of significant economies of density, enterprises are inclined to concentrate and agglomerate, as demonstrated in the analysis of the 2007 survey on African airline seat distribution illustrated in Figure 8 above.

Common instances are seen in logistic systems requiring the delivery or collection of items, such as solid waste management. Delivering mail in a region with several postboxes yields overall cost efficiencies, hence reducing delivery expenses. The average cost per unit decreases as traffic volume grows, creating Economies of density (Shah, 2011).

According to Meichsner, (2018), this study found that only Ethiopian Airlines, Royal Air Maroc, and EgyptAir financially viable among the top 10 African carriers. Air Mauritius and South African Airways went bankrupt. Arik Air and Aero Contractors merge with Nigerian government financial aid. The author believes Air Algerie, Kenya Airways, TAAG, and Tunis Air have government support and are further threatened by COVID-19.

2.18 Economies Of Scope

Economies of Scope occur when producing several items at once which results in cheaper products and services. Economies of scope in airlines (Cook, 2008) refer to the cost efficiencies achieved by simultaneously flying passengers and cargo on the same aircraft. This is due to the cost-effectiveness of operating a single aircraft accommodating both passenger and cargo shipment, rather than maintaining separate airlines for each service.

The extent of economies may be assessed by contrasting the cost per unit of production between alliance airlines and non-alliance airlines. Airlines within (Cook, 2008) an alliance should see a reduced cost per RPK owing to economies of scope.

2.19 Economy of Scale

This study acknowledges that the sustainability of flight route networks in Africa can be examined separately from airline production factors, which an increase in flight network activity and schedules exhibit an inverse relationship with airfare prices, thus indicating a possible enhancement in air travel activity. Johnston's study (2013) revealed that, six decades prior, at least 30 investigations had examined the concept of economies of scale in the aviation sector; nevertheless, this aspect was not consistently the primary focus of the enquiries, akin to the current study. The predominant focus of academic research has been on airlines operating within the United States, with only a few notable exceptions that delve into carriers from Canada or Australia.

Considering the aforementioned points, this study adhered to considerations as researched by Johnston (2013), which indicated that an initial analysis was carried out by Crane in 1944, whereas the latest preceding investigation was executed by Creel and Farrell in 2001. Johnston (2013) elaborated on the fact that Creel and

Farell did not adequately address the methodological deficiencies noted in previous models, as they utilized the same variables and opted for a Fourier series instead of a Taylor series expansion. Furthermore, the data analyzed may have been influenced by the unpredictable conditions characteristic of a fluctuating industry. A more in-depth examination scrutinized data from prior to deregulation and/or up to 1985, an era in which the industry appeared to operate under the assumption that economies of scale were nonexistent.

This study acknowledges that the US airline industry, while navigating the intricacies of bankruptcies and mergers, has nonetheless seen significant growth in flight networks over the past three decades. The present environment is significantly altered and demonstrates a degree of sophistication that stands in stark contrast to the 1980s, indicating the possible presence of economies of scale. The examination of a broader and more current data set reveals substantial advantages, particularly when tailored to meet the needs of route network expansion within the African airline sector.

2.20 Economies of Scope and Economies of scale Differences

Economies of Scope and Economies of scale are distinct principles (Chandler, 2009) used to reduce a company's expenses. Economies of scope emphasis the average overall cost of producing a range of items, whereas economies of scale highlight the cost advantages associated with increased production of a single object.

3.0 THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1 Theoretical Framework

For the sake of practicality, this case study research should follow predetermined protocols; therefore (Denzin, 1995), the researcher should meticulously analyze the study's results to formulate recommendations, whereas case studies employ rigorous scientific methods, while sociology utilizes it as a qualitative interpretive framework (Denzin & Lincoln, 1994; Harris, 2003). Orlikowski (1993) describes case studies as an inductive framework and a qualitative approach, rather than a fixed, objective narrative, predominantly shaped by causality to offer a contextual, process-oriented analysis and clarification of the event (Andersson A. H., 2003).

3.2 Conceptual Framework

This study acknowledges that some qualitative researchers utilize case studies to establish objectives or subjects for questionnaires and assess responses (Orlikowski, 1993). This study identified ten essential management constructs that influence the operational effectiveness of African Airlines, as illustrated in Figure 9 below. The existing constructs within the concept of this study are discussed under individual headings as; African Aviation Technocrats/Key AOC Management Levels, Air Law And Civil Aviation Requirements Standards, Airline Marketing Management Skills, Available Aircraft, ICT Programs and Airport Facilities, Direct Aviation Economic Input Factors, Flight Crew Training Requirements, Aircraft Insurance, Technical Staff Training Requirements, Marketing Management Skills, African Airline Markets, African Aircraft Operational Costs.

The management of the African Airline Markets (Button, 2015) involves a systematic approach to data analysis that enables the researcher to examine a specific case and extract precise results. This approach shall evaluate primary literature data from This research analyzed 31 African airlines, which together provide 1,261 destinations/routes, in conjunction with 49 international airlines, each boasting a capacity of over 100 destinations. Insights from management experts and senior officials from various Civil Aviation Authorities have facilitated assessments and conducted thorough analyses of African airlines, providing a clear understanding on the financial position of airlines, during AOC certification process and renewal. This study further assessed the authenticity and quality of secondary data from literature, books, newspaper articles, and websites related to civil aviation.

As a result, a conceptual framework (Jabareen, 2009) serves as a network or "plane" of interconnected concepts that define reality. Ideas within a conceptual framework support one another, elucidate phenomena, and form a coherent philosophy. Each conceptual framework notion carries with it ontological or epistemological ramifications. Ontology asserts "the state of being," "the essence of reality," "actual" existence, and "genuine" activity (Guba, 1994). Epistemological assumptions relate to the essence of reality

and the underlying mechanisms at play. The foundational assumptions of methodology establish a conceptual framework and delineate its implications regarding the nature of "reality". This study elucidated the premises and constructs related to the challenges of the Airline Route Network. Consequently, a thorough examination of the pertinent literature regarding the specified factors was carried out in accordance with established researcher standards to formulate the appropriate study conceptual theorem illustrated in Figure 9 below.

3.3 Conceptual Theorem

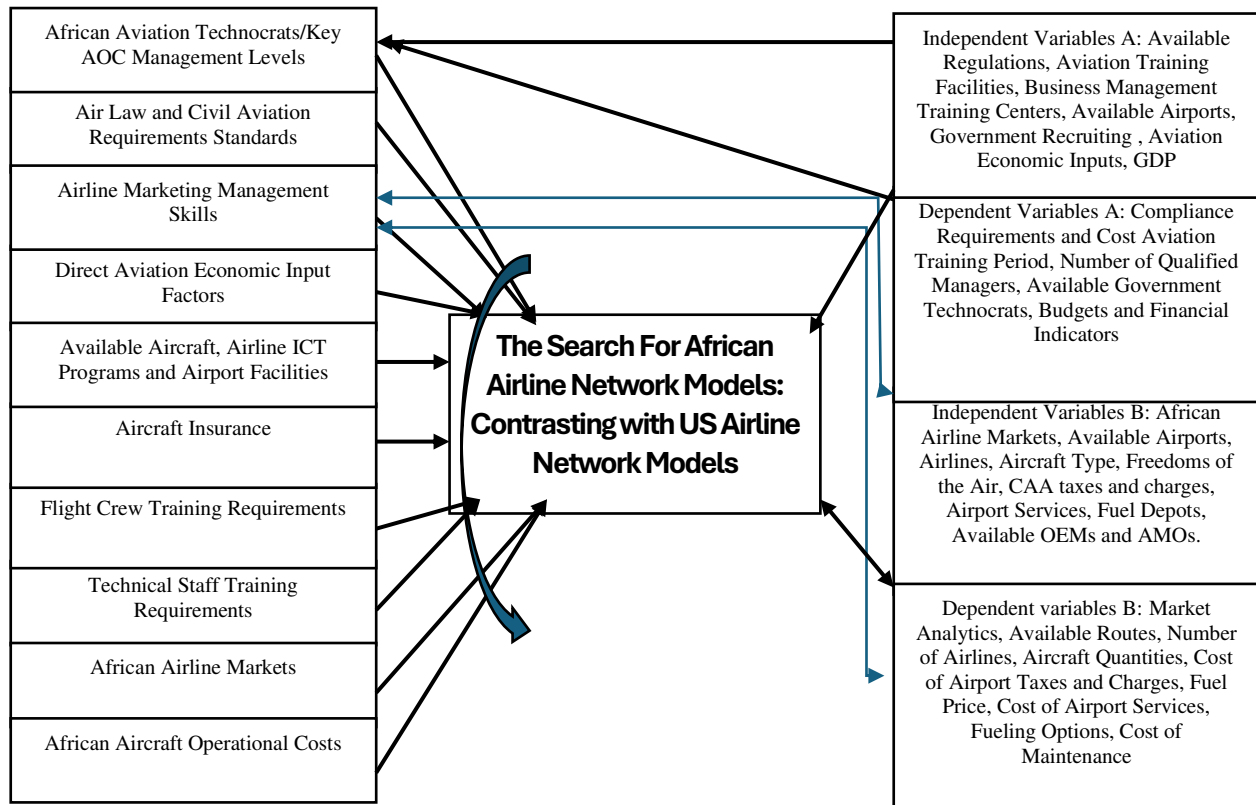


FIGURE 9: AFRICAN AIRLINE FLIGHT NETWORK CONSTRUCTS-CONCEPTUAL THEOREM

3.4 African Aviation Technocrats/Key AOC Management Levels

The research examined the obstacles encountered by airlines regarding the qualifications and experience of their key AOC managers, competency levels of Civil Aviation Authority personnel, as well as the senior government technocrats acting as aviation and financial analysts. The data for this research was sourced from several aviation literature and aviation sites in Africa.

This study analyzed the prevalence of aviation professionals with expertise in airline management, highlighting instances of misplacement and the challenges encountered in the hiring standards implemented by African airlines, Civil Aviation Authorities, and governmental bodies. The study further evaluated the capacity of governments to ascertain if they possess qualified and experienced senior officials in aviation management. The criteria for job placement have been raised, emphasizing that many African governmental recruitment standards favour academic qualifications over practical aviation experience or skills. The policy governing civil aviation in Africa is closely tied to governmental directives; therefore, roles within the Aviation Ministry hold considerable significance and warrant thorough assessment during the pursuit of qualifications. The CAAs stipulate that the management of designated airlines should adhere to minimum acceptable standards of approval and licensing.

3.5 Air Law And Civil Aviation Requirements Standards

This study sought to analyze the literature concerning the effects of African aviation regulations and standards on various aspects of airline operations, including finance, aviation licensing, airworthiness criteria, and the financial consequences of adhering to CAA oversight for airlines.

This research encompassed a thorough examination of the existing literature and an in-depth analysis of data, leading to enquiries regarding the impact of African Government Aviation Technocrats and CAA Management on regulations governing airline financing. The costs associated with the airline are significant in relation to compliance with CAA standards. Meanwhile, the operational management of the airline's business model is influenced by shareholder perspectives and the management's ability to maintain sustainable costs, as anticipated by suitably qualified airline personnel. Additionally, it has been noted that the limited number of operational African Airlines has prompted many Civil Aviation Authorities to conduct selective background checks, primarily targeting ICAO-recognized operators, while those that are less prominent and not associated with IATA receive minimal attention. Consequently, smaller African airlines may face constraints due to a restricted availability of specialists who comprehend the ramifications of lacking a transparent airline finance policy aligned with government regulations.

A comprehensive analysis of the literature data from most African Airlines was conducted, focusing on compliance with CAA criteria and airline safety standards. The research effectively clarified the outlined expectations below:

- 3.5.1 The predominant portion of pilot type rating training for license endorsement is conducted abroad because of the insufficient availability of type-certified aircraft simulators.
- 3.5.2 The Successful attainment of airline certification necessitates experienced personnel, and the majority of CAA-approved training institutions are mostly situated abroad and in particular overseas, resulting in considerable cost repercussions for the airline in management training initiatives.
- 3.5.3 Aircraft Engineer Qualification Criteria: Authorized manufacturer training centres are often overseas, making it difficult and cost prohibitive to meet experience requirements for CAA approved aircraft maintenance privileges that are cost efficient to airlines.
- 3.5.4 Aircraft Maintenance Certification Criteria: The challenges associated with certification compliance and qualification are financially burdensome due to the insufficient number of OEMs in Africa. Consequently, the limited availability of approved aircraft maintenance locations results in significant financial losses for airlines. It is imperative that the methods employed to meet daily and continuous airworthiness requirements adhere rigorously to the guidance protocols established by the CAAs.

3.6 Airline Marketing Management Skills

The study indicates that a limited number of African institutions offer aviation management programs, which consequently affects an airline's capacity to find qualified operational managers and airline market analysts who possess the essential combination of experience and educational credentials required to address the complexities inherent in particular airline route and network business models within the African economic landscape. Airlines ought to adhere to qualifications vetted by the CAA; however, the scarcity of aviation management institutions and airline marketing analytics experts complicates the search for qualified and experienced management/operational personnel who possess the requisite skills to execute operations in alignment with the airline's vision and mission statement.

3.7 Direct Aviation Economic Input Factors

The researcher conducted a thorough examination of existing literature concerning African aviation markets, financial management challenges, and the impact of national economic policies on the financing and operational costs associated with airlines. The Minimum Equipment List (MEL) for stock purchases and AOG orders entails considerable currency externalization, and the management of this aspect, alongside local governmental aviation regulations, complicates the scenario further. After conducting a thorough review of the literature and data processes, particular airlines were analyzed regarding the influence of overarching

government policies on direct aviation inputs, as well as potential outcomes based on economic and business growth projections.

