

Review Article

# Evaluating Business Modelling and Sustainability in the Aviation Industry: A Comprehensive Review

Silas Nzuva  
Nairobi, Kenya

Received Date: 09 September 2020

Revised Date: 17 October 2020

Accepted Date: 24 October 2020

**Abstract** - Business models are not new business management concepts, as they have been studied extensively in aviation companies. This study aimed at describing how business models create an impact in terms of sustainability in the aviation industry. A systematic literature review of 16 articles from 5 credible databases was carried out to explain various sustainability strategy concepts and models. Inclusion and exclusion criteria were used to determine the articles that fit the topic of sustainability. The study utilized a systematic review and documentary analysis to explain how the data was gathered from different authors. The research findings revealed that airline companies usually combine different aspects of business models with meeting the needs of their customers and comply with environmental guidelines for sustainability. The study also revealed that airlines should review their operations by using alternative fuels and inventing new aircraft designs to enhance efficiency and comply with GRI guidelines. The study concluded that firms in the aviation industry should boost their efforts to attain sustainability by adopting business models that match customers' values and consider environmental issues to enhance the well-being of the community it serves. While the aviation industry is perceived as unstable to overcome pressure in the long-run, the industry strives to intensify innovation and adopt the new ULCC model to minimize operating costs.

**Keywords** - Organizational sustainability, business modeling, organizational performance

## I. INTRODUCTION

As the number of people worldwide continues to rise, accompanied by increasing resource use and rising environmental concerns, various sectors in the economy have laid down measures for a sustainable future. Aviation is one of the fundamental sectors, which is heeding the call for a sustainable future. The industry contributes largely to connecting the world by facilitating people's movement and high-value goods across continents. Since the invention of air transport more than half a century ago, aviation has played an increasingly vital role in social and economic development. It has contributed to creating new trade patterns and promoting the development of multicultural societies' multi-national political alliances.

Sustainability can be attained when stakeholders in the aviation industry can predict customers' social needs and develop a business model to achieve those needs. A sustainable business is defined by having a specific model capable of creating value for all stakeholders, including shareholders, supply chains, employees, civil society, and the planet [35]. Technology, innovation, and knowledge have been instrumental in the evolution of the world economy and international business, thus, enabling people to solve real-world problems [3]. Additionally, eco-efficiency and corporate social responsibility (CSR) practices are also incorporated into the industrial sustainability agenda. Still, all these aspects are not sufficient to create a holistic change necessary to attain long-term social and environmental sustainability.

Like any other business, the aviation industry applies a number of business models, determining how the industry would generate revenue through its operations. Consequently, the industry has contributed immensely to the expansion of economies through job creation, aircraft manufacturing, airport operation services, and global trade.

However, the aviation industry has been blamed for contributing to environmental destruction by releasing carbon dioxide emissions. As the demand for air transport continues to grow, so is the increase in carbon dioxide in the atmosphere. Aircraft noise has also been a critical constraint in the strife to enhance aviation capacity. Efforts have been made to solve noise in aircraft, where aircraft manufacturers are designing aircraft that do not produce much noise, thus, avoiding a negative impact on the surrounding communities.

The aviation industry has strived to meet the goals set through sustainability strategy, where it has developed aircraft, engine design, and technology that helps enhance fuel efficiency. Besides, the aviation industry has been working on reducing carbon dioxide emissions by improving the engine. Airline companies such as KLM are working on reducing fossil fuel consumption through investing in modernized aircraft, where the new fleet is capable of reducing carbon dioxide emissions by about 20% [16].



Stakeholders in aviation have also supported the commercialization of sustainable and alternative fuels, which would help airline firms save on costs. Airline manufacturers have also opted to build light aircraft by replacing metal parts with composites, reducing fuel burn [17]. Even when most aircraft manufacturers turn to electricity-powered flight, short-distance commercial airplanes will continue using jet fuel for a prolonged time due to its sustainability, scalability, and compatibility with existing fuels.

