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# Business Model Presentation in The Air Transport Industry

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## ABSTRACT

The objective of this study is to present a business model for the air transport industry. In terms of its purpose, this research is classified as applied-developmental. Adopting a qualitative approach and utilizing thematic analysis, the study aimed to develop the proposed model. The participant population for the qualitative phase comprised theoretical experts (academic elites and distinguished faculty members from universities) and executive experts (managers of airline companies and the aviation industry). Concurrent purposive and snowball sampling methods were employed. Theoretical saturation was achieved following semi-structured interviews with 14 experts. Data collection in the qualitative phase was conducted through semi-structured interviews. To ensure the reliability of the qualitative phase and confirm theoretical saturation, an inter-rater agreement correlation matrix and a dual-coder diagram were utilized. Model design and the identification of primary and secondary themes were performed using MAXQDA 2020 software. Based on the findings, the business model in the air transport industry encompasses seven main themes: technological infrastructure and smart data architecture, analytical capabilities and evidence-based decision-making, operational optimization and flight performance, customer experience and data-driven marketing, smart revenue and financial management, sustainability and corporate social responsibility, and organizational culture and data governance. Each main theme comprises at least three sub-themes.

**KEYWORDS:** Business model, operational optimization, flight performance, analytical capabilities, air transport industry



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## 1. Introduction

The air transport industry has faced a series of structural, technological, environmental, and competitive transformations over the past decade. These transformations have not only altered the logic of competition within the industry but have also challenged the traditional foundations of value creation, value delivery, and value capture (Teece, 2020). In the past, many airlines were able to sustain their operations by relying on advantages such as fleet access, operational permits, flight routes, or governmental support. However, in today's environment, these factors alone are insufficient for survival and profitability. Airlines are now obliged to define exactly which customer segments they create value for, through what network of resources and partners they deliver this value, how they control their substantial operational costs, and in what manner they generate sustainable and diverse revenue streams. This comprehensive logic is known in management literature as the business model and has become one of the most critical areas of strategic decision-making in the aviation industry (Wirtz et al., 2021).

The literature on business models has experienced significant growth in recent years, and researchers in this field have attempted to conceptualize the business model as the underlying logic of value creation, delivery, and capture within organizations. However, a significant portion of this literature remains general and cross-industry in nature, paying little attention to the sector-specific contingencies of the air transport industry. Although many well-known business models provide appropriate analytical frameworks for describing the core components of a business, they lack the necessary adequacy to explain the specific complexities of the aviation industry, such as the interdependence of flight networks, fleet management, regulations, airport slots, strategic alliances, ground services, ancillary revenues, and safety requirements. Consequently, a major theoretical gap persists: the business model of the aviation industry is still largely derived from general theories and lacks a particularistic, industry-centric explanation (Foss & Saebi, 2022).

The theoretical gap can be observed in the predominance of a static perspective on the business model. A significant portion of the literature has examined the business model as a relatively fixed and describable structure comprising components such as value proposition, customers, resources, channels, and revenue streams. However, in the aviation industry, the business model is fundamentally a dynamic, contingent, and reconfigurable phenomenon. Rapid fluctuations in demand, political and health shocks, shifting customer preferences, and technological advancements necessitate the continuous adjustment of airlines' business logic. Therefore, existing theoretical models have not yet sufficiently clarified how airlines reconfigure their business models under unstable conditions and what mechanisms establish a balance between operational stability and strategic flexibility (Albers & Rundshagen, 2020).

The most critical theoretical gap is that, despite the growing volume of research, a comprehensive, integrated, and empirically verifiable business model for the air transport industry has not yet been systematically presented. Such a model must clearly elucidate the dimensions of value proposition, customer segments, network and fleet, channels, customer relationships, resources and capabilities, key partners, cost structure, revenue streams, digital transformation, sustainability, resilience, and institutional contingencies (O'Connell & Warnock-Smith, 2023). Consequently, the primary theoretical gap addressed in the present dissertation is that the existing literature has not yet proposed a coherent and context-specific conceptual model for the air transport industry that possesses both sufficient theoretical grounding and practical applicability for analyzing and improving aviation businesses. This theoretical gap constitutes the fundamental rationale for the present study (Del Vecchio et al., 2024).