Aviation Fuel costs/Levies: Africa has the highest aviation fuel costs, affecting Airline's financial commitments due to monthly fuel payments. Airline operating costs are high due to fuel prices.

Aviation-Related Costs. Airlines should adhere to a range of governmental regulations, airport charges, and fees imposed by the Civil Aviation Authority. The selective application of regulations among African states reveals a complex landscape, with certain airlines managing the inconsistencies presenting unfair business advantages amongst the African airlines. For instance, the Ethiopian government has provided Ethiopian Airlines with exemptions from various domestic company charges, allowing the airline to offer notably low-ticket prices throughout Africa. This situation raises important questions regarding the potential implications for foreign airlines competing with Ethiopian Airlines.

3.8 Available Aircraft, ICT Programs and Airport Facilities

The principal airline equipment used by aircraft, maintenance, and ground personnel is rarely produced in Africa and does not depend on local CAA for initial certification; it is often obtained via a process of "approval or acceptance" for the requisite license or certification. The approval or acceptance criteria are often based on the certification standards set by the Original Equipment Manufacturer (OEM) from the state of manufacture or origin applicable as required by local African Civil Aviation Standards or regulations. Notwithstanding the substantial expenses and restricted financial assistance in Africa, these prerequisites should be readily available to airlines that need operational approval.

3.9 Airline Insurance Considerations

This research observed that Africa has several insurance underwriting organizations that, regrettably, do not provide policies pertaining to airline risks. The majority of African insurance firms function as agents or brokers for global insurance conglomerates, allowing them to offer policies that mitigate aviation industry risks related to the airline business. It is crucial to recognize that before tackling the issues related to insurance costs on a particular airline route network, the participation of brokers and agents overseeing a considerable share of African airline insurance for underwriters located outside the continent significantly elevates insurance expenses.

The research also analyzed reactions from the African airline flight networks, emphasizing that different aircraft route networks may intersect with, approach, or operate in areas characterized by civil disturbance or conflict zones within Africa. The complexities of flight networks in war zones (Owuor, 2017) inside Africa provide considerable operational issues associated with the creation of customized flight networks in specific countries, such as Somalia, Sudan, South Sudan, and the Democratic Republic of Congo (DRC). Additionally, Owuor (2017) observes that in the three regions mentioned, governing authorities maintain a presence in major metropolitan centres like Hargeisa and Garowe in Somaliland, Juba and Nimule in South Sudan, and Goma and Bukavu in eastern DRC. However, extensive areas within their jurisdictions remain devoid of law and order. The foregoing situation illustrates considerable volatility, as underwriters encounter substantial challenges that have resulted in increased insurance premiums for African airlines in recent years. The airlines have limited options regarding the cost of insurance premiums, necessitating the transfer of a significant portion of these increased expenses to customers through higher airfares.

Despite the aforementioned, Dube (2021) indicated that the COVID-19 pandemic resulted in a global economic downturn owing to interruptions in the supply and demand chain within the travel sector. The study according to Dube (2021) investigated potential recovery trajectories for the global aviation sector in light of the significant adverse effects of the COVID-19 pandemic, utilizing archival and secondary data primarily obtained from Flightradar24, ICAO, IATA, and EUROCONTROL, illustrating the pandemic's profound impact on global aviation. This led to ratings downgrades, liquidation, and insolvency for several airlines and airports, due to substantial financial depletion resulting from travel restrictions (Dube, 2021).

Gao (2021) observes that the majority of firms have had substantial financial consequences owing to the coronavirus pandemic, and these losses are expected to last for a prolonged duration. The predominant losses can be ascribed to a reduction in business activity (Gao, 2021) and income resulting from several

factors: mandates from civil authorities to halt operations, supply chain disruptions impacting both suppliers and customers, the lack of local attractions that usually attract clientele, employee illness, the need for facility decontamination, and transportation interruptions that impede customer access to business locations. As losses continue to mount, businesses are investigating options to alleviate or recover some of these financial deficits, with one such solution centred on the assessment of insurance coverage (Gao, 2021).

This study subsequently examined the periods preceding and following the pivotal events of September 11, 2001 (Nyampong, 2013), along with the ramifications of the COVID-19 pandemic, concentrating on the responses of various insurance markets concerning the inclusion or exclusion of coverage for aviation war and terrorism risks, collectively termed aviation war risks, and the consequent escalation of liability costs for airlines. Thus, research by Nyampong (2013) emphasizes the need for an exhaustive examination of the historical development of insurance coverage and exclusions connected to war, terrorism, and other hazards in the London maritime market.

This research examined the adaptation and implementation of practices from the insurance market to other pertinent insurance sectors, particularly emphasizing the aviation risks market, as numerous insurance companies incurred substantial financial losses due to the failure of various airlines during the COVID-19 pandemic. This research further recognized court opinions for certain hazards categorized as war and terrorist threats in aviation, as well as dangers related to pandemics.

Concerning the viability and extension of the African aviation network, airlines are urged to actively participate in mitigating the spread of developing worldwide pandemics associated with air travel. The preceding acknowledges the conclusions drawn by Nyampong (2013) concerning the participation of national governments and diverse players in the recent failure of the war risk insurance industry, especially in relation to the repercussions following September 11, 2001.

This study recognizes that insurance rates in Africa are substantially higher than in other areas, mostly owing to the influence of international reinsurance and broker fees and agreements. Globally, insurance brokers and agents are actively seeking partnerships with reputable insurance underwriters capable of providing coverage for African airlines. The aforementioned scenario arises from the restricted number of insurance firms equipped to manage airline risks, which hinders the efficient underwriting of insurance needs specific to African-owned airlines and aircraft, a sector overseen by a few set of brokers and agents.

This study has thoroughly examined the impact of the aforementioned scenarios on African airline route network sustainability and highlighted the ongoing challenges related to aviation insurance, particularly stressing the need for affordable lower premiums that adequately address all aviation risks including third-party liability in accordance with international aviation insurance standards.

3.10 Flight Crew Training Requirements

Flight Crew training is expensive and varies in proficiency levels.

- 3.10.1 Continuous operation of aircraft handling money for at least 3 months.
- 3.10.2 Regular proficiency checks every six months.
- 3.10.3 Line Check: 12 months
- 3.10.4 Annual instrument rating
- 3.10.5 Medical, annually
- 3.10.6 Simulator, every six months

Soft Skills: CRM, DG, SEPT, Aviation Medicine, Security, Ditching, and Fire Fighting for 1–3 years pilots and their achievement.

3.11 Technical Maintenance Facilities, Tools, approved ATOs, MROs, OEM.

This study further revealed that African Airlines face considerable obstacles due to the insufficient availability of commercial aircraft simulators, resulting in elevated pilot training expenses for the airlines. International simulator training is predominantly sourced from North America, Europe, and the Middle East, while within Africa, Ethiopia and South Africa emerge as the preferred choices.

The African airline industry need more MRO hangars and their current equipment is inadequate for maintenance. In view of the foregoing, aircraft spend a lot more time on the ground awaiting foreign maintenance criteria, the lack of sufficient MROs in Africa for aircraft manufacturers shortens aircraft operational deployment lifespans. Over 70% of African aircraft are over 10 years old and therefore such a position increases maintenance costs on life components, fewer available Line Replaceable Units (LRU), higher fuel use and costs, pollution, downtime, and lesser safety/reliability of equipment.

3.12 Technical Staff Training Requirements

Training programs for airline pilots and technical staff required to manage and operate a complex flight network system involve significant financial commitments and careful preparation.

Training Standards: This study reveals that African airlines face challenges in covering costs essential for fulfilling safety requirements in aviation service delivery, in alignment with the necessary international standards for operating a flight route network.

Aircraft Technicians Requirements: The research elucidated the intricate flight route network embedded within the maintenance and technological oversight of aircraft maintenance schedules, airworthiness initiatives, and IT solutions for airlines. The research delved into the literature concerning the factors that affect the technical requirements of the chosen airline, projecting a rise in operational expenses associated with maintaining a published flight route network.

Route Network Training Captains : Africa experiences a shortage of certified aircraft Training Captains, due to the limited number of aircraft-specific operators who have completed manufacturer-approved flight training programs. Permits require credentials from accredited foreign training institutions, except for Military Pilots, along with CAA endorsement for training captain licenses.

Following an extensive literature review, an analysis was undertaken concerning African Airlines, focussing on the operational prerequisites associated with flight network training components that impact the establishment of a robust network. The expectations that are outlined are as follows:

Airline Technical Training Schools: CAA-approved aircraft-specific training institutions are few in the African region and most airlines often use facilities located overseas for engineer type rating training.

Aircraft Simulators: The majority of aircraft type rating simulators are not owned by African airlines, with exceptions from ET Group and a handful of prominent African airline leaders. Consequently, simulator training is often sourced from external providers, as there is a scarcity of approved simulators within Africa, and pilot training tends to be financially burdensome.

Management Skills Training: Most authorized centers are externally supplied and not accessible locally.

3.13 African Airline Markets

The researcher noted that according to Heinz, (2013) extensive literature exists on airline business changing global contexts; however, there is a paucity of research concerning their applicability to Africa. This research posits that the African environment necessitates distinct strategies, potentially forming a novel strategic template or business model. A literature analysis is conducted to characterize the African aviation environment and analyze airline business models both internationally and within Africa.

According to Tolcha, (2024) , the airline business is the fastest means of international travel and boosts worldwide economic development. African airlines contribute little to global aviation. A research examined African airlines' worldwide market selection and entry barriers. Consequently, this study conducted a thorough review of the literature concerning 989 African destinations and the airline networks of 31 African airlines, along with their respective sizes. The analysis indicated that the selected 31 airlines collectively served 1261 destinations globally. A census was adopted that Managers or their equivalents in planning, marketing, and government industry affairs received a standardized questionnaire via email or fax to gather primary data.

In research conducted by Tolcha (2024), this study noted that sixteen types of survey were employed from the thirty-seven airlines involved, resulting in a response rate of 43%. Frequencies, mean scores, and standard deviations were tabulated for central tendency analysis. African airlines carry 36 million passengers out of 1.584 billion worldwide. African airlines serve internal and international routes, with several foreign

destinations throughout the continent. African airlines struggle to compete internationally owing to market constraints and fleets of less than 10 aircraft, mostly for short-haul trips.

This research found that African Airlines struggled to assess foreign market profitability, risk, and yield. Lack of well-developed models causes this. African airlines face several regulatory barriers to worldwide expansion despite the industry's ongoing liberalization. Airlines had trouble choosing an entrance strategy since they had to weigh the risk and the possibility to increase market share. The researcher advises African airlines to analyze their long-term strategic orientation to establish and develop successful strategic partnerships to overcome current obstacles. Research focusing on scheduled carriers. International charter operators may have been excluded from the research. The researcher suggests studying whether other airlines face similar challenges to African airlines and how African airlines have addressed the challenges of selecting international markets and modes of entry.

3.14 African Aircraft Operational Costs

African airlines encounter higher fuel costs in comparison to foreign airlines in various global regions. Fuel constitutes the foremost expense for airlines, comprising around 28.7% of total global expenditures. The airports located in Central and Western Africa impose significant passenger taxes and levies, which this study identifies as an additional complication in costs. African airlines function within a context of uncertain and fragile local currencies, contrasting sharply with the United States, where the economic landscape is unified under a single official currency, the US dollar. The airline industry often encounters difficulties stemming from supply chain stagnation, resulting in prolonged periods of aircraft being grounded. The circumstances are further intensified by the modest scale of the African middle class, whose constrained disposable income leads to diminished demand for air travel. As a result, airlines encounter increased operational costs stemming from a multitude of factors. These additional expenses include those related to transporting passengers, maintaining aviation equipment, utilizing navigation systems, accounting for depreciation and amortization, and compensating flight crews along with their associated costs. A variety of approaches employed by airlines to manage expenditure encompasses:

- 3.14.1 Minimizing the mass of their aircraft
- 3.14.2 Substituting antiquated aircraft
- 3.14.3 Facilitating the optimization of fuel consumption
- 3.14.4 Reducing the duration of taxiing prior to takeoff
- 3.14.5 Modifying in-flight navigation strategies
- 3.14.6 Utilizing alternative airports

3.15 Authorities Connected To Airline Business Models

This study highlighted the significance of government aviation policy, aviation authorities, and the policy drivers of the aviation ministry, alongside essential resources, as potential connections to comprehensive civil aviation laws, economic policies, and airline policies, with responsibilities that are directly or indirectly related to airline business models. In light of the aforementioned, the following list enumerates the authorities associated with the determinants of airline network sustainability:-

1. The Head of Government
2. Aviation Minister
3. Finance Minister
4. Commerce Minister
5. Aviation Ministry-Department of Aviation Teams
6. CAAs Board Members
7. CAAs Directorate

8. CAAs Inspectors
9. Airports and their Authorities
10. Air Traffic and Navigation Services
11. Aircraft Accident Investigation Teams
12. Airline Accountable Managers or CEOs
13. Airline-Director of Operations
14. Airline-Chief Pilot
15. Airline-Director of Maintenance
16. Airline-Director of Safety
17. Airline-Director of Quality
18. Airline-Ground Operations Teams
19. Airline-Commercial Director
20. Airline Marketing Team
21. Airline-Chief Inspector
22. African Aviation Technicians
23. CAA Compliance Criteria and Requirements
24. Direct Aviation Economic Input Factors
25. Airline Training Delivery
26. Airline Technical Requirements
27. African Airline Market Researchers
28. Aviation Training Organizations
29. Airline ICT Policies

3.16 Measurable Variables

Independent variables Group A: Available Regulations, Aviation Training Facilities, Business Management Training Centers, Available Airports, Government Recruiting , Aviation Economic Inputs, GDP.