The aviation industry has been in the spotlight due to its failure to satisfy radical and sustainable change. Despite the efforts made by airline companies, advancement in technology in the coming years may not successfully minimize environmental impacts. Achieving reductions in greenhouse gas emissions while expanding the aviation industry has been a global challenge, which prevents the industry from attaining sustainability [17]. Consequently, a holistic approach is necessary to overcome the challenges of attaining a sustainable future, where efforts would be channeled towards environmental changes, which align with economic and social change [5]. The establishment of sound regulatory measures to address the novel issues linked to emerging aviation technologies is necessary to help the aviation industry attain sustainability. The technology is backed by necessary economic support, which encourages the commercialization of airline companies.

Top executives in airline companies are usually dealing with a complex and unparalleled problem that touches on the social, environmental, market, and technological aspects of the business. These aspects necessitate sophisticated, sustainability-based management [35].

Business models are vital in meeting the sustainability strategy for the aviation industry. As the aviation industry works on consolidating itself, adopting the most appropriate business model is necessary. According to Bocken et al., a business model helps understand how a company carries out its operations and can be utilized for analysis, comparison, performance assessment, and communication [5]. The aviation industry utilizes a business model to define its competitive strategy by focusing on how it charges for its products and services; the costs involved in producing its services; and how the firms' products are differentiated from the competing firms through value proposition.

This study is based on the notion that there is a growing concern of the lack of sustainability strategy in the aviation industry, even when some firms in this industry have made a profit through their operations. The aviation industry is unsustainable to operate in the long-term because of the foreseen growth and finite natural resources. This is because the airline companies' sustained investments have generated progressively diminishing returns, and no hope that the emission objectives would be attained at the current pace [26]. The spatial scale and the impact of

aviation on stakeholders include climate change, noise, air pollution, and other socio-economic effects.

Reporting on fuel efficiency and carbon emission levels is challenging for most airline companies, as different companies utilize different data units. Both jet fuel and gasoline produce about 70% carbon dioxide from engine combustion, and this emission is expected to go up as more airline companies expand their operations worldwide [17]. When airline companies fail to develop good relationships with their customers and society, they experience increased conflict, making it hard to operate within the scheduled budget.

Thus, the aviation industry should strive to attain its success by making use of sustainability strategy. The International Civil Aviation Organization (ICAO) has facilitated in attaining sustainability by limiting the effects of aviation emissions on air quality, minimizing the number of people significantly affected by aircraft noise, and limiting greenhouse gas emissions from aviation on the global climate [17]. Consequently, airline firms are becoming aware of the need to enhance their corporate sustainability reporting through utilizing their scarce resources effectively, complying with the regulations, and expanding the customer base through meeting their needs. This study focuses on explaining how business models affect the aviation industry in terms of sustainability and operations.

## II. METHODS

This research entails a systematic review of past relevant studies on business models in the aviation industry. Further, the documentary analysis approach was used, a qualitative research method that uses a systematic procedure to analyze documentary evidence and answer specific research questions [6]. The aviation industry adopted this form of research because it helps determine its operations' sustainability by evaluating different business models and attitudes towards sustainability from different individuals. Analyzing documents in this method involves coding content into themes, in the same way as how focus group interviews are analyzed. The use of documentary analysis will help in making appropriate conclusions concerning sustainability issues in the aviation industry. This approach allowed the researcher to research without necessarily interacting with participants or traveling long distances to meet participants.

The documentary analysis research method's strengths allow for an extensive study since documents can be accessed with ease and offer reliable data. According to Williamson and Whittaker, document analysis saves time that could be wasted when negotiating with participants and arrangement of interviews, thus, making it economical to gather data [36]. This qualitative research method is cost-efficient because it involves obtaining and analyzing documents that already have the required information. Additionally, data collected through documentary qualitative research helps in minimizing bias and build credibility [6].

### **A. Research Databases And Keywords**

The research databases used for the study include Google scholar, EconBiz, ProQuest, Social Science Research Network (SSRN), and Directory of Open Access Journals (DOAJ).

The keywords and subsequent combinations used in each of the above databases included Aviation Industry, Airline, Social Sustainability, Environmental Destruction, Global Reporting Initiative (GRI), Business Models, Greenhouse gas emissions, Biofuel

### **B. Inclusion and Exclusion Criteria**

Before undertaking a research study on the aviation industry and sustainability, the researcher developed a protocol to determine what should be included in the study and what was unnecessary. The purpose of inclusion and exclusion criteria is to have control over extraneous variables and ensure that a representative sample has been included in the study.