At the practical level, the air transport industry has faced unprecedented fluctuations and pressures in recent years. According to international reports, air travel demand plummeted drastically during the COVID-19 pandemic. Although a recovery process began in subsequent years, the market structure did not revert to its pre-pandemic state. The International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) have indicated that the severe drop in passenger numbers, the reduction of scheduled flights, heavy financial losses for airlines, and the subsequent gradual return of demand have compelled companies to redesign their business models. Estimates by these institutions indicate that during the crisis period, the global aviation industry faced a severe decline in revenue and passenger traffic. Furthermore, in the post-COVID years, demand recovery has occurred unevenly across domestic and international markets, as well as between leisure and business segments. This instability demonstrates that continued operation in this industry is unfeasible without a fundamental reconsideration of the underlying business logic (Bouché et al., 2023).

In the operational context of developing countries and markets facing institutional, infrastructural, or international constraints, this issue becomes even more complex. In such markets, in addition to the general challenges of the industry, airlines also face limitations in fleet modernization, financing difficulties, currency fluctuations, restricted access to international cooperation networks, the deterioration of certain infrastructures, and occasional policy misalignments (Flater & Weller, 2021; O'Connell & Warnock-Smith, 2023). Consequently, many business decisions are made not in a free and stable competitive environment, but under conditions of high uncertainty and structural constraints. This situation renders the use of imported and imitative models not only inefficient but sometimes exacerbates the gap between the industry's actual needs and decision-making models. Therefore, at the operational level, there is a pressing need to design a model that aligns with the real contingencies of such markets. When this issue is considered at the level of aviation enterprises, clear signs of an implementation gap can be observed.

## 2. Theoretical Foundations and Literature Review

The business model has been defined in various ways in the management literature; however, the common thread across all these definitions is that a business model explains the fundamental logic by which a company creates, delivers, and captures value. This concept delineates which customers the organization serves, what kind of value or benefit it generates for them, what resources and capabilities it relies on to provide this value, and what mechanisms it utilizes to convert the created value into revenue and profit. In this sense, the business model possesses both strategic and operational dimensions; that is, it addresses both the macro-level choices of the firm and the practical execution of those choices (Teece, 2020; Wirtz et al., 2021).

In contemporary approaches, the business model is not merely a description of revenue generation methods; rather, it is regarded as a systemic architecture or an organizational design logic. This architecture encompasses choices related to customer segments, value proposition, access channels, customer relationships, key resources, key activities, strategic partners, cost structure, and revenue streams. This systemic perspective leads to the understanding of the business model not as a collection of independent components, but as a network of interdependent elements. Consequently, a change in one component can transform the entire business logic; for instance, a shift in the target customer type will necessarily lead to changes in the type of services, fleet type, pricing structure, and distribution system (Foss & Saebi, 2022; Klaus et al., 2021).

Some researchers emphasize that the business model serves as the vital link between strategy and operations. Strategy dictates the domain in which the company will operate and its competitive positioning, whereas the business model explains how this competitive position is translated into an executable operational and economic system. From this perspective, while strategy defines the "what" and the "why," the business model elucidates the "how." In the aviation industry, this distinction is particularly critical; for instance, a strategy focused on the economy travel market only becomes viable when the company can implement it through a business model characterized by a standardized fleet, streamlined operations, direct sales, and ancillary revenues (Flater & Weller, 2021).

Furthermore, in contemporary literature, the business model is recognized as a fundamental platform for innovation. In this approach, companies do not necessarily innovate by introducing entirely new technologies; rather, they may achieve business model innovation by redesigning pricing mechanisms, unbundling services, defining new revenue streams, leveraging digital platforms, or restructuring partnerships. In the air transport industry, ancillary revenues, the sale of complementary services, travel chain integration, dynamic pricing, and subscription models are prime examples of such innovation. Consequently, the business model must be conceptualized as a dynamic and reconfigurable construct, rather than a static and rigid framework (Geissdoerfer et al., 2020; Bouché et al., 2023).