Dependent variables Group A: Compliance requirements and Cost, Aviation Training Period, Number of Qualified Managers ,Available Government Technocrats, Budgets and Financial Indicators.

Independent Variables Group B: African Airline Markets ,Available Airports, Airlines, Aircraft Type, Freedoms of the Air, CAA taxes and charges, Airport Services, Fuel Depots, Available OEMs and AMOs.

Dependent Variables Group B: Market Analytics ,Available Routes, Number of Airlines, Aircraft Quantities, Cost of Airport Taxes and Charges, Fuel Price, Cost of Airport Services, Fueling Options, Cost of Maintenance

4.0 RESEARCH METHODOLOGY

4.1 The Choice of A Case Study

The researcher used a case study framework to evaluate main data sources and collect secondary data using qualitative methods. This portion entails creating evaluations of empirical evidence from aviation literature related to African airlines and the data analysis of volunteer questionnaire replies from participants to provide representative results and insights on data causality. The transcripts of analyzed data was thereafter compared with transcripts from other sources. The qualitative data from various sources were examined using vignettes, thematic and content analysis. As a result, descriptive

statistics, cross-tabulation, percentages, and averages were all appropriate for these research methods. This research therefore examined all ethical dimensions of case study research methodology

4.2 Methodological Framework

This case study emerged from a qualitative conclusion following an extensive examination of the network and analytical scale of 31 African airlines, which together serve 1,261 destinations, in conjunction with 49 global airlines, each offering over 100 destinations, culminating in a total of 9,956 destinations (FlightFrom.Com, 2024). The prominence of African airlines stands in stark contrast to other global airlines within the aviation sector, as they provide an impressive array of destinations worldwide. Classifying the primary business models employed by African airlines presents a formidable challenge; however, accomplishing this task could significantly contribute to the expansion and development of sustainable flight networks across the continent. Heinz and O'Connell (2013) performed research that selected eight distinct airlines to compare their products and organizational structures after a cluster analysis. Although the airline network in Africa typically aligns with established patterns corresponding to the governing structures of individual nations, there are occasions when occurrences diverge from anticipated paths. This can be observed in the case of Ethiopian Airlines amidst the civil strife in Ethiopia, as well as the unexpected accountability demonstrated by Royal Air Maroc and South African Airways. The broad route network of African and regional airlines has significant vitality and importance (Heinz, O'Connell, 2013).

The researcher executed a case study examining the impact of a literature review completed before data collection and analysis of several African airlines flight network models and strategies.

The fundamental elements of the case study approach are examined and compared with positivist/post-positivist techniques. The essential factor in preserving the integrity of constructivist research is the researcher's commitment to prioritizing factual facts above personal prejudices in current literature. The value of critically assessing one's epistemological position is highlighted in the concluding data analysis, since it is just from this viewpoint that the literature evaluation may possess any relevance or importance for the development of outcomes in case study theory. Consequently, the aim of this qualitative case study was to provide findings based on rigorously gathered and analyzed data. The results of a literature review are more intricately connected to the epistemological framework of case studies, which may have incorporated certain aspects of grounded theory research, rather than being solely attributable to the case study methodology itself.

4.3 Research Philosophy

4.3.1 Ontological Status of the African Airline Networks

This research illuminated the current state of expansion initiatives and the sustainability of methodologies pertaining to the African airline route network. It suggests that scholars may sometimes overlook the philosophical underpinnings when analyzing research paradigms, resulting in a deficiency of shared comprehension among social scientists. Regarding fundamental philosophical and methodological concepts, this research follows on Ates, (2013), to acknowledge that during a study, the factors discussed influence the understanding and methodology of analyzing the existing and sustainability African airline route networks. The insufficiency of the African airline route network constitutes the primary basis of this study's epistemology, since it has been demonstrated that the African flight network possesses ontology. Objective ontology serves as the basis for post-positivism,

which is associated with quantitative methodology, while subjective ontology plays a significant role in shaping constructivism. The optimal study approach and methodology are contingent upon research philosophy, as stated by Ates (2008), this study acknowledges that epistemology and ontology influence the realities of African airline route network research philosophy.

4.3.2 Epistemology Of The African Airline Studies

Epistemology assists academics in acquiring knowledge (Crotty, 1998). According to Petty et al (2012), epistemology is the study of what can be comprehended and the standards used to validate its status as knowledge. In reference to the acknowledged worldview as a paradigm or epistemology (Creswell, 2014; Mertens, 2009) amplifies another reality that Ontology and epistemology are in conflict. Ontology pertains to the philosophy of reality (Mertens, 2009; Petty et al., 2012; Raddon, 2010; Sobh and Perry, 2006), consequently this research acknowledges that epistemology concerns the means by which we acquire knowledge of African Airlines. Epistemological ideas influence the evaluation of airline business knowledge as this study refers to research according to Hunt, (2015). Epistemology connects scholarly pursuits with empirical reality of the African airline market. This study further connects Some African aviation researchers to research that may have perceived reality (Feast, 2010) by differentiating between objective and subjective ontology. The aforementioned phenomena delineate the framework for this study's paradigm as well as the epistemology of airline marketing and route modelling. Therefore ,Ontology exerts an influence on epistemology, as articulated by Brd et al. (2011). The researcher rides on Brds(2011) argument to further contend that paradigms determine the calibre of research and in this case study within the aviation sector. Thus, limiting psychological and educational research to a narrow set of African airline business paradigms may present significant challenges. This study examines various platforms of philosophical beliefs relevant to achieving success in research, while also shedding light on integrated ontologies that include both objective and subjective dimensions. In light of the preceding discussion, Creswell (2014) and Mertens (2009) delineate four research paradigms or worldviews, as delineated in the five points below, with the last fourth divided into two halves:

- 4.3.2.1 post-positivism,
- 4.3.2.2 positivism
- 4.3.2.3 Constructivism,
- 4.3.2.4 Transformativism;
- 4.3.2.5 *Pragmatism.*

This study examined a brief overview of the above five research paradigms in relation to African airline research. The discourse focusses on their practical implementations, contrasts the underlying assumptions of each paradigm and considerations on their significance or insignificant applications within the context of this research. The epistemological framework of qualitative methodology guides research by shaping how researchers express their comprehension of reality based on their selected technique (Sobh and Perry, 2006). Positivism is fundamentally associated with quantitative research, while constructivism influences various elements of qualitative research. The foundational premises that underpin these worldviews are markedly different, and based on the ontological status of the research, a researcher may occasionally find them at odds with a mixed methodology approach (Hesse-Biber & Johnson, 2015). Thus, this study acknowledges the close relationship between constructivism and case study being within qualitative methodology.

4.3.3 Post Positivism Research On African Airlines

Post-positivism allows aviation scholars to discern "reality" within a probabilistic paradigm (Mertens, 2009). This study recognizes that Post-positivism is sometimes grouped under the umbrella containing positivism, empirical science, or the scientific method (Creswell, 2014; Petty et al., 2012). Proponents of post-positivism in airline research contend that knowledge is measurable (Assalahi, 2015), but empirical social scientists examine the complexities of the constructs within African airline context. The analysis of quantitative behaviour in African aviation mostly resides within the post-positivist philosophical framework (Creswell, 2014). Post-positivism asserts that research may be interpretive, enabling the collection of many perspectives via an extensive literature review in the aviation industry. This practice may improve the congruence of research with data (Petty et al., 2012).

4.3.4 Positivism Research On African Airlines

Positivists use deductive reasoning (Ates, 2008; Raddon, 2010) and notwithstanding that Positive research also use surveys (Ates, 2008; Easterby-Smith et al., 2015). As a result, positivist Airline academics may adopt the following:-

- a) Research surveys as part of suitable tools,
- b) Study using statistical analysis (Crotty, 1998).

In view of the above, some African airline research surveys employ positivist epistemology (Easterby-Smith et al., 2015), acknowledging that ontology and epistemology influence the research methodology, with objectivism impacting positivism. This study identifies four essential components of the positivism knowledge framework as:-

4.3.4.1 Epistemology,

4.3.4.2 Theoretical viewpoint

4.3.4.3 Methodology, and

4.3.4.4 Research methodologies (Crotty, 1998) are hierarchically organized, as per Feast (2010)

Positivist ontology embodies a form of objectivism (Assalahi, 2015), while objective ontology underpins the principles of positivism. Raddon (2010) argues that positivists seek objective knowledge, whereas Post-positivism posits the existence of a singular objective reality (Petty et al., 2012). African aviation analysts may employ research methodologies to reduce bias (Assalahi, 2015; Mertens, 2009) and as such, this study contends that the objective ontology paradigm, or post-positivism, often overlooks the experiences and expertise of qualitative analysts in the context of African airlines (Petty et al., 2012). Experienced airline researchers are capable of performing impartial assessments, whereas certain proponents of Positivism in the airline industry argue that specific researchers can methodically, logically, and thoroughly quantify a consistent reality to reveal objective truths (Petty et al., 2012). Researchers working within a positivist framework analyze the inherent challenges in research to identify and quantify factors that could affect outcomes (Creswell, 2014).

Consequently, both positivists and post-positivists emphasize the importance of objectivity and the capacity for generalization. This study resolves that the Positivists advocate for airline market and route network researchers to derive meaning (or truth) from a rational perspective rather than an absolute one (Mertens, 2009).

4.3.5 Constructivism Research on African Airlines

Constructionists analyze the strategic justifications and arguments used by airline researchers on certain business policies and legislation (Ates, 2008). Certain experts assert that personal experiences

influence the researcher perspectives. Reflexivity biases (Petty et al., 2012) obscure the differentiation between academic interpretation and reality, making the achievement of this objective a complex and ongoing endeavour. Petty et al. (2012) identified post-positivism and constructionism, sometimes referred to as interpretivism providing significant aviation research paradigms. The philosophical foundations of a constructivist research paradigm about African airlines establish a fundamental framework for this study as according to Mertens,(2009). This study thus recognizes that the subjective ontology of African airlines plays a significant role in the framework of constructionism.

4.3.6 Interpretivism on African Airline Research

Interpretivism posits that the sociocultural context of African airlines shapes reality of the flight route network system following on principles of research according to Petty et al. (2012),therefore, implying that stakeholders in the African aviation sector may see events or circumstances variably throughout the African aviation markets. A similar reality may provide several perspectives; hence, researchers may discern various interpretations of an aviation occurrence from different network viewpoints. Interpretivism employs the narratives, perspectives, and insights of airline data participants to clarify various viewpoints (Petty et al., 2000).in view of the foregoing, the researcher assumed the research subject fits a qualitative methodological approach and uses the case study paradigm to gather primary and secondary data.

4.3.7 The Transformativism And Pragmatism Paradigm In African Airline Research

Mixed methodology on African aviation research is characterized by the integration of philosophical viewpoints related to qualitative and quantitative research. In this context, a paradigm is a certain philosophical viewpoint used by aviation researchers as a framework for investigating, analyzing, and interpreting aviation topics, events and processes (Morgan, 2013). Thus, only the transformativism paradigm and pragmativism may be relevant to the specifics of mixed methodology investigation. Creswell (2013) contends that the transformative worldview maintains that academic study should be intertwined with political concerns and a reform agenda to tackle social injustice at all levels (p. 9). Mertens (2014) contends that this paradigm emphasizes the needs and viewpoints of marginalized groups to foster social change in communities. The transformative worldview is associated with the depiction of "pluralistic interests, voices, and perspectives" (Greene, 2007, p. 129). This paradigm is based on the notion that social and political transformation arises from research.

This study examined available philosophical beliefs in relation to achieving success and integrated ontologies that encompass both objective and subjective dimensions.

4.3.8 Pragmativism In African Airline Research

Pragmatism is a philosophy often referred to John Dewey and Donald Davidson. It relates to the idea of diverse realities and the principle of pragmatism in research technique (Schrauf, 2016). Ivankova (2014) posits that pragmatists reject the strict division between quantitative and qualitative approaches, arguing that truth is defined as 'what works' most efficiently for understanding a particular research problem". As a result, pragmatists might emphasize that tackling research enquiries related to African airlines and resolving practical issues necessitates the careful selection of methods that align with either qualitative or quantitative research standards. This study notes that presently in African aviation literature, this research acknowledges that pragmatism also provide an appropriate basis for mixed methods research.

4.3.9 Philosophical Frameworks in Pragmatic Contexts

African Aviation Researchers may use the transformational paradigm and pragmatism as foundational philosophies, applying these perspectives to practical situations in diverse ways. Some aviation researchers often use parallel and sequential strategies for data collection to organize their mixed methods research (Creswell & Plano Clark, 2007). Parallel data collection refers to the concurrent gathering of qualitative and quantitative data, while sequential data collection includes the capture of qualitative and quantitative information at separate phases to enhance or clarify previously collected data.

4.3.10 Transformativism Research In African Airlines

A number of aviation researchers in Africa employ the transformativism paradigm to explore pressing societal challenges that affect underprivileged or marginalized stakeholders within the aviation sector. The researchers employ both simultaneous and sequential methodologies for data collection, grounded in a transformational perspective that highlights the importance of participant involvement in the analysis of results and the resolution of study-related issues. Consequently, individuals involved are frequently subjected to enquiries, given surveys, and introduced to subjects for discussion within a focus group framework. This research frequently connects to social issues in African aviation, as well as education, healthcare, and various other domains, drawing upon the findings of Shannon-Baker (2016). When researchers adopt the transformational paradigm, their objective is to address research enquiries related to African airlines, considering the perspectives of stakeholders facing specific social challenges in civil aviation, with an emphasis on delivering solutions to the identified issues within the aviation sector.