During documentary analysis, applying sampling concepts necessitates rules that guide what should be incorporated in the sample [36]. In this category, the researcher ensured that the selected articles covered the topic under research and that the study population was consistent uniform and objective. After selecting articles, the researcher checked for thorough, well-reasoned theories and arguments since scholarly and peer-reviewed articles offer logical arguments and theories.

Exclusion criteria cover traits that make the population targeted for study become ineligible [9]. In this section, the researcher checked aspects that made the study population appear ineligible for the study. The researcher checked the date of publishing to eliminate articles that exceeded ten years. Besides, articles that did not incorporate at least one of the keywords were also excluded from the study.

The researcher opted to select a total of 57 articles from the databases. After a thorough evaluation of inclusion, the researcher eliminated 7 articles, which did not meet the inclusion criteria. 14 duplicates were also eliminated, as well as 8 studies that were deemed irrelevant. A further check for reliability and validity led to the elimination of 6 articles. Thus, the remaining 16 articles (n=16) were found eligible for the study and were consequently used.

### **C. Validity and Reliability**

The quality and appropriateness of articles assessed are vital with regard to the validity and reliability of findings. Academic journals are perceived to be the most reliable sources of information required for research. However, such articles must be peer-reviewed to enhance their reliability. To ensure that the articles used in the study were reliable, I incorporated the words 'peer-reviewed articles' and 'scholarly journals' while searching the databases. The consistency of results in different

articles can help determine the selected articles' reliability based on the research topic [19].

The validity of the selected articles' results can be confirmed by evaluating arguments in different articles, as some arguments may lead to a false conclusion. The choice of the methodology is essential for detecting the validity of the articles [19]. However, assessing validity using a sample size of articles is not possible, as the sample size depends on the kind of analysis that the researcher wants. Positivists measure validity based on whether the research study attained its expectations without having logical errors when concluding.

Reliability and validity were attained by ensuring that the research incorporated only empirical articles and research studies that utilized a large sample. Based on the inclusion and exclusion criteria, researchers can judge their effects on the study results' validity. While a valid measurement can be termed as generally reliable, reliable measurement cannot be assumed to be valid. A robust research design is necessary to enhance the reliability and validity of the research.

### **D. Research Limitations**

Undertaking document analysis has a number of limitations, which prevented the researcher from attaining reliable data. Some of the limitations include a low level of retrieval. This can happen when some documents require a fee to access them; thus, the researcher is blocked from accessing them [6]. This analysis is subject to increased errors, primarily when a relational analysis is utilized to achieve a higher level. The availability of data in plenty makes it hard to eliminate the unnecessary one [36]. Some documents may lack adequate information, leading to more searching or relying on additional articles than necessary.

Biased selectivity can occur when the researcher opts to utilize documents from one particular organization or author. Besides, documents available are likely to be limited in both scope and quality or miss essential aspects that the researcher is interested in [36]. Additionally, researchers find it hard to evaluate user opinions because they do not always have access to different articles' authors. Some articles may contain sensitive information, and the authors are not always available to clarify such information.

## **III. DATA ANALYSIS AND DISCUSSION**

The researcher opted to select a total of 57 articles from the databases. After a thorough evaluation of inclusion, the researcher eliminated 7 articles, which did not meet the inclusion criteria. 14 duplicates were also eliminated, as well as 8 studies that were deemed irrelevant. A further check for reliability and validity led to the elimination of 6 articles. Thus, the remaining 16 articles (n=16) were found eligible for the study and were consequently used.

**Table 1. The elimination process**

<b>Total number of studies from search results</b>	<b>n = 57</b>
Duplicate articles	14
Not available in full text	6
Did not meet inclusion criteria	7
Questionable reliability and validity of the study	6
Lacked relevance	8
Studies used for the research	n=16

Environmental problems have resulted in more demanding aviation policies, which aim at creating limits for future emissions within the aviation industry [15].