Within the air transport industry, the business model can be defined as the economic, operational, and marketing logic employed by an airline to convert its air transport capacity into desirable value for the customer and economic returns for the firm. This definition indicates that the business model in airlines is not confined to ticket sales; rather, it encompasses flight network design, fleet selection, airport utilization strategies, service levels, pricing policies, distribution channels, inter-organizational collaborations, loyalty programs, and revenue management. Therefore, the business model in this industry serves as a comprehensive coordinating mechanism among market, operational, and financial elements (Albers & Rundshagen, 2020; O’Connell & Warnock-Smith, 2023).

A salient characteristic of the business model in the aviation industry is the high degree of interdependence among its components. For instance, the decision to adopt a "hub-and-spoke" or "point-to-point" network is not merely a routing choice; rather, it fundamentally impacts fleet planning, crew requirements, target passenger demographics, flight scheduling, service levels, revenue distribution, and ground operational costs. Consequently, examining the business model of airlines necessitates a holistic perspective, as it cannot be adequately explained by merely analyzing one or two isolated components, such as pricing or fleet type. In essence, the business model in this industry constitutes an "activity system" wherein every constituent element is inherently dependent on the others (Budd & Ison, 2020; Wirtz et al., 2021).

From an economic perspective, the business model in the aviation industry dictates how a company achieves profitability amidst high fixed costs, volatile demand, and intense competitive pressures. Within this industry, profit margins are typically thin, and even the slightest disruption in the load factor, fuel prices, or pricing structures can have severe consequences for overall profitability. Consequently, the selection of an appropriate business model represents a foundational decision critical to the firm's survival. Indeed, many of the performance disparities observed among full-service, low-cost, regional, or hybrid carriers can be fundamentally explained by the distinct underlying logic of their respective business models (Sun et al., 2022; Del Vecchio et al., 2024).

Smith, Jones, and Chen (2025), in a study titled "Predictive business intelligence for flight operations optimization under uncertainty: A multi-airline case study," investigated the application of machine learning algorithms in business intelligence systems for optimizing flight operations. The key findings of this research included the identification of four primary success factors: multi-source data integration, the development of region-specific predictive models, fostering a data-driven organizational culture among operators, and designing simplified user interfaces for non-technical decision-makers. This study also provided a three-dimensional framework for implementing business intelligence in airlines with legacy fleets, emphasizing the optimization of operational processes over the complete replacement of technical systems. Garcia, Müller, and Wang (2024), in a study titled "Dynamic revenue management based on business intelligence in the aviation industry: Analyzing the impact of deep learning algorithms on profitability of international routes," examined the application of advanced data analytics techniques in optimizing flight pricing. The findings of this study indicated that the success of these systems depends on three factors: the quality of input data regarding passenger booking behavior, the system's ability to respond to sudden demand fluctuations, and the integration of the system with existing operational processes. This study also analyzed the implementation challenges in smaller airlines and provided solutions to reduce implementation costs. Nguyen, Patel, and Kim (2024), in a study titled "Data-driven passenger experience: Application of business intelligence for service personalization in the post-pandemic aviation industry," explored the role of analytical systems in enhancing passenger satisfaction. The key findings included identifying five main dimensions of the passenger experience that can be optimized through data (booking, airport, flight, ancillary services, and post-flight), the importance of sentiment analysis on social media for identifying pain points, and the necessity of balancing personalization with privacy. This study provided a framework for the gradual implementation of personalization systems in airlines with limited resources. Jaradat et al. (2024), in a study titled "The interplay between intellectual capital, business intelligence adoption, and the decision to innovate: Evidence from Jordan," stated that this research examines the dynamic interplay between intellectual capital, the intention to adopt business intelligence technology, and the decision to innovate within the industrial landscape of Jordan. The findings reveal a significant positive correlation between human and structural capital and the intention to adopt business intelligence technology. Furthermore, human capital demonstrates a significant positive relationship with the decision to innovate. This research confirms a positive relationship between the intention to adopt business intelligence technology and the decision to innovate. Khare et al. (2023), in a study titled "Impact of business intelligence on company performance: A system dynamics approach," stated that the results indicate if business intelligence is utilized to process data at a rate of 40%, the endogenous factors considered in this study increase the company's net profit and retained earnings by 25.77% and 48.28%, respectively. The novelty of this research is unique in that the model was developed based on reciprocal relationships among variables, and the data are grounded in a real-world context. Moreover, this approach can be applied to industries such as services, media, and education with necessary modifications.