4.4 Research Design

Research design helps researchers accomplish goals according to Easterby-Smith et al. (2015) as it provides a research inquiry's roadmap to answers (Cooper and Schindler, 2008). Research Study design involves goal, inquiry type, researcher interference, environment, measurements, unit of analysis, sample design, time horizon, data collection, and analysis (Sekaran, 2007). The Design includes research measures, data collecting, processing, and interpretation (Cooper and Schindler, 2008; Creswell, 2014). Research design normally depicts the researcher's investigation from hypotheses to data analysis (Cooper and Schindler, 2008). To create new data, every study requires appropriate methodological assumptions (research designs) (Hunt, 2015) that is based on study sequence. Cooper and Schindler present a structured framework comprising four phases of research design (2008) that adhere to a sequential order of the initiation of data collection, sample design, instrument fabrication, and pilot testing predicated upon the establishment of a comprehensive research design plan. Research reporting follows data gathering, analysis, and interpretation. Research study design affects the whole study process; thus, researchers should investigate relevant research designs to get significant insights (Hunt, 2015). The goal of basic research designs is:-

- a) understand recurring issues
- b) respond well.

After examining the philosophical implications of qualitative and quantitative research outlined above, this particular research employed a case study research design to collect primary data in order to achieve the desired outcomes. An effective case study design enhances the rates of questionnaire responses.

4.5 Study Population

This research required the analysis of primary and secondary literature data from 31 African airlines and an overall 49 global airlines (FlightFrom.Com, 2024) to adequately tackle the "General African Aviation Problem" (GAAP). The Key management personnel from the African airlines and the Civil Aviation Authority were solicited to voluntarily provide information and highlight any gaps within the airline sector during the first data collection phase. Essential data from many literary stakeholders is used to get accurate and dependable information on the selected African airlines. Additionally, information from many periodicals, reputable sources, airlines, and air operators shall be included to improve data quality.

4.6 Study Sample

The researcher efficiently collected data on commercial air operator difficulties and civil aviation management using a random selection method derived from academic journal articles. To achieve our objectives, the researcher efficiently gathered 30 responses from 50 participants, and the sample accurately reflects a significant portion of important African airline operations. The researcher sent questionnaires to senior management of several selected airlines, government and regulatory experts. The researcher conducted an analysis of 31 African airlines having a total 1261 destinations as well as a total of 49 global airlines, each offering over 100 destinations, culminating in a total of 9,956 destinations (FlightFrom.Com, 2024). Notably, only one African airline, Ethiopian Airlines, emerged with 155 destinations, representing a percentage score of 1.556%. In contrast, United Airlines dominated the landscape with an impressive 371 destinations worldwide.

4.7 Research Tools

According to Owen (2014), Interviews and document analysis play a crucial role in the selection of a hybrid in a methodology. The methodology employed in this study, which utilized a case study approach, suggests that policy analysis incorporating ethnographic elements, along with data collection through interviews or document analysis from existing literature, were sufficient. Analyzing papers and doing "responsive interviewing" provide a comprehensive understanding of airline flight network route policy. This research also included limited surveys, interviews, document analysis, and participant observation.

4.8 Data Analysis

Qualitative research uses either or combination of content analysis, thematic analysis, conceptual analysis, discourse analysis, semiotic analysis, and metaphor analysis as methods for finding words, phrases, themes, metaphors, constructions, and ideas in a text. Many techniques may be flawed owing to "a lack of simple processes, laborious data preparation, difficulties in connecting textual data to other data, and a lack of a suitable theoretical foundation" (Carley, 1993). Thus, they describe occurrences well but struggle to create new hypotheses. When examining an idea, conceptual analysis measures its prevalence and existence.

Despite time and budget limits, this study relied on data gathering to compile, consolidate, and analyze information from the mentioned sources, which assisted in providing reliable results. Before collecting data, the researcher determined what data and information was needed to answer research questions. As is common among researchers, to quickly find data and information from both primary and secondary sources, the researcher collects raw data from the original source, boosting data dependability and accuracy. Employing primary sources in research typically enables the investigator

to acquire precise insights into pivotal issues, in contrast to the secondary data derived from aviation journals, publications, reports, and books. Consequently, this study concentrated on both sources. Amaratunga et al. (2002) developed a questionnaire to collect primary data.

This study involved a review of the publications and writings by various authors in aviation. By utilizing these sources, the researcher acquired an understanding of the primary challenges encountered by the African airline sector in expansion initiatives and the sustainability of flight route networks. An elucidation of the interconnections among the diverse ideas transpired, despite the verifiability of the facts; descriptions were categorized according to their attributes. Nevertheless, these concepts continue to be essential to the lexicon of descriptive terminology. The evidence is unequivocal, and the theoretical structure established through the synthesis of diverse concepts required only slight modifications. The use of conceptually defined categories to characterize and explain interaction patterns is a defining feature of qualitative research (Mishler, 1990).

5.0 DATA ANALYSIS

5.1 Airline Networks in Africa: Untapped Potential

This study's results showed that, with an estimated population of 1.5 billion, there is considerable potential for the growth of African airline flight networks; however, individual African nations should not concentrate exclusively on the interests of specific airlines within their jurisdiction. It is essential that the various African states achieve a consensus on what serves the best interests of the continent as a whole. African governments should collaborate with the aviation sector to deliberate on strategies for minimizing the airline costs as stipulated in this study's Chapter 3, Concept theoretical constructs and devising methods to streamline both independent and dependent variables. This approach is essential in fostering confidence for the expansion of airline network models and ensuring the sustainability of route networks. Africa's potential continues to be substantial (Finlayson, 2023), as the decades-old cliché suggests. However, until governments acknowledge the broader advantages that an efficient aviation system may offer, including its influence on economic growth, the ongoing scenario may continue to exist. A crucial initial measure would involve eliminating counterproductive taxation schemes, however there is still significant work to be done in addressing the fundamentally protectionist regulatory aspects.

This study underscores the imperative for aviation experts to acknowledge the significant opportunities that exist within the African airline markets. It is indeed troubling that many African nations persist in adopting selective and insufficient "freedoms of the air" policies, coupled with protectionist measures, which impede the advancement of aviation throughout the continent. Despite the aforementioned considerations, the execution of airline market liberalization policies represents a pivotal opportunity for the advancement of sustainable route networks within the African airline industry.

In view of the foregoing, African states ought to develop deliberate policies that support strategies aimed at expanding operations for low-cost carriers in the region. This potential development would lead to collaboration among the African regional Civil Aviation Authorities to ensure that the need for route expansion is addressed alongside improvements in business-friendly regulatory frameworks.

5.2 Fuel Cost Implications

An analysis by Brandt (2024) indicates that Africa has the highest average aviation fuel prices, with fuel expenses accounting for almost 30% of the airline industry's budget. This significant expenditure poses

a considerable risk to the aviation industry across the continent, as it is well established that rising fuel costs negatively impact business prospects related to competitiveness and profitability.

Empirical research indicates that the cost of aircraft fuel per litre entering an aircraft's wing is significantly higher in Africa. As a result, variations in regional fuel prices indicate the global competitiveness of the aviation sector within an African context, as evidenced by A recent report from IATA revealed that Africa recorded the highest average aircraft fuel price. Supplier competition at outlying airports is diminished due to government regulation or monopolistic control over "in-wing" fuel costs. The "in-wing price" refers to the expenditure incurred by airlines on fuel, as reported by the IATA. Price variations are evident across different regions. Regional trade centre prices vary as a result of market dynamics, as reported by IATA. "The add-on price exhibits significant regional variations and encompasses expenses associated with transportation, storage, and into-aircraft fuelling." This disparity may be ascribed to supplier noncompetition and region-specific logistical challenges. The IATA evaluation indicates that airports with modern supply networks and unrestricted fuel infrastructure exhibit fewer and more consistent add-ons.

Brandt (2024) indicates that logistical challenges and inadequate fuel infrastructure contribute to increased costs, while African airlines with elevated fares across different regions face comparable issues. "Some airlines face difficulties in using conventional fuel because of inconsistent access to established fuel supply chains, leading to disparities." The International Air Transport Association promotes the availability of airport fuel infrastructure for sustainable aviation fuel (SAF) sources. SAF functions as a drop-in fuel, allowing for its utilization in the same manner as conventional aviation fuel. All airlines, regardless of their origin, should participate in equitable competition within the global SAF market, akin to their operations in the jet fuel sector. This study conducted a comprehensive investigation, as noted by Brandt (2024), and demonstrated the effects of increasing fuel prices on African airlines. AfricAviation experienced increased expenses attributed to high fuel prices. African airlines have substantial operational costs mainly owing to significant aviation fuel levies (Finlayson, 2023). The issue is intensified by the monopolistic practices of oil marketing companies, which have attributed the high delivery costs to shipping companies, despite the selective nature of the supplier lists for airport services companies. However, the aforementioned factors are not the exclusive explanations for the shortcomings of continental airline business strategies; rather, African airlines have also encountered obstacles in attaining success due to regulatory limitations on operational independence and inadequate management practices (Finlayson, 2023).

5.3The Single African Air Transport Market (SAATM)

This study recognizes that, within a specific context, the current challenges are significant for evaluating the Effective Implementation (EI) of aviation regulations by African governments in accordance with the Yamoussoukro Declaration (YD) (Schlumberger, 2007).

Table 1: Concentrations of air transport, economies and populations within Africa

Air Transport (Passenger Kilometres)			Economy (GDP)			Population		
Country	Contribution	Cumulative	Country	Contribution	Cumulative	Country	Contribution	Cumulative
South Africa	27%	27%	South Africa	23%	23%	Nigeria	15%	15%
Egypt	15%	42%	Nigeria	14%	37%	Ethiopia	8%	23%
Ethiopia	10%	52%	Algeria	11%	48%	Egypt	8%	31%
Kenya	8%	60%	Morocco	8%	56%	Congo, DR	7%	38%
Mauritius	6%	66%	Angola	6%	62%	South Africa	5%	43%
Top 5		66%			62%			43%
Algeria	4%	70%	Sudan	5%	67%	Tanzania	4%	47%
Tunisia	3%	73%	Tunisia	3%	70%	Sudan	4%	51%
Nigeria	2%	75%	Ethiopia	3%	73%	Kenya	4%	55%
Namibia	2%	77%	Kenya	3%	76%	Algeria	3%	58%
Seychelles	1%	78%	Ivory Coast	2%	78%	Uganda	3%	61%
Top 10		78%			78%			61%

Source: Euromonitor, ICAO, IMF

Table 1: Concentrations of Air Transport Economies and Populations in Africa

The performance monitoring of the African air transport sector by YD EI is a matter of considerable concern for Civil Aviation Authorities, accepted as a core priority by the African Union(AU) through the African Civil Aviation Commission (AFCAC). A general consensus among existing airlines regarding the impacts of the Single African Air Transport Market is essential. Consequently, governments should develop agreed-upon policies with AFCAC to address the complexities arising from “size and complexity of the operators” or simply the disparities between established operations of large airlines versus smaller airlines.

Nonetheless, this study observed the extensive performance metrics of commercial air operations throughout the African continent. A notable characteristic of the African market is that overall analysis is that the continent exhibits one of the most modest tourism-driven aviation markets globally. To entice new clientele, African Airlines should offer cost-effective, high-quality services, as a formidable challenge (Schlumberger, 2007). Additional research and consensus (Adler, 2018) suggest that by 2030, there shall be adequate demand to justify an additional hub in central Sub-Saharan Africa, such as Lusaka (Zambia). However, this is contingent upon the execution of liberalization policies as delineated in the Yamoussoukro Decision, a stance that both Zambia and the Republic of South Africa have demonstrated a formal readiness to adopt, despite apprehensions that the preeminence of other African air carrier behemoths could compromise the economic viability of domestic Airlines.

5.4 Airline Strategies For African Airlines

Heinz and O'Connell (2013) indicate that, in recent decades, African airlines have faced formidable operational challenges, such as adhering to standardized global policies, navigating vast and sparsely populated remote geographical areas, and contending with Western-regulated dollar-based financial systems. African airlines have consistently employed a range of strategies to attain enduring profitability and secure a competitive edge (Heinz, O'Connell, 2013). The issues previously mentioned underscore the imperative for a distinct array of methodologies that can be thoroughly demonstrated. Frameworks or strategic plans are devised to address challenges within specific operational contexts. Heinz, O'Connell, (2013) further state that the most environmentally beneficial and sustainable approaches accessible to African airlines are consequently examined within African business models and it is therefore imperative to first explore the current airline flight network business models in place. An initial examination of the business models utilized by airlines across the African continent was conducted, accompanied by an assessment of their distinctive characteristics. The concept of sustainability was evaluated and interpreted (Heinz, O'Connell, 2013) through identifiable distinct perspectives that correspond with the business model framework, associated with its network characteristics, including Hub and spoke, point to point, or limited multi models like ET Group.

5.5 Airline Marketing Strategies

The airline business is the fastest means of international travel (Ismaila, 2013) that is supported by boosts in worldwide economic growth. However, African airlines contribute low numbers when considering total global aviation (Meichsner, 2018). This research examined the descriptive issues affecting an African airlines' s market selection and entry barriers (O'Connell, 2012). To achieve the study objectives, the researcher efficiently gathered 30 responses from 50 participants, and the sample reflects a significant portion of important African airline operations. The researcher sent questionnaires to senior management of several selected airlines, government and regulatory experts. This research conducted an analysis of 31 African airlines having a total 1261 destinations as well as a total of 49 global airlines, each offering over 100 destinations, culminating in a total of 9,956 destinations. Notably, only one African airline, Ethiopian Airlines, emerged with 155 destinations, representing a percentage score of 1.556%. In contrast, United Airlines dominated the landscape with an impressive 371 destinations worldwide. African airlines serve internal and international routes, with several foreign destinations throughout the continent. These airlines struggle to compete both at continental and inter-continental levels owing to market constraints and a good number have fleets of less than 10 aircraft, suitable for medium to short-haul trips. This study found that African Airlines struggled to assess foreign market profitability, risk, and yield. The inadequacy of well-developed airline models causes this predicament. The study also noted that the African airlines face several regulatory barriers to worldwide expansion despite the industry's ongoing liberalization. Most Airlines exhibit trouble choosing an entrance strategy since they have to weigh the risk and possibility of increasing its market share.