The growing concerns over the aviation industry's destructive behaviors that include environmental degradation, depletion of resources, global warming, and climate change, have triggered the need to adopt more socially responsible business activities, aiming to enhance society's overall well-being [18]. Although most aviation companies have managed to publish sustainable reports, some airline companies are yet to embrace sustainable reporting; thus, the regulatory agencies should focus on developing regulations based on how firms can meet societal needs. The use of biofuels is typically approved by regulatory organizations, which control such fuels [15].

Emissions from airplanes are highly considered due to the altitude at which they are released. According to Jagtap (2019), the aviation industry contributes about 2% of carbon dioxide (CO<sub>2</sub>) to the atmosphere, and CO<sub>2</sub> is known to cause global warming through GHG emissions. Other gases emitted from the aircraft's engine include nitrogen oxide, which constitutes the ozone layer. However, the International Civil Aviation Organization (ICAO) has set measures to control GHG emissions from airline companies worldwide [1].

Apart from GHG emissions, the aviation industry is responsible for noise pollution, which comes from engine testing, take-off, landing, and surface transport. Thus, noise pollution is considered a severe environmental problem that limits the aviation industry [1]. The aviation industry's limitations should strive to solve include unstable fuel prices, poor management, low profitability, overcapacities, and risks of terrorist attacks [29]. With ineffective business models, most airline companies experience low revenues, which prevents the industry from expanding. Adopting a low-cost carrier model can help airline companies overcome competition pressure and minimize cost structures.

The success of the aviation industry is tied to innovations and effective organizational management. Fernandes's findings were that the mediating effect existing between environmental uncertainties and business

performance and innovations and competitive conditions encourage organizations to become more innovative in running a business and succeeding in the competitive market in the long-run [8]. However, Pereira and Caetano advise airline companies to choose the most appropriate business model to encourage the development of innovative products and technologies. Additionally, Schneider, Spieth, and Clauss have developed an idea of business model innovation, where the holistic business model becomes a vital unit of analyzing innovation [29]. Airline companies may be compelled to switch to different business models due to external changes in Maintenance, Repair, and Overhaul (MRO).

The aviation industry can enhance its sustainability in the long-run if it capitalizes on improving the environment by using alternative fuels. According to Jagtap, bio-jet fuels can help minimize life-cycle GHG emissions, which in turn improves local air quality [15]. The use of biofuels can assist in attaining International Air Transport Association (IATA) targets, which aims to improve fuel efficiency and carbon-neutral growth. The use of biofuels will help save on costs, which would also be passed to customers through lower ticket charges.

The findings by Nair, Palacios, and Ruiz [22] and Pereira and Caetano [24] indicate that technological changes necessitate airline companies to review their business models by evaluating other models to come up with the model with the highest potential to attain sustainability. The most preferred business models, based on the findings by Bachwich and Wittman, are ULCC and LCC, where merging the traits of both is even better than having ULCC or LCC separately [4]. ULCC's growth is likely to make policymakers review their decisions to enable airline companies to maintain their competitive advantages since ULCC has lower unit costs compared to the network carriers.

Although the aviation industry has severe environmental impacts, it has contributed immensely to developing human life's social and economic aspects. Agaçsapan and Çabuk indicated that the aviation industry had influenced urban, regional, and national growth by connecting people and increasing access to resources [1]. Additionally, airline companies have led to creating jobs, facilitation of tourism and trade, and an increase in tax revenue for the host countries. Thus, airline companies should strive to establish business models that would assist in overcoming barriers to innovations and attain the target of innovation through the development of better products and services, which in turn lead to better performance [8]. Sustainability is attained when the aviation industry manages to meet consumers' social, economic, and ecological needs for a prolonged time.

The various studies reflected in the journal articles explore and describe the significant and holistic features of innovation in the aviation sector that influence airlines' business models. The innovations enhance profitability through value creation and maintaining a competitive

advantage. Faced with a new era of business model innovation in the aviation industry, airlines must continuously and appropriately respond to regulatory, technological, and market changes to revamp their business models to create a competitive advantage [24]. The business model of an airline comprises various factors—however, a majority of innovations in airlines' activity set. Despite past research's failure concerning the specific areas or activities that require innovative touch, the Boolean algorithm sets the stage for innovative focus [14]. A combination of several activities makes up a business model that positively contributes to operational profitability. They may include; online ticketing, fares, and lack of Longue access, among other activities the airline may choose. New activities must always be identified with the ever-changing, progressive, and dynamic aviation industry, which builds business model innovation for enhanced profitability [14].