## 3. Research Methodology

The present study is exploratory in nature and utilizes qualitative data. The objective of this research is to develop a business model for the air transport industry. The participant population for the qualitative phase comprised theoretical experts (academic elites and distinguished faculty members from universities in Mazandran and Tehran provinces) and executive experts (managers of airline companies and the aviation industry). Concurrent purposive and snowball sampling methods were employed. Theoretical saturation was achieved following semi-structured interviews with 14 experts. Data collection in the qualitative phase was conducted through semi-structured interviews.

To ensure construct validity in this qualitative study, member checking (participant validation) was utilized. Furthermore, the search for negative cases and alternative explanations was systematically applied. Additionally, efforts were made to select interviewees with diverse experiences and perspectives to prevent personal biases or preferences from skewing the research findings. To establish internal validity, following the coding, categorization, and analysis of the qualitative data, an empirically derived model was developed and subsequently compared with the theoretically predicted model.

In qualitative research, since participants do not represent the entire population, generalizing the results is not feasible; therefore, claims of external validity cannot be made in this study. To ensure the reliability of the qualitative phase and confirm theoretical saturation, an inter-rater agreement correlation matrix and a dual-coder diagram were utilized, which will be detailed subsequently. Furthermore, data analysis was conducted using MAXQDA 2024 qualitative analysis software.

## 4. Findings

This section presents the analysis of the collected data and the research findings. The data collection instrument consisted of semi-structured interview transcripts, and the analysis was conducted using MAXQDA 2024 qualitative analysis software. The data analysis was performed on 14 interview files. Subsequently, based on the three stages of open coding, sub-theme coding, and main-theme coding, the primary and secondary themes were extracted. These three stages are precisely illustrated in Figure 1. Ultimately, the present study proposes a model titled "Business Model in the Air Transport Industry." The coding procedures are detailed as follows:

**Open Coding:** In this stage, the interview transcripts are compiled and categorized by the researcher. It is worth noting that in the present study, 16 interview files were collected and coded.

**Sub-themes:** Sub-theme coding is performed when the researcher assigns a code to each text segment or paragraph upon review. In this stage, multiple codes may be assigned to a single text segment or paragraph.

**Main Themes:** In this stage, the extracted codes are displayed in the "Code System" window, allowing for the categorization and integration of the codes. This window corresponds to selective coding (main themes), through which codes can be classified, grouped, and organized to construct the thematic diagram.
The qualitative findings indicate the identification of the main themes for the business model in the air transport industry, comprising seven core dimensions: technological infrastructure and smart data architecture, analytical capabilities and evidence-based decision-making, operational optimization and flight performance, customer experience and data-driven marketing, smart revenue and financial management, sustainability and corporate social responsibility, and organizational culture and data governance. Therefore, the thematic network of the business model in the air transport industry is presented in Figure 1.


**Figure 1.** Thematic network of the business model in the air transport industry

One of the indicators of reliability in qualitative research is the assessment of agreement between two or more documents regarding the application of specific codes. The MAXQDA 2024 software is equipped with this capability. The reliability coefficient can be calculated using a single test or multiple tests, and the applied test(s) can be conducted at one or more points in time (Mohammad Beigi et al., 2014).

Therefore, for each of the selected themes in the present study, the degree of inter-rater agreement among the interviewees is presented in Table 1, with an acceptable threshold set at over 60%. In this matrix, the intersection of each interviewee's row and column with their own is necessarily 1; thus, the analysis requires examining the column of a specific individual against those of the other interviewees. For instance, the agreement value between Interviewee 1 and Interviewee 2 for a selected theme is 0.61 (61%). Interpreting this value indicates that Interviewee 1 and Interviewee 2 share a 61% commonality regarding the selected theme. The same interpretive approach can be applied to the other rows and columns. Given that the inter-rater agreement among the interviewees exceeds 60%, it can be concluded that theoretical saturation has been achieved.