5.6 Airline Route Network and Frequency

The research showed that in order for airlines to achieve peak performance, they need to strategically arrange their fleet in accordance with their operational network plans. The airline's network and fleet size strategy is determined by the choice of aircraft type, route design, flight frequency, and total fleet size... The financial viability and profitability of the airline are essential. Airlines should assess their

objectives, resources, and capabilities when formulating network and fleet strategies. Route network Plans should exhibit sufficient flexibility to accommodate market fluctuations. As previously noted, the researcher conducted an analysis of 31 African airlines, which collectively serve 1,261 destinations, alongside 49 global airlines, each offering more than 100 destinations which culminated in a total of 9,956 destinations across the examined airlines. It was found that only a singular African airline, Ethiopian Airlines, attained 155 destinations, which equates to a percentage score of 1.556%. In stark contrast, United Airlines distinguished itself within the industry by offering an impressive total of 371 destinations worldwide.

African governments should engage in cooperation with airlines to formulate strategies aimed at achieving cost efficiency and improved productivity. This collaboration must prioritize customer safety and reliability by optimizing airline networks and fleet suitability, ultimately leading to increased flight frequency as operational costs decrease. This objective can be typically accomplished through the subsequent steps:-

5.6.1 Aircraft Fleet Strategy

Airlines conduct thorough evaluations of markets prior to formulating their network and fleet strategies, indicating that a comprehensive analysis of airline demand and supply dynamics is essential for identifying viable markets. It is essential for research to encompass demographic, economic, passenger traffic, competing routes, and pricing data. Market analysis necessitates the inclusion of these elements.

5.6.2 Market Research

Market research involves systematic gathering, analysis, and interpretation of data pertaining to a market, product, or service. Segmentation involves the division of a market into smaller groups of consumers who share similar characteristics, needs, preferences, or behaviours. By engaging in market research and segmentation, African airlines can identify their target consumers, gain insights into their desires and expectations, and tailor their products and services accordingly. The examination commences with data derived from the airline industry, encompassing demographics, economic factors, passenger traffic patterns, competitive routes, and pricing structures. This information is provided by governmental entities, industry bodies, and market research organizations.

This study notes that on a broader view of prospective airline market research, as of 18th December, 2024, the population of Africa stood at 1,531,226,940, representing roughly 18.3% of the total global population. Africa holds the distinction of being the second most populous region in the world, characterized by a population density of 51 individuals per square kilometre. In juxtaposition with the significance of this study, the U.S. Census Bureau has projected that on 1st July 2024, the population of the United States will reach approximately 340,110,988. The United States accounts for 22% of the Africa population. The foregoing data reveals a notable imbalance in the aviation networks when comparing Africa and the United States of America.

5.7 Selected Airlines Network Sizes

As previously indicated this study examined 31 African airlines that collectively offer 1,261 destinations/routes, alongside 49 global airlines, each with a capacity exceeding 100 destinations, culminating in a total of 9,956 locations. Among the 9,956 global destinations/routes served by 49 airlines, only one African airline, Ethiopian Airlines, is accounted for, reaching 155 destinations and

achieving a percentage score of 1.556% for all unrepresented African airlines in this analysis. In contrast, United Airlines dominated the market with 371 global destinations.

1. Air Algerie	35 Domestic 10 Destination To Other African States 54 International Destinations
2. TAAG Angolan Airlines	16 Domestic 10 Destinations To Other African States 17 International
3. Benin Airlines	Nil Data
4. Air Botswana	04 Domestic 06 Destinations To Other African States
5. Air Burkina	9 Destinations In West Africa
6. Camair-Co (Cameroon)	06 Domestic 06 Destinations To Other African States
7. Carbo Verde Airlines	03 Destinations To Other African States 08 International Destinations
8. Karinou Airlines	10 Destinations To Other African States
9. Tourmai Air Tchad	02 Destinations Within Africa 01 International
10. Ethiopian Airlines	22 Domestic Destinations 68 Destinations To Other African States 133 International Destinations
11. Int'air Îles	03 Domestic 03 Destinations To Other African States 06 International Destinations
12. Egypt Air	12 Domestic 31 Destinations To Other African States 65 International Destinations
13. Air Cote D'ivoire	6 Domestic Destinations 21 Destinations To Other African States
14. Kenya Airways	07 Domestic Destinations 46 Destinations To Other African States 71 International Destinations
15. Libyan Airlines	
16. Madagascar Airlines	25 Domestic Destinations 05 Destinations To Other African States 08 International Destinations 14 International Destinations
17. Fly Safair	08 Domestic Destinations 04 Destinations To Other African States 04 International Destinations



Source: Airline Reporter Jan,2019

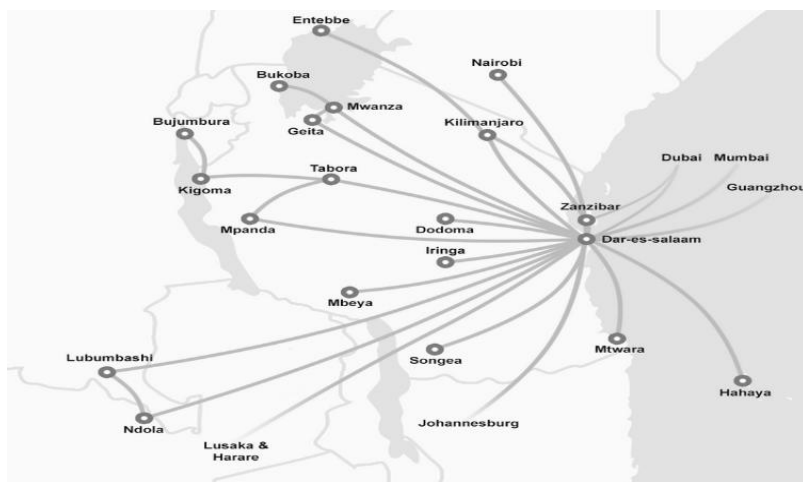
FIGURE 10: ETHIOPIAN AIRLINE ROUTE NETWORK

18. South African Airlink

17 Domestic Destinations

29 Destinations to Other African Sates

29 International destinations



Source: Sputink,(2023)

FIGURE 11: AIR TANZANIA FLIGHT NETWORK

19. TunisAir
09 Domestic Destinations
18 Destinations to Other African States
81 International Destinations
20. Uganda Airlines
01 Domestic Destination
16 Destinations to Other African States
17 International Destinations

Row Labels	Sum of Percentage of Total Destinations	Sum of International destinations	Sum of Number of Destinations/Routes
31 Airlines			
Domestic Destinations	44.8850119		566
Inter African Destinations	33.54480571		423
Foreign Destinations	21.57018239		272
Total Destinations/Routes	100		1261
Total All African Destinations For 31 Airlines`			989
All Africa/Foreign Destinations	55.1149881	695	
49 World Wide Airlines with over 100 destinations	1.556%	155 (Ethiopian Airlines Only)	9956

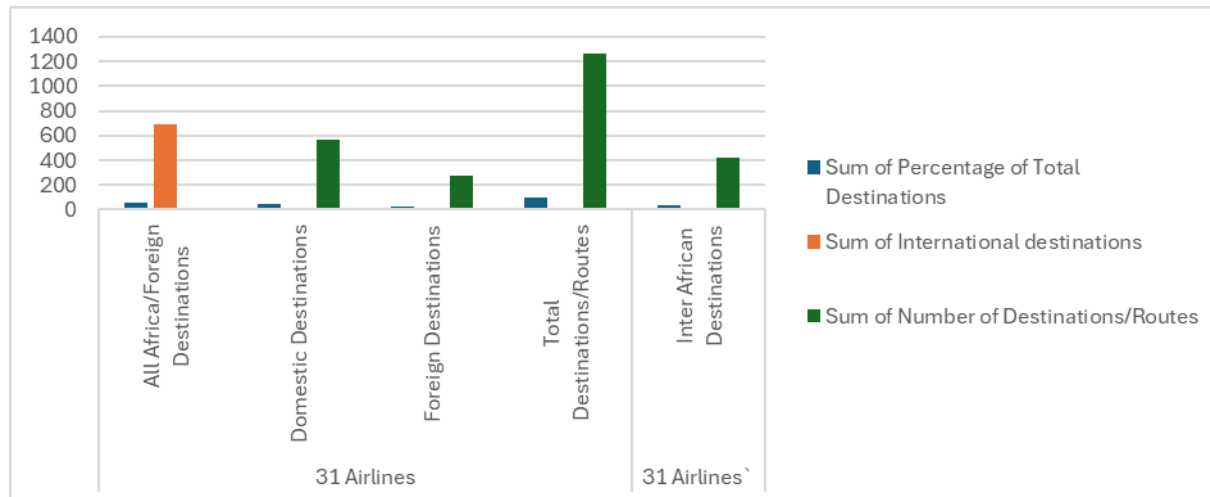
Source: Author(2024)

Table 2 :Percentage Distribution for the Selected 31 African Airline Destinations

21. Proflight Zambia
11 Domestic Destinations
03 Destinations to Other African States
03 International Destinations
22. Zambia Airways 2014
02 Domestic Destinations
03 Destinations to Other African States
03 International Destinations
23. Air Zimbabwe
03 Domestic Destinations
02 International destinations
24. Fast Jet Zimbabwe
03 Domestic destinations
02 Destinations to Other African States
02 International destinations
25. Air Tanzania
14 Domestic Destinations
22 Destinations to Other African states
29 International Destinations

5.8 African Airline Market

The past decade proved to be remarkably turbulent for the airline industry, especially as a result of the repercussions of Covid-19 from 2020 to 2023. The Covid-19 pandemic was intensified by considerable external economic influences that raised airline expenses while simultaneously facing reduced demand. This study recognizes that a significant portion of research on African aviation has, to a to some extent, encompassed the impacts of trade and economic liberalization across the continent (Chingosho, 2009; ICAO, 2003; Morisson, 2004). It is noteworthy that the United Nations Economic Commission for Africa (2001) and Schlumberger (2010) serve as two reputable sources in this discourse.



Source: Author(2024)

FIGURE 12: GRAPHICAL ROUTE/DESTINATION NETWORK FOR 31 AFRICAN AIRLINES

In light of the previously discussed considerations, there exists a paucity of information concerning the strategic modifications undertaken by African airlines in reaction to these adverse developments. The Covid-19 pandemic necessitated a re-evaluation of business strategies, leading to notable achievements through adaptive measures. A recent examination of African aviation has predominantly concentrated on the complexities associated with conducting business within the continent (Abeyratne, 1998; Chingosho).

This viewpoint stands in stark opposition to the assertions made by Ssamula (2013), who examines the pros and cons of hub-and-spoke networks as a viable strategy for minimizing expenses and enhancing connectivity in African air transport markets of nations marked by limited air travel demand conditions. Mason and Morrison established organizational architecture in 2008, emphasizing a global lack of study about the viability and effectiveness of employing certain settings as benchmarks for tailoring models to the distinctive conditions and characteristics of the African environment. The research concluded that the distinctive characteristics of the African environment necessitate the incorporation of creative strategies into a new strategic framework or business model

5.9 Application of Ansoff's Strategies In The African Airline Market

According to Mwaniki, (2014), Ansoff's (1957) growth strategy matrix delineates four techniques for businesses:

- 5.9.1 Market penetration,
- 5.9.2 Product creation,
- 5.9.3 Diversification, and
- 5.9.4 Market development and expansion.

Market penetration involves enhancing the presence of an existing product within its current market, while product creation and market growth serve as alternative strategies. When executed with precision, these strategies possess the potential to bestow a competitive edge upon the African airline, particularly within meticulously analyzed and researched regions, thus enhancing its route network schedules.

5.10 Absence from The Global Stock Market Effect

This study examines the relationships between global airline stock prices and the macroeconomic factors that are crucial for predicting the development of the airline sector, which subsequently influences the expansion of African airlines in terms of existing schedules and route networks. Consequently, this study advocates for African governments to collaborate with African airlines to promote the public listing of these enterprises on the stock market. Africa harbours considerable potential to establish itself as a pivotal force in the aviation sector, bolstered by robust forecasts of economic development, as it includes numerous rapidly growing economies on the global stage.

It is also important to note that African airlines presently represent around 1.3 percent of the worldwide air freight market. A study conducted by Alici (2024) examined the macroeconomic variables that impact airline stock prices. The variations in stock prices and the progression of the market are shaped by the choices made by investors (Alici, 2024). Investor decisions are by the performance of corporations, the state of the national economy, political occurrences, and variations in macroeconomic elements. Comprehending these elements and their potential impact on stock prices is essential for price formation and investment decisions, which are vital for the necessary expansion of the African airline network. This analysis centres on three macroeconomic variables that could profoundly impact the valuation of airline stocks. The subsequent data points encompass the Crude oil price, the dollar exchange rate, and the interest rate. The study according to Alici,(2024) explored the correlation between the daily macroeconomic indicators of 14 airlines spanning from 2009 to 2018 and their associated stock prices. Employing the Toda-Yamamoto causality and Hatemi-J asymmetric causality tests, noteworthy correlations were discerned regarding the macroeconomic factors that impact stock prices.