Drawing from airlines' central business models, it is considered the industry is shifting from traditional models of low-cost and full-service towards hybrid business models. For instance, considering Brazilian companies, it is found that the occurrence of innovations that impact business models adopted by airline companies is linear [27]. This implies that innovation is mainly focused on processes and services rather than the airline's map's topography. Airlines seek business model innovations that are linear to their competitors, which create a perception of major organizational innovations, thus creating a competitive advantage [27]. However, the same results are neither evident nor apparent for large external innovations for business models adopted in a comparative panorama for such companies. Some similar characteristic exists among Low-Cost Carriers (LCCs). Nevertheless, the studies provided no clear-cut business model suitable for all LCCs. Although most LCCs strategies include elements like-charged service offerings, the use of secondary airports, short-haul point-to-point routes, low distribution costs, high labor utilization, the models exhibit considerable divergence in their offering and operation methods [30].

Africa is considered to have a unique air transport landscape, which warrants the creation of either new business models or a renewed emphasis by airline management on the parts of business models geared towards financial sustainability and credibly [13]. Even though Africa's main markets of air transport are heterogeneous, there are continent-wide common challenges that should be considered when tailoring airline business models. Low demand over long distances indicates that Full-Service Network Carriers (FSNC) have a higher likelihood of remaining Africa's most sustainable business models, considering service operation through centralized network and utility of scale [13]. However, this financial success and sustainability must be viewed through the lens of government support they receive either financially or through strict policy regulation.

In a more localized sense, regional carriers are likely to remain central to the continent's air transport development, exploiting strong yields and enhancing connectivity through partnerships with larger FSNCs, particularly in smaller emerging markets [20]. A wide range of additional benefits is set to be enjoyed by the increased partnership between these carriers. The merits include; sharing of expertise, technical and operational support, and additional revenues. The carriers' collaboration shall further improve connectivity, which is fundamental to the success and sustainability of African airline business models. The bottom line is that Africa should not wholly develop a new business model for African airlines but instead focus mainly on enhancing connectivity and pushing up average load factors, which have comparatively slowed down the African markets [20]. Existing full-service carriers with well-established international hubs, together with well-developed feeder networks either through regional partners or subsidiaries, proved to be the most sustainable in terms of year-on-year profit levels.

However, there has been a considerable breakthrough in and significant contributions to the airlines' operation and innovations of their business models to deliver customers' desired value. The identification of applicable indicators enhances a better understanding of the significance of innovation in influencing business models. The emergence of LCCs considerably and greatly impacted the air service industry [37]. The deregulation of the air service industry and air liberalization played an instrumental role in LCCs' emergence and growth. Some LCCs copied the business model of Southwest, and others adopted combined business strategies. LCCs' driving force and their sustainability are attributed to urbanization and the subsequent rise of the middle class [37]. LCCs are credited for their high adaptability to market changes and their success in the air service industry. Full-Service Airlines (FSAs) were the most affected by the emergence of LCCs. As a result, FSAs have to lower their high-cost operational base to lower prices to compete with LCCs.

As explained earlier, the air service industry innovates towards new suitable business models, and thus the emergence of a hybrid model. The new model combines the cost-saving features of LCCs with the service, flexibility, and route structure of the full-service carrier. The LCCs' exploration of new markets by flying to main airports is parallel to new FSA policies of removing some packages from their services such as; baggage allowance and meals. A majority of traditional full-service airlines have created new products, restructured and streamlined their processes, and reduced costs. The future of the aviation industry and its growth depend on developing innovative market solutions to gain market share. The value proposition for business models demands new agendas for future research that can address the perception of value generated in consumers' views, which previous studies have failed to address.

#### IV. CONCLUSION

The aviation industry should strive to attain sustainability by adopting business models that correspond with the values of customers and