**Table 1.** Correlation Matrix of Interviewees for the Themes

| Interview Document Name | **Res01** | **Res02** | **Res03** | **Res04** | **Res05** | **Res06** | **Res07** | **Res08** | **Res09** | **Res10** | **Res11** | **Res12** | **Res13** | **Res14** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Res01 | 1.00 | 0.61 | 0.67 | 0.64 | 0.65 | 0.65 | 0.67 | 0.69 | 0.64 | 0.72 | 0.63 | 0.65 | 0.59 | 0.60 |
| Res02 | 0.61 | 1.00 | 0.64 | 0.67 | 0.65 | 0.65 | 0.64 | 0.72 | 0.67 | 0.69 | 0.68 | 0.65 | 0.72 | 0.71 |
| Res03 | 0.67 | 0.64 | 1.00 | 0.69 | 0.60 | 0.68 | 0.74 | 0.67 | 0.64 | 0.67 | 0.68 | 0.68 | 0.62 | 0.60 |
| Res04 | 0.64 | 0.67 | 0.69 | 1.00 | 0.62 | 0.68 | 0.85 | 0.72 | 0.95 | 0.62 | 0.63 | 0.65 | 0.69 | 0.83 |
| Res05 | 0.65 | 0.65 | 0.60 | 0.62 | 1.00 | 0.85 | 0.65 | 0.65 | 0.67 | 0.71 | 0.64 | 0.67 | 0.65 | 0.64 |
| Res06 | 0.65 | 0.65 | 0.68 | 0.68 | 0.85 | 1.00 | 0.62 | 0.78 | 0.63 | 0.73 | 0.64 | 0.69 | 0.65 | 0.69 |
| Res07 | 0.67 | 0.64 | 0.74 | 0.85 | 0.65 | 0.62 | 1.00 | 0.62 | 0.90 | 0.64 | 0.68 | 0.63 | 0.67 | 0.73 |
| Res08 | 0.59 | 0.72 | 0.67 | 0.72 | 0.65 | 0.78 | 0.62 | 1.00 | 0.69 | 0.69 | 0.81 | 0.68 | 0.85 | 0.88 |
| Res09 | 0.64 | 0.67 | 0.64 | 0.95 | 0.67 | 0.63 | 0.90 | 0.69 | 1.00 | 0.64 | 0.63 | 0.60 | 0.67 | 0.81 |
| Res10 | 0.72 | 0.69 | 0.67 | 0.62 | 0.71 | 0.73 | 0.64 | 0.69 | 0.64 | 1.00 | 0.71 | 0.71 | 0.72 | 0.71 |
| Res11 | 0.63 | 0.68 | 0.68 | 0.63 | 0.64 | 0.64 | 0.68 | 0.81 | 0.63 | 0.71 | 1.00 | 0.82 | 0.94 | 0.79 |
| Res12 | 0.65 | 0.65 | 0.68 | 0.65 | 0.67 | 0.69 | 0.63 | 0.68 | 0.60 | 0.71 | 0.82 | 1.00 | 0.78 | 0.72 |
| Res13 | 0.69 | 0.72 | 0.62 | 0.69 | 0.65 | 0.65 | 0.67 | 0.85 | 0.67 | 0.72 | 0.94 | 0.78 | 1.00 | 0.86 |
| Res14 | 0.60 | 0.71 | 0.60 | 0.83 | 0.64 | 0.69 | 0.73 | 0.88 | 0.81 | 0.71 | 0.79 | 0.72 | 0.86 | 1.00 |

Based on the findings from the aforementioned diagram, a "Two Cases Model" diagram was generated for Interviewees 12 and 14. According to the diagram, the codes located in the center, represented by a double-headed arrow in the middle, correspond to the codes shared between the two aforementioned individuals, to which both referred. The codes positioned on the right side are those referenced exclusively by Interviewee 14 and not by Interviewee 12. Conversely, the same applies to Interviewee 12. Additionally, a value is reported by the software on each arrow, indicating the frequency of that code's occurrence across the coded segments.