This study examines the relationships between global airline stock prices and the macroeconomic factors that are crucial for predicting the development of the airline sector, which subsequently influences the expansion of African airlines in terms of existing schedules and route networks.

5.11 Airline Market Product Assessment

Numerous theoretical and empirical studies have been undertaken in the passenger airline industry to evaluate airline performance based on key competitiveness metrics, including

- 5.11.1 Cost,
- 5.11.2 Operational performance,
- 5.11.3 Cost and productivity,
- 5.11.4 Price and productivity,
- 5.11.5 Price and service quality,

- 5.11.6 Productivity and efficiency,
- 5.11.7 Profitability,
- 5.11.8 Safety, and
- 5.11.9 Service quality.

Nonetheless, these individual metrics alone do not encapsulate the concept of comprehensive airline competitiveness. Airline competitiveness should be evaluated by examining all essential performance metrics related to efficiency and effectiveness from the perspectives of both the airline and the consumer. A study on a competitiveness index, created by Aviation Week and Space Technology, delineates a series of performance dimensions for evaluating the relative competitiveness of publicly traded aerospace and airline firms, aiming to elucidate the influence of management decisions on overall organizational performance. The identified performance characteristics include operational efficiency, financial stability, asset utilization, earnings protection, liquidity, and market value. Although this competitiveness index serves as a valuable benchmarking instrument for objective evaluations, it is not applicable to specific competitive contexts, such as the domestic passenger airline sector, where customer-centric performance metrics play a crucial role in overall competitiveness. New auxiliary revenue sources, like checked baggage fees, seat reservation costs, and food sales, were introduced in the late 2000s. Furthermore, airlines have encountered several pre-existing ancillary fees, such as redeeming mileage award tickets, same-day standby, agent-assisted ticketing, domestic and international ticket exchanges, onboard checked pet services, and unaccompanied minor services, which have escalated costs.

5.12 Managing Factors of Key Performance Indicators

Although Africa encompasses a vast area, the contribution of African airlines to the global passenger air transport sector is at around 2%.

Key Performance Indicators are measurable metrics (InetSoft, 2020) that indicate the extent to which a company is achieving its objectives. The key performance indicators that hold the utmost importance for airline operations are those that assess the effectiveness and efficiency of the airline's activities. According to InetSoft, (2020), commonly used KPIs for these metrics include:

- 5.12.1 On-Time Performance (OTP)
OTP stands as a critical KPI for airlines. The calculation determines the ratio of flights that arrive at their intended destination punctually. On-time performance serves as a vital metric for assessing customer satisfaction and is utilized by airlines to evaluate their operational effectiveness and reliability. An airline that consistently maintains a high on-time performance is more likely to attract new passengers and sustain a positive reputation.
- 5.12.2 Load Factor Analysis
The load factor measures the occupancy levels of an airline's flights. The determination is made by calculating the ratio of the number of individuals on the aircraft to the total number of available seats. Airlines aim to optimize load factors as a key indicator of their profitability. A high load factor signifies that a substantial percentage of the airline's tickets are sold, leading to increased revenue.
- 5.12.3 Analysis of Flight Utilization

Flight utilization quantifies the duration an aircraft is operational on a daily basis. Airlines aim to optimize the number of flights they can conduct with their existing fleet by focussing on improving flight utilization. An airline with a high flight utilization rate effectively maximizes its aircraft to enhance revenue generation.

5.12.4 Revenue Passenger Kilometres

The metric representing the kilometres travelled by paying passengers is referred to as RPK. RPK functions as an indicator of the revenue generation capabilities of an airline. An airline's income is directly proportional to the amount of RPK it generates.

5.12.5 Goals of the Organization

Analytics refers to the systematic approach of employing data to identify patterns, trends, and insights that can enhance organizational performance. Identifying opportunities for operational optimization underscores the significance of analytics for professionals in the airline industry. Several key analytical methods utilized by professionals in airline operations encompass the following:

5.12.6 Enhancing Network Efficiency

Network optimization involves utilizing data analysis to identify the most cost-efficient aircraft schedules and routes for an airline. This procedure evaluates various factors such as flight durations, fuel consumption, aircraft availability, and passenger demand. An airline can enhance productivity and reduce costs through the optimization of its network.

5.12.7 Crew Scheduling

The complex task of crew scheduling necessitates the integration of the airline's requirements with the preferences and availability of the crew members. Airlines improve crew scheduling by utilizing data analysis, considering factors such as staff qualifications, seniority, and working hours. By enhancing staff scheduling, airlines have the potential to reduce costs and elevate the quality of life for their crew members.

5.12.8 Strategic Maintenance Planning

Effective maintenance planning is essential for ensuring that aircraft remain in optimal condition and safe for operation, which involves careful scheduling of maintenance activities. Airlines enhance their maintenance schedules through the use of data analysis, factoring in elements such as aircraft utilization, maintenance history, and regulatory obligations. By enhancing maintenance planning, airlines can reduce maintenance costs and minimize aircraft downtime.

5.12.9 Revenue Management

The process of modifying an airline's pricing and inventory strategies to enhance revenue is referred to as revenue management. Airlines utilize data analysis to identify demand patterns and adjust their inventory and pricing accordingly. Airlines have the potential to enhance their revenue and profitability through the optimization of their revenue management strategies.

5.12.10 Assessment of Customer Satisfaction

Customer satisfaction serves as a measure for assessing the level of contentment consumers derive from their overall airline experience. Airlines utilize customer satisfaction scores to pinpoint areas needing improvement and assess the effectiveness of their customer service initiatives.

5.12.11 Baggage Management

The performance of an airline in handling baggage serves as an indicator of its effectiveness in managing checked luggage. This KPI includes metrics such as the number of lost or delayed bags and the duration required to return luggage to passengers upon arrival at their destination. Airlines aim to optimize the delivery of luggage to customers, focussing on minimizing the incidence of lost or delayed bags.

5.12.12 Aircraft Turnaround Time

The duration required for an aircraft to complete the processes of landing, loading and unloading passengers and luggage, cleaning the cabin, refuelling, boarding passengers, and taking off is referred to as the aircraft turnaround time. To optimize aircraft utilization and reduce costs, airlines focus on minimizing turnaround time. Analysis of Airline Operations Forecasting Maintenance Needs Predictive maintenance utilizes data analysis to identify potential issues with equipment, such as aircraft, prior to their occurrence. By analyzing data from sensors and various sources, airlines can predict when maintenance is necessary and implement proactive measures to address issues before they lead to delays or cancellations.

5.12.13 Optimizing Flight Paths

Flight path optimization employs data analytics to identify the most efficient flying paths and altitudes. Airlines have the potential to enhance their on-time performance while simultaneously reducing fuel consumption, emissions, and noise pollution through the optimization of flight patterns.

5.12.14 Assessment of Crew Performance

Crew performance management monitors crew performance and pinpoints areas for enhancement through the utilization of data analysis. By implementing targeted training and coaching, airlines can enhance the performance and job satisfaction of their crew members.

5.12.15 Analyzing social networks

Monitoring social media involves systematically tracking mentions of an airline's name, products, or clients. This data enables airlines to analyze patterns and issues effectively, allowing for a prompt response to consumer feedback and complaints.

5.13 Airline Safety in Africa

According to IATA, (2024), Africa experienced no jet hull losses in 2023, indicating a continuation of this trend for the second consecutive year. Additionally, the continent recorded zero fatalities in commercial aircraft incidents for the year 2023, as outlined in the IATA Annual Safety Report. The accident rate across Africa stands at 6.38 per million sectors, indicating a positive trend compared to the five-year average of 7.11 per million sectors. Airlines that are IOSA-registered demonstrate a consistent superiority in performance compared to their non-IOSA-registered counterparts, both within the continent and globally. Currently, the IOSA registry includes 31 operators in Africa. Africa's main

emphasis is on the implementation of safety-critical ICAO Standards and Recommended Practices (SARPS) to ensure safety. IATA initiated the Collaborative Aviation Safety Improvement Program (CASIP) as part of the Focus Africa program to advance this goal. The Global Aviation Safety Plan (GASP) and the ICAO African Indian ocean (AFI) Regional Aviation Safety Plan target a 75% implementation rate of SARPS across Africa. Currently, only 12 out of Africa's 54 nations meet this criterion.

5.14 Effect of Past Safety Record on Aviation in Africa

Africa reported the greatest runway safety Accident rate at 4.41 for the period 2010 to 2014 (IATA, 2015), with African airlines accountable for 22 percent of runway safety accidents compared with the rest of the World. In 2010, the cost was projected to be considerably elevated, according to the International Air Transport Association. Therefore, reflective on the ongoing issues brought about by this knowledge greatly facilitated persuasion as noted in concerns of the former Chief Executive Officer of Ethiopian Airlines (Oqubay A. a., 2019) indicated that a significant number of passengers were changing their airline choices to overseas carriers. Dunn (2012) stated that eighty percent of all air travel within Africa is conducted by airlines from outside the continent.

5.15 Insufficient Data on Capacity of African Airlines

According to a research conducted in 2012 by O'Connell and Warnock-Smith, EgyptAir represents a relatively little portion of international travel to and from Egypt. The proportion of passengers increased from 13.3% in 2007 to 15.7% in 2009, indicating substantial growth. Egyptians expressed apprehension on the potential influx of guests from other nations via air travel facilitated by Africa Airlines. The upshot of this prevalent scenario is that the production of the continent has fallen based on the data supplied by Airport IS which proved that African airlines only transmit around twenty percent of the whole African capacity.

5.16 Challenges within the African Business Environment

The African climate presents several challenges, including high operational expenses, inefficient aircraft utilization, and limited demand for aircraft. African carriers incur far higher operational costs than carriers in other areas. The long-distance transportation of petroleum is essential in many nations. Numerous landlocked nations on the continent are deprived of maritime access, intensifying the gravity of the problem due to insufficient infrastructure.

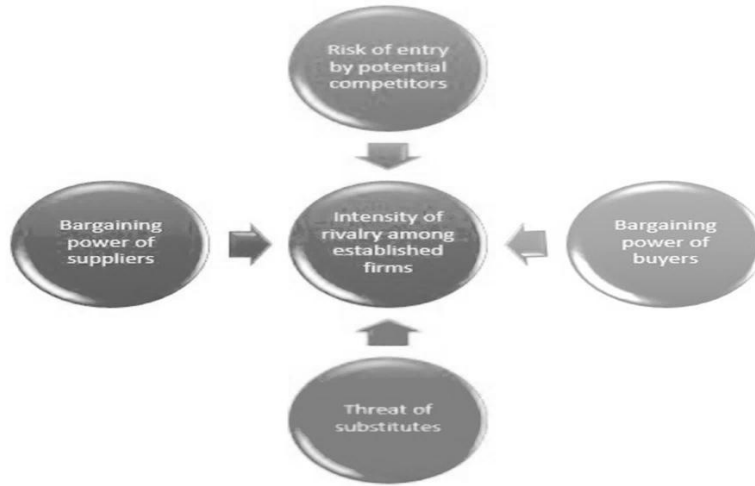
Most African airlines are unable to negotiate advantageous terms for economical aviation fuel due to their modest fleet size. African airlines, although negotiating prices with aviation fuel suppliers, are susceptible to unexpected price surges due to the lack of fuel hedging assistance. Another consideration is the intricacies associated with the petroleum distribution networks available to airlines for swift incorporation into their procurement plan.

Airlines face restrictions like those experienced in Africa, where limitations exist on the utilization of credit cards and internet access. In the travel sector, travel brokers often earn a commission of seven percent of the total ticket price as amplified by Chingosho (2009, p. 32) asserting that the potential for earning a commission motivates travel agents to meet their sales obligations.

Airports and organizations providing navigational services are quintessential examples of enterprises within this business. Government-controlled monopolies in Africa contribute to the elevated prices relative to other regions. The landing costs at each airport are far more than those at the majority of airports globally, making it costly to fly big aircraft in and out of most African cities compared to analogous locations outside Africa.

5.17 Porter's Five Forces In The Airline Industry Analysis

This study found that there existed another way to analyze the competitive dynamics of African airline markets (Mukhezakule, 2019) with the help of Porter's Five Forces model in Figure 13 and Figure 14 below. Understanding the competitive environment of the African airlines and the underlying elements driving profitability in African airline markets is the major aim when evaluating industry profitability (Afonina, 2015).



Source: Baxter, G (2019)

FIGURE 13:PORTER'S FIVE FORCES

Finding markets with high levels of competition is made more difficult by the fact that the Five Forces method is static and does not take time into consideration.

Airline Industry Porter's Five Forces Model



Source: EdrawMax Website

Accessed 2024

Figure 14:Porter's Five Forces framework as a tool for defining critical elements

Variables specific to an industry, according to (Dälken, 2014), should explain why some businesses do better than others. Additionally,

Mwaniki, (2014) further refers to Porter (1980), that five competitive forces influence every market and industry. The elements encompass the level of competition, the bargaining power of suppliers and customers, the threat of new entrants, and the potential for substitutes. These influences may enhance the comprehension of an African airline's appeal, profitability, and competitive competition.

The Porter framework serves as an excellent organizational tool for defining the critical elements of an African airline's structure and its implications for competitive conduct. The framework excels at forecasting industry profitability and assessing the firm's impact on (Mwaniki, 2014) industry structure to enhance profitability in particular route network.

Nonetheless, (Mwaniki, 2014) according to Downes (1997), these assumptions are no longer tenable in the twenty-first century's global economy. He identifies deregulation, digitalization, and globalization as three rising forces necessitating innovative strategies and analyses in corporate design.