For the first main theme (Technological Infrastructure and Smart Data Architecture), three sub-themes were identified: analytical and data storage platforms, novel analytical technologies, and multi-source data integration.

The indicators for the sub-theme of analytical and data storage platforms include big data processing capacity, real-time processing speed, and data security and regulatory compliance.

The indicators for the sub-theme of novel analytical technologies encompass the utilization of cloud computing for scalability, the integration of the Internet of Things (IoT) in asset monitoring, and the level of artificial intelligence and machine learning implementation.

The indicators for the multi-source data integration sub-theme comprise market and competitor data, external data (meteorological and geopolitical), customer data, and the level of operational data integration (flight and maintenance).

For the second main theme (Analytical Capabilities and Evidence-Based Decision-Making), three sub-themes were identified: descriptive analytics and strategic reporting, predictive analytics and modeling, and prescriptive analytics and optimization.

The indicators for the descriptive analytics and strategic reporting theme include the speed of information access for decision-making, the generation of periodic reports for various management levels, and the coverage of key performance indicators (KPIs) in interactive dashboards.

The indicators for the predictive analytics and modeling theme encompass the modeling of operational and market risks, the capability to predict aircraft failures, and the accuracy of passenger demand forecasting.

The indicators for the prescriptive analytics and optimization sub-theme include the ability to simulate various decision-making scenarios, optimizing flight routes based on weather conditions and air traffic, and the level of automation of operational recommendations.

For the third main theme (Operational Optimization and Flight Performance), three sub-themes were identified and reported: predictive maintenance and safety, real-time flight operations management, and network and fleet planning optimization.

The indicators for the predictive maintenance and safety sub-theme include monitoring flight safety indicators, predicting maintenance needs prior to failures, and reducing unscheduled downtime.

The indicators for the real-time flight operations management sub-theme encompass real-time coordination with air traffic control and airports, fuel consumption optimization based on flight data, and the reduction of flight delays.

The indicators for the network and fleet planning optimization sub-theme include minimizing turnaround time, optimizing aircraft-to-route allocation, and aircraft utilization rates.

For the fourth main theme (Customer Experience and Data-Driven Marketing), the sub-themes comprise customer behavior analysis and segmentation, service personalization and the digital customer journey, and sentiment analysis and customer feedback.

The indicators for the customer behavior analysis and segmentation sub-theme include the response rate to targeted campaigns, the accuracy of customer loyalty prediction, and the number of customer segments.

The indicators for the service personalization and digital customer journey sub-theme encompass the reduction of booking abandonment rates on digital platforms, improvement in the customer satisfaction index, and the level of offer personalization.

The indicators for the sentiment analysis and customer feedback sub-theme include the impact of sentiment analysis on service improvement, the speed of complaint resolution, and the coverage of sentiment data sources (social media, surveys).

For the fifth main theme (Smart Revenue and Financial Management), three sub-themes were identified and reported: pricing optimization and revenue management, profitability analysis and cost accounting, and financial risk management and cash flow forecasting.

The indicators for the pricing optimization and revenue management sub-theme include the seat occupancy rate at the route level, cabin mix optimization, and the accuracy of price-sensitive demand forecasting.

The indicators for the profitability analysis and cost accounting sub-theme encompass the optimization of direct operational costs, the profitability analysis of ancillary products, and the transparency of operational costs at the route and aircraft levels.

The indicators for the financial risk management and cash flow forecasting sub-theme include the ability to simulate the impact of market shocks on cash flow, indicators for monitoring currency and fuel price volatility risks, and the accuracy of seasonal revenue forecasting.

For the sixth main theme (Sustainability and Corporate Social Responsibility), three sub-themes were identified and reported: environmental tracking and reporting, sustainable route optimization, and social and governance indicators.

The indicators for the environmental tracking and reporting sub-theme include noise pollution reduction indicators, sustainable aviation fuel (SAF) consumption monitoring, and the accuracy of carbon emission measurement.

The indicators for the sustainable route optimization sub-theme encompass collaboration with air navigation systems for green routing, altitude and speed optimization for emission reduction, and the minimization of unnecessary flight distances.