5.18 Focused View On Resources

According to Wernerfelt (1984), optimal competitive strategies are founded on a firm's internal strategic resources; existing resources may be utilized to develop new ones, in contrast to Porter's external viewpoint on competitive advantage (Mwaniki, 2014). Barney (1991) suggests that a company's competitive advantage might be further analyzed by assessing the resources it possesses. A corporation cannot gain a competitive advantage unless it has resources that are valued, rare, difficult to imitate, and organized to optimize value capture. Duncan, Ginter, and Swayne (1996) identify a significant disparity between the creation of instruments for assessing a firm's internal strengths and weaknesses and those for evaluating external opportunities and dangers. This constitutes the foundation of (Mwaniki, 2014) Barney's perspective. For instance, take the often-referenced Porter's Competitive Forces Model previously described.

This viewpoint elucidates how a corporation may sustain a competitive advantage (Mwaniki, 2014) over time by strategically managing its resources in a manner that competitors cannot duplicate its success.

5.19 Public Private Partnerships For African Airlines

Nonetheless, there is the prospect of accomplishing some good things with airline business in Africa. As a result of the strategy's success in other areas, governments are increasingly teaming up with private airlines to launch their own flag carriers. More and more, African airlines are looking to expand regionally rather than just inside within the domestic routes of the individual African states. Much like everywhere else, the continent's aviation scene has been radically altered by the COVID-19 outbreak. But Africa's aviation services were back up and running in no time, and by mid-2022 they were operating at capacity levels similar to before the epidemic. According to the current schedules, capacity has been surpassing 2019 levels since 2023, and this trend is expected to continue throughout the year.

5.20 Competitive Advantage Of Existing Network Airlines

With an ever-increasing seat capacity share of more than 9%, Ethiopian Airlines is unrivalled in the African industry. At now, Ethiopian Airlines seat capacity is about double that of all other African airlines combined and over 50% more than EgyptAir's. When this past decade began, Ethiopian Airlines was much smaller than its rivals.

The CAPA Fleet Database reports that there are now 2,900 aircraft in Africa's commercial aviation fleet. In addition, a little over 150 planes have been ordered by African airlines. The order book of Ethiopian Airlines is larger than that of Air Peace and Arik Air, both of which are Nigerian carriers.

Although it has kept its name, South African Airways now has a quite different perspective. Others have quickly taken advantage of the gap that the break has created. On the other side, Ethiopian Airlines' cross-border business strategy has allowed it to thrive and develop substantially. With the support of the one world global alliance, Royal Air Maroc has also become more resilient.

5.21 Growth Of Low-Cost Carrier Networks

There is clear room for growth in the Low-Cost Carrier (LCC) industry in Africa. The percentage of seats in Africa that can be attributable to low-cost carriers has almost quadrupled in the last five years, according to data from CAPA and OAG. About 20% of all available seats were on LCCs as of early August 2023. Despite expansion in certain areas, this proportion is still quite small and mostly includes lines that link North Africa to Europe. A large number of important African markets still do not have any Low-Cost Carriers (LCC).

This divergence has attracted significant attention in both academic and public discussions, with various authors linking the differing outcomes to discrepancies in route configurations and the economic size of towns or regions serving the airports at the start and end points of specific airline routes.

5.22 Aircraft Utilization

The utilization rates of aircraft in Africa are notably low. Africa's average daily flight duration of 6.9 hours is very low globally, mostly due to inadequate aircraft scheduling and limited night-time operations. This results in Africa's suboptimal economic growth rate of 9.9%, the grounding of ageing aircraft, and a shortage of pilots and maintenance personnel. African airlines service a higher number of destinations each trip compared to other global carriers, suggesting inefficiency in aircraft utilization, since smaller aircraft are assigned to several distant sites. (Chingosho, 2009). Aviation limitations denote the propensity of State-owned airlines to pursue activities beyond their aircraft's capabilities, driven by a combination of market dominance and patriotic fervour.

In contrast to the US aircraft utilization data, the report noted that in 2023, Delta Air Lines operated over 11,000 flights with its Boeing 717 aircraft. The airline now operates the biggest fleet of the 717, including 71 active units, as reported by Ch-aviation. The aircraft, averaging 22 years in age, were slated to provide approximately 1.2 million seats in November 2023.

Compared to prominent markets like the US, African airlines encounter significant challenges in air transport routes, primarily due to limited demand stemming from elevated air travel costs and unequal income distribution, resulting in inadequate competition within the aviation sector. Leisure travel is often not significantly affected by price fluctuations, with an elasticity value of 0.53. Aviation travel in Africa remains seen as a luxury (Abrahams 2002; Chingosho 2009; Irandu 2006; Schlumberger 2010; Ssamula 2008, 2009, 2012). In 2010, the demand for African routes drastically declined, as seen by the continent's load factors, which plummeted to a low of 69.7%. The International Air Transport Association (IATA) said that the average shown by the worldwide league table in 2010 was 75.2%.

Notwithstanding the challenges, the aviation industry in Africa has always shown considerable potential. Nonetheless, airlines throughout the continent have been unable to capitalize on this potential owing to the challenges they have faced. Titus Naikuni, then Chief Executive Officer of Kenya

Airways, provided a comprehensive assessment of the African aviation industry. He said that Africa is the second largest continent worldwide and has a substantial population capable of sustaining its airline operations competitively with other regions. The African continent, with a population of one billion, is comparable in size to China and India. Nevertheless, it is now encountering challenging circumstances. African airlines could efficiently use self-communication with potential customers, perhaps via smartphones. The predominant portion of Africa's road and rail infrastructure remains inadequate, underscoring the need for enhanced air connectivity across the continent. Investors are expected to be drawn to Africa's abundant natural resources, given that extractive industries need significant capital for operation (Buyck, 2010, sentence 33).

6.0 RECOMMENDATIONS

6.1 Competitive or Comparative advantage strategies

This study has determined that airlines seeking a competitive edge should prioritize excellent offers, investigate new routes, include sophisticated aircraft, and provide appealing products and services. therefore, airlines should implement industry best practices, conform to current market needs, deliver outstanding customer service, and foster a culture of continuous development and learning to maintain a competitive edge.

In view of the above, this research recognizes that African airlines encounter considerable obstacles in maintaining and expanding flight route networks, particularly in contrast to foreign airlines operating within large international markets, such as those in the United States, which exhibit a well-established and developed flight route network for both domestic and international flights. African airlines have issues due to inadequate demand, attributed to elevated air travel costs and economic inequality, leading to a less competitive aviation sector. Price variations rarely affect leisure travel, demonstrating an elasticity of 0.53, which suggests that air travel in Africa presents a distinctive opportunity for transportation. According to Abrahams (2002), Chingosho (2009), Irandu (2006), Schlumberger (2010), and Ssamula (2008–2012). Since 2010, progress has been insufficient, as load factors have decreased to 69.7% owing to diminished demand for flights within Africa. In 2010, the global league ranking revealed an average load factor of 75.2% across airlines, according to IATA data.

Despite the aforementioned obstacles, the African airline industry has constantly exhibited significant potential within the African markets regardless of various restraints. The airlines based on the African continent have faced challenges that have impaired their ability to effectively capitalize on this potential. Titus Naikuni, the ex-Chief Executive Officer of Kenya Airways(2003 to 20140, provided a comprehensive analysis of the African aviation sector. Dr Naikuni emphasized and supported that Africa is the second largest continent and possesses a significant population that can competitively sustain its airline operations. Africa has a population of one billion individuals, comparable to that of China and India. This study also acknowledges that Smartphone technology facilitates direct engagement with potential clients, potentially beneficial for airlines in Africa. The inadequacy of Africa's road and rail infrastructure underscores the necessity for enhanced air connectivity. Africa's abundant natural resources should attract investors due to the substantial financial requirements of extractive sectors (Buyck, 2010, sentence 33).Market Segmentation within the Aviation Industry.

This research further recognizes that African airlines ought to provide products and services tailored to meet the preferences, aspirations, and contentment of their customers. Considering the aforementioned points, this study observes that as of December 18, 2024, Africa's population was

recorded at 1,531,226,940, which constitutes roughly 18.3% of the total global population. Africa stands as the second most populous region in the world, exhibiting a population density of 51 individuals per square kilometre, whereas, as of 1st July 2024, the U.S. Census Bureau (Routley, 2024) projects the population of the United States to be 340,110,988. The United States accounts for 22% of the population of Africa. The data reveal a notable imbalance in flight networks between the United States and Africa. Among the 49 global airlines, US carriers demonstrate a capacity of about 1,521 destinations, representing 15.27% of the world average in destination coverage.

6.2 Benchmarking With Foreign Airline Flight Networks

The researcher proposes investigating if other foreign airlines encounter analogous constraints to those faced by African airlines and examining how African airlines have navigated the difficulties of picking overseas markets and forms of entrance. The study recommends that African airlines evaluate their long-term strategic direction to create and cultivate effective strategic alliances to address flying network challenges. Research concentrating on scheduled flights indicates that international charter providers are essential to marketing strategies, notwithstanding their exclusion from the study.

6.3 Execution Of AFCAC Drive Towards Liberalization: YD (EI)

Consequently, the African Union backed Single African Air Transport Market (SAATM), the Yamoussoukro Declaration (YD) advocates for a comprehensive plan of liberalization for African airspace. This SAATM strategy requires to be executed delicately and carefully in alignment with the economic needs of the many economic blocs throughout the African continent. The varying degrees of integration among the Regional Economic Communities (RECs) in Africa impact the whole continent. Fragmentation and unpredictability are two defining aspects of implementation. Africa has forty metropolitan cities, each with populations over one million inhabitants. The Yamoussoukro Declaration aims to serve as a catalyst for extensive connectivity, akin to the developments witnessed in the United States and Europe post-aviation sector liberalization.

6.4 Developing African Low-Cost Carriers

This study underscores the importance of thoroughly investigating the enhancement of network density and connectivity by African airlines prior to the adoption of business models aimed at achieving lower costs in the financial outlook of the airlines. The differences in the performance of low-cost and network carriers contextualized from the North American region after 2001 are often ascribed to variations in route system design. This research examines and contrasts the economic and operational features of point-to-point and hub-and-spoke transportation networks in Africa as not fully exploited for sustainable airline business and furthermore, contends that the focus on route configuration obscures significant variations in corporate strategies. The researcher notes the common belief that U.S. low-cost carriers primarily operate point-to-point networks; however, the reality is that only a sizeable fraction of US airlines actually fall in this category. Across Africa, various individuals have engaged in experimentation with diverse airline models and operational procedures, leading to a range of outcomes. The precedence requires reevaluation in light of a route network that is orientated towards market research and has potential for expansion.

6.5 Support For Low-Cost Airlines In Africa

The distinction between African hub and spoke network airlines and low-cost carriers is increasingly blurring as network airlines enhance their domestic services while low-cost carriers expand their range of offerings. The notable growth and continued expansion of select low-cost carriers, such as Airlink

and Proflight Zambia, noticeable from about 2021 stand in stark contrast to the severe financial challenges and significant losses faced by larger African network operators like air Mauritius, South African Airways (SAA, recently under accountability) etc. The South African government temporarily halted operations at SAA in response to considerable financial losses; however, the airline has since resumed operations under a restructured and innovative management framework. Recently, it disclosed favourable profit figures for the financial year concluding in 2024.

Additionally, the emergence of next-generation aircraft has provided low-cost carrier (LCC) operators with new prospects. Unlike previous aircraft models, which had limited range and could not operate certain routes from the Middle East to specific European destinations, low-cost carriers employing new-generation fleets, such as Air Arabia, Wizz Air, and Flydubai, have begun servicing additional European and Asian locations. Nevertheless, one question remains - have these airlines recognized that by using these aircraft, they are directly competing with established carriers?

6.6 Reduction On Older Aircraft

This research encourages that African airlines should move away from extended periods of fleet inactivity and the heavy dependence on outdated equipment commonly found in many Maintenance, Repair, and Overhaul facilities (MROs), as the current circumstances worsen the high maintenance costs faced across the continent. It is noteworthy that African airlines utilize some of the oldest aircraft models globally, underscoring the average age of their fleet. Research indicates that over 80% of all aircraft in Africa have been in operation for a minimum of ten years. Consequently, there is an increase in maintenance expenses, a rise in fuel consumption, and a decline in overall performance.

6.7 Increase In Aircraft Utilization

The study also recommends a review on African airlines suboptimal aircraft utilization, with an average daily flight duration of 6.9 hours, which is comparatively low on a global scale, attributed to inefficient aircraft scheduling and limitations on nighttime operations. Africa's economic growth stands at an impressive 9.9%; however, the grounding of older aircraft has led to a notable shortage of pilots and maintenance personnel. African airlines operate a greater number of destinations per flight compared to other global carriers, suggesting a less efficient use of aircraft, as smaller planes are deployed to serve various remote regions. 2009 (Chingosho). State-owned airlines frequently exceed the operational limits of their aircraft, driven by market dominance and national pride. The airlines should evaluate the attributes of market segments following their identification, including passenger demand, pricing strategies, and competitive dynamics. This data enables the airline to identify potential market opportunities and assess possible obstacles. After a thorough examination of the marketing competition, a decision has been reached to increase the number of flights, resulting in reduced operating costs and decreased air rates.

In view of the foregoing, the airlines may meticulously strategize its aircraft schedules after comprehensive market analysis. The airlines remain responsible for determining the appropriate frequency and capacity for each route, identifying viable flight paths, and assessing demand levels. Enhanced resource allocation is achieved by iterative route planning that takes into account factors such as passenger demand, competitiveness, and profitability.