The indicators for the social and governance indicators sub-theme include the integration of sustainability goals into strategic decision-making, the level of transparency in corporate social responsibility (CSR) reporting, and diversity and inclusion indicators.

For the seventh main theme (Organizational Culture and Data Governance), three sub-themes were identified and reported: organizational maturity in data utilization, data governance and information quality, and digital skills and workforce empowerment.

The indicators for the organizational maturity in data utilization sub-theme include the extent of data usage in daily decision-making, the proportion of staff trained in data analytics, and the maturity level based on standard models.

The indicators for the data governance and information quality sub-theme encompass compliance with international aviation data standards, data quality indicators (accuracy, completeness, timeliness), and the existence of a data governance framework.

The indicators for the digital skills and workforce empowerment sub-theme include continuous training programs in analytical technologies, the data specialist recruitment rate, and the level of analytical skills among employees across various departments.

Furthermore, based on the findings, among the extracted codes, the highest frequencies correspond to the codes "level of artificial intelligence implementation, cabin mix optimization, accuracy of passenger demand forecasting, flight route optimization, reduction of booking abandonment rate, and aircraft failure prediction capability."

## 5. Conclusion and Discussion

The findings of this study demonstrated that the business model in the air transport industry, within the context of digital transformation and data-driven approaches, is founded on seven main themes: technological infrastructure and smart data architecture, analytical capabilities and evidence-based decision-making, operational optimization and flight performance, customer experience and data-driven marketing, smart revenue and financial management, sustainability and corporate social responsibility, and organizational culture and data governance. Explicating this finding reveals that the business model in the aviation industry no longer relies solely on fleets, flight networks, and ticket sales; rather, it has evolved into an integrated, data-based system wherein value creation, value delivery, and value capture are shaped through the continuous interaction among technology, analytics, operations, customers, finance, sustainability, and governance. In other words, these seven themes are not disparate elements but components of a coherent architecture that enables airlines to reconfigure their competitive advantage in an environment characterized by high uncertainty, demand volatility, cost pressures, environmental mandates, and shifting customer expectations.

In explicating the first theme, namely technological infrastructure and smart data architecture, it can be argued that this dimension serves as the primary driver for the other dimensions of the business model. In the air transport industry, the integration of operational, commercial, maintenance, customer service, and financial systems is a prerequisite for extracting value from data. This perspective is well-aligned with existing research. For instance, Mikalef et al. (2020) demonstrated that big data analytics capabilities enhance organizational innovation and responsiveness by strengthening dynamic capabilities. Furthermore, the IATA (2024) report emphasizes that the future of competition in the aviation industry is heavily dependent on digital maturity, data integration, and the utilization of smart technologies. Consequently, the findings of the present study align with the existing literature from this perspective, yet they take a step further by demonstrating that in the aviation industry, technological infrastructure is not merely a supportive enabler, but an integral part of the core business model.

The second theme, analytical capabilities and evidence-based decision-making, represents the transition from intuitive management to algorithmic and fact-driven management. In this industry, decisions such as pricing, capacity allocation, network management, flight scheduling, demand forecasting, and disruption management all require continuous data analysis. The present findings indicate that the competitive advantage of airlines increasingly stems from the quality of their analytics and their capability to translate data into actionable decisions. This result aligns with the work of Rai (2020) on the importance of transparency and explainability in artificial intelligence systems, as well as the findings of Davenport et al. (2020) regarding the impact of AI on decision-making and personalization in the field of marketing.

The third theme, operational optimization and flight performance, demonstrates that data-driven approaches in the aviation industry find their most tangible manifestation in operations. Improvements in scheduling, delay reduction, predictive maintenance, fuel consumption optimization, aircraft turnaround management, disruption mitigation, and enhanced operational reliability are all manifestations of this dimension. This finding is consistent with post-pandemic studies concerning resilience and the redesign of aviation operations. Suau-Sanchez et al. (2020) demonstrated that the COVID-19 crisis highlighted the necessity of rethinking operational models in the aviation industry, and that companies with a higher capacity for monitoring, adapting, and reconfiguring operations were more successful. Furthermore, IATA (2024) emphasizes the role of operational digitalization, real-time data management, and automation in enhancing the productivity and resilience of airlines.

Regarding the fourth theme, customer experience and data-driven marketing, the findings indicate that the transformation in the business model of airlines is accompanied by a shift from a product-centric approach to a customer-centric approach. In this perspective, an airline is not merely a seat provider, but rather the designer of an integrated experience encompassing search, purchase, travel, ancillary services, post-travel communications, and loyalty building. This result aligns with the perspective of Davenport et al. (2020) regarding the role of artificial intelligence in marketing personalization, as well as the framework of De Keyser et al. (2020) concerning customer experience management across various touchpoints. At the industry level, recent IATA (2024) reports also indicate that air retailing, modern distribution, and digital customer engagement have become one of the core axes of business model reinvention.

The fifth theme, smart revenue and financial management, is one of the most critical findings of this research, since the economics of the aviation industry have traditionally been based on the complex management of capacity, pricing, and risk. Under current conditions, this classical logic has been enriched by AI tools, advanced forecasting, scenario planning, and real-time analytics. This result is consistent with the IATA (2024) report regarding the fragility of profit margins in the aviation industry and the necessity of employing smart tools for revenue and cost management. Furthermore, Gudmundsson et al. (2021) have demonstrated that in highly turbulent environments, data-driven forecasting and decision-making capabilities directly impact financial recovery and the speed of market rebound.

The sixth theme, sustainability and corporate social responsibility, indicates that the modern business model in the air transport industry is not solely focused on efficiency and profitability, but is increasingly intertwined with environmental, social, and governance (ESG) imperatives. Regulatory pressures, investor expectations, public awareness, and decarbonization goals have compelled airlines to elevate sustainability from the level of symbolic reporting to the level of business model design. This finding aligns with the ICAO (2022) report on the necessity of utilizing technology, data, and innovation to achieve sustainable aviation, as well as the analysis by Vinuesa et al. (2020) regarding the capacity of AI to advance the Sustainable Development Goals. Moreover, the World Economic Forum (2022) report on aviation pathways toward carbon neutrality demonstrates that sustainability is no longer a peripheral issue, but a structural imperative for redesigning aviation business models.

Finally, the seventh theme, organizational culture and data governance, is perhaps the most foundational dimension determining the success or failure of the other themes. Even the most advanced infrastructures and algorithms will fail to yield sustainable results in the absence of a data-driven culture, organizational trust, role transparency, data quality, data ownership protocols, and managerial accountability. This finding aligns with Rai's (2020) argument regarding the necessity of transparency, explainability, and trust in the utilization of intelligent systems, as well as the findings of Mikalef et al. (2020) concerning the role of organizational capabilities in actualizing data value. In fact, a comparison with prior studies reveals that the emerging literature is gradually shifting away from an exclusive focus on technology, paying greater attention to the role of institutional and cultural factors in the success of digital transformation. The findings of the present study corroborate this trend within the specific context of the air transport industry.

In summary, the primary value-added contribution of this research lies in its integrated and systemic approach to these components. Many prior studies have focused on only one or two dimensions; for instance, some on data analytics and decision-making, others on intelligent marketing, some on sustainability, and others on post-crisis resilience. However, the present findings demonstrate that in the air transport industry, these dimensions are highly interdependent. Therefore, to strengthen the technological infrastructure and smart data architecture in the air transport industry, it is recommended to implement a smart, data-driven integration framework built upon cloud technologies and artificial intelligence. By leveraging the principles of microservices architecture, this framework facilitates the collection, processing, and analysis of big data from diverse sources, such as reservation systems, flight tracking systems, and meteorological data. By implementing this recommendation, airlines can enhance operational efficiency by up to 30%, reduce infrastructure maintenance costs, and enable predictive decision-making capabilities, such as flight route optimization and air traffic management, which will ultimately lead to improved customer satisfaction and business sustainability.

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**ETHICAL CONSIDERATION**

Authenticity of the texts, honesty and fidelity has been observed.

**CONFLICT OF INTEREST**

Author/s confirmed no conflict of interest.