6.8 Identifying Potential Routes

The first phase in formulating an airline's routes involves identifying potential routes that include demand, competition, and location. Before selecting a route, the airline should do a comprehensive

assessment of its aircraft fleet and their operational range. It is essential for the airline to identify the market categories that provide the most profitability. The market is classified based on passenger demographics, travel objectives, and geographical areas. The airline may classify its customers into specific categories, including business, leisure, or regional and national travellers.

Subsequently, the airlines should evaluate market competitors following studies conducted on routes, pricing, and customer service. This information may assist the airline in identifying and addressing currently unmet market opportunities. The airline has the capacity to identify a market characterized by robust demand and little rivalry. Analyzing market trends and competition enables the airline to examine several market sectors, facilitating the assessment of potential.

This study evaluates market size, competitive intensity, and profit potential, with research data aiding the airline in prioritizing various markets. The airlines should develop advertising, promotions, and various marketing strategies aimed at specific demographics. The airlines should evaluate marketing strategy and then execute required adjustments.

6.9 Market Size Analysis

Following the identification of routes, the subsequent stage for the airline is to ascertain the demand level by analyzing factors such as market size, competitive intensity, and passenger travel behaviours. The airline should also consider the potential for passenger connections and the seasonal demand for certain routes.

6.10 Market Profit Analysis

Upon assessing demand, the next phase for the airline involves determining the profitability of each route. It is essential to align expenditures associated with fuel, labour, and aircraft maintenance with the projected revenue generated from passenger ticket sales. The interplay of market dynamics and pricing strategies can significantly impact on the profitability of various routes.

6.11 Marketing Route Frequency

Identifying the optimal balance between frequency and capacity occurs subsequent to the airline's evaluation of the route's profitability. Consider the number of passengers, the dimensions of the aircraft, and the overall industry context. The airline should also consider layovers and connecting flights.

6.12 Marketing Route Performance

The airlines should evaluate the performance of the route following its implementation. It is essential to compare projected and actual passenger demand, revenue, and expenditures. The airline should evaluate the impact of competition and fuel costs on the efficiency of its routes.

In light of route performance, airlines should revise their route strategy. Flight routes, frequencies, capacity, and aircraft classifications may be altered. A change in the route could affect the airline's fleet and network. Current African airlines are urged to pursue ongoing improvement, service quality, and innovation in response to the competition from foreign airlines operating in and out of Africa (Samunderu, 2023). Achieving this is challenging given the minimal profit margins of current African airlines, which is essential for any business model.

6.13 Efficient Airline Fleet Planning

The airlines are expected to proceed with the fleet planning phase when the route network has been identified. This entails determining which aircraft are most suited for each route, calculating the

necessary number, and organizing maintenance and upgrades. Factors like market accessibility, fuel economy, and aircraft efficiency are crucial when it comes to fleet planning.

Formulating an airline's fleet involves many consecutive stages:

- 6.12.1 It is essential for an airline to delineate its aims and objectives, including route network, demand, and financial targets, before making fleet decisions.
- 6.12.2 Assess the fleet's age, kind, and performance. The findings of this analysis indicate that the fleet is ineffective and deficient in several aspects.
- 6.12.3 Following a thorough assessment of the existing fleet, devise a long-term plan to facilitate the airline's attainment of its objectives. This encompasses the amount and types of aircraft purchased, leased, and retired, as well as the timing of their retirement.
- 6.12.4 Prior to selecting an aircraft, a flying firm should evaluate its options about performance, capacity, range, fuel economy, and operating expenses. The airline may additionally consider factors like facilities, maintenance, and system compatibility.
- 6.12.5 Assess potential finance alternatives: Based on the airline's financial condition, it may be essential to secure funds to purchase or lease new aircraft. You may choose to collaborate with commercial banks, leasing firms, or the aircraft manufacturers directly to get financing.
- 6.12.6 Implement the fleet strategy: Upon completion of the fleet plan, the airline may acquire or lease aircraft, divest or donate obsolete ones, or reallocate existing planes to other routes or destinations. Adapt to changes in the competitive environment of the airline business by modifying the fleet plan. Modifying flight routes, decommissioning obsolete aircraft, or augmenting the fleet may constitute a viable alternative.

6.14 Flight Network Optimization

This requirement denotes the refinement of an airline's route and fleet strategies to enhance revenue. This procedure includes adjusting capacity and frequency aligning with demand while reducing costs, as well as assessing the economic viability of various routes. Identifying profitable, unexplored markets is also an aspect of network optimization.

To assess the efficacy of an airline's network, it is essential to evaluate the following factors:

- 6.14.1 The proportion of flights that depart and arrive punctually directly influences the network's efficiency. Individuals incur financial losses and experience dissatisfaction when plans are abandoned or postponed.
- 6.14.2 The effectiveness of an airline's network is determined by the frequency of flights it runs on certain routes. Frequent plane travel improves connectivity and offers consumers more choices.
- 6.14.3 The effectiveness of an airline is influenced by the extent and comprehensiveness of its route network. Enhanced revenue, more satisfied consumers, and improved connectivity are all outcomes of strategically designed route networks.
- 6.14.4 Airline firms should enhance their resource allocation to satisfy customer demand, optimize revenue, and sustain a robust profit margin. Maximizing aircraft capacity utilization is crucial for enhancing network performance.

- 6.14.5 Airlines should ensure customer satisfaction to develop loyalty. Delivering exceptional service, resolving customer grievances, and fostering passenger appreciation may enhance network performance.

The process of airline fleet and network planning involves several components and teams, characterized by its complexity and iterative nature. The analysis of the market, route development, fleet planning, network optimization, schedule formulation, and revenue management are essential procedures. Airline firms may fulfil the demands of their stakeholders and passengers while conducting profitable, efficient operations by using these metrics.

The African airline might pursue two main routes of action regarding this situation (Tokarev., 2022). Both options have inherent hazards, requiring careful deliberation of the choice as follows;

- 6.14.6 An option is to consider leasing pre-owned aircraft or extending the leases of current fleets. This technique offers distinct advantages: less financial risk and the ability to acquire aircraft swiftly as needed. It is crucial to acknowledge the heightened expenses associated with the maintenance of older aircraft and their comparatively worse fuel economy relative to newer versions. The impact of rising inflation on maintenance costs may greatly influence the financial viability of operations, making it a crucial consideration in decision-making.
- 6.14.7 A different technique requiring the adoption of recently manufactured aircraft to rejuvenate the existing fleet. The advantages of modern aircraft include reduced maintenance costs, improved consumer appeal, and much better fuel economy, as claimed by the Original Equipment Manufacturers (OEMs) compared to earlier generation aircraft. OEMs often emphasize that the new aircraft mitigates increasing emissions issues and conforms to the environmental dimensions of Environmental, Social, and Governance (ESG) efforts. Following the COVID lockout, access to the newly built aircraft has been more accessible. Recent sources suggest that the newly founded airline is capable of acquiring 737MAX aircraft from Boeing, with first deliveries expected to begin in 2024. African airlines should provide a valid rationale for incorporating additional aircraft into their current network to address increasing passenger demand and enable extended routes.

6.15 Strategic Schedule Planning

The airline may formulate its flight schedule subsequent to the completion of network and fleet planning. This necessitates the strategic scheduling of flights to optimize aircraft utilization, reduce passenger travel times, and enhance connectivity. The timetable is designed considering crew assignments and maintenance needs.

The following are the processes used by airlines to construct their schedules:

- 6.15.1 Evaluate market size, seasonality, competition, and travel patterns when analyzing passenger demand for various routes and destinations.
- 6.15.2 Assess the aircraft now in the fleet: The quantity and types of aircraft required for implementation are established via demand studies. This includes every available aircraft, regardless of age.
- 6.15.3 Once the airline has determined the requisite number of aircraft, it should choose the specific planes for each route and journey, considering efficiency, range, and capacity.

6.15.4 Airline aircraft allocation facilitates the development of flight plans that more efficiently satisfy the demand for certain routes and destinations. Flight itineraries, connections, and layovers are finalized.

6.16 Schedule Optimization

After the airline formulates preliminary flight plans, it may implement modifications to enhance efficiency and optimize income. This necessitates the rescheduling of flights, perhaps including the addition or removal of flights and the reassignment of aircraft to alternative routes.

6.17 Efficient Crew Scheduling

Following the confirmation of flight schedules, airlines should designate crews for each individual trip, including pilots, flight attendants, and ground workers.

6.18 Effective Distribution of Schedules

Upon finalization, the airline may disseminate the schedules via its reservation system, website, and other distribution channels, enabling customers to book flights and arrange their trip plans.

6.19 Pro-Active Revenue Management

This is a strategy enabling airlines to enhance their revenue and profitability. Data analytics and pricing methodologies enhance ticket pricing, inventory control, and yield optimization. Effective revenue management requires ongoing oversight and adjustments in response to fluctuations in demand and competition.

Revenue management for airlines include the following components:

6.19.1 Demand forecasting: Revenue management commences with the evaluation of flight demand via the analysis of historical data, booking trends, seasonal variations, competitive influences, and events. This enables the airline to project ticket sales at various price levels.

6.19.2 Pricing strategy: In accordance with demand forecasts, the airline may adjust flight fares. This entails formulating tariff structures, determining price points for various ticket categories, and managing discounts and promotions. Inventory management: The airline should oversee its seat inventory to ensure enough availability at each pricing level. This involves overseeing reservations, adjusting price and availability, and managing inventory distribution across several channels.

6.19.3 Overbooking management: Airlines may overbook flights to compensate for no-shows and cancellations. This mechanism should be managed well to prevent overselling and customer dissatisfaction.

6.19.4 Ancillary Revenue: The sale of baggage fees, seat assignments, and in-flight meals generates additional revenue. Revenue management may enhance earnings from these supplementary offerings.

6.20 Airport Capacity

In the context of fleet expansion, airlines should conduct a comprehensive evaluation of the decision to acquire new or used aircraft in accordance with established business strategies. Despite numerous advancements in aircraft technology, it is crucial to acknowledge the substantial airport construction projects in Africa over the past decade, which either limit or enhance the capacity of aircraft operated by specific airlines.

6.21 Economic Fuel Tankering Policies

ICAO Document 10013, Section 7.5.2 stipulates that there exists a possibility for diminishing the extent of tankering. African Aircraft operators ought to consider the comprehensive implications of transporting additional fuel when deliberating on tankering strategies. The total expense encompasses the supplementary fuel necessary for transporting the tankered fuel. It is noted by this study that Aircraft operators ought to regularly assess fuel prices to ascertain whether tankering remains warranted by the existing fuel price differentials.

Tankering refers to the practice in which an aircraft transports an excess of fuel beyond what is necessary for a safe journey, with the intention of minimizing or eliminating the need for refuelling at the destination airport for future flights. The 2014 edition of the ICAO Doc. 10013, which addresses “Operational Opportunities to Reduce Fuel Burn and Emissions,” underscores the economic advantages associated with fuel consumption. Nevertheless, environmental ramifications are not fully emphasized. In view of the foregoing, It is important to recognize that fuel tankering carries considerable environmental implications due to the rise in aviation emissions and should be eschewed when conducted solely for financial motives. In the pursuit of mitigating climate change, it is imperative for governments and industry to formulate policies that do not inadvertently encourage tankering, as such practices would ultimately lead to an escalation in aviation emissions.

6.22 Original Equipment Manufacturers (OEMs)

The participation of Original Equipment Manufacturers (OEMs) in the conceptualization of business initiatives seems to be low across the continental airlines, as their engagement usually occurs at the later phases of the airline project. This presentation aims to enlighten airlines, challenging the notion that acquiring new orders from original equipment manufacturers (OEMs) is the sole avenue for their fleet expansion strategies. Fuel economy should be rigorously assessed, whereas emissions performance may provide a persuasive justification for the acquisition of contemporary aircraft. this discussion shall focus on technical aspects rather than exploring ownership costs, inflation, and debt expenditures. In pursuit of improved fuel efficiency, Original Equipment Manufacturers (OEMs) have recently made significant efforts to ensure that aircraft are outfitted with high-quality engines that operate within established parameters. The procurement from manufacturers inherently creates the opportunity for improved route efficiency, which would markedly reduce emissions and encourage airlines to lessen the burden of emission costs on consumers. This may result in either stable or possibly diminished emissions per passenger, owing to lower emission levels in comparison to previous aircraft models.

6.23 Conclusion

The establishment of the Single African Air Transport Market (SAATM) is crucial for promoting deregulated airline business operations that encourage healthy airline competition within Africa. This advancement is frequently viewed as advantageous for the expansion of African flight networks, ultimately benefiting air travel customers throughout the continent. Nonetheless, it is crucial to recognize that certain traditional African airlines, supported by their respective governments, persist in their hesitance to expand the freedoms of the air beyond Bi-lateral Air Service Agreements (BASAs) or to adjust to the competitive landscape introduced by a common air transport market. Consequently, airlines aiming to expand their networks may face constraints arising from the finite capacity of

airports. In light of the imperative for increased passenger capacity, the utilization of larger aircraft is consequently recommended.

African states should reconsider the fundamental aviation policy objective to include airline network strategy, recognizing the considerable, yet predominantly untapped, potential for the growth and expansion of airline fleet networks. As the saying goes, a significant portion of this progress hinges on African governments acknowledging the numerous benefits that a well-functioning aviation system can bring for expected economic development. The present condition, when carefully planned and executed, promotes the enduring viability of airlines. African governments should engage in collaboration with airlines to cultivate a favourable business environment, promoting the elimination of harmful tax policies and the reformation of protectionist regulatory frameworks that are at odds with the principles of the SAATM.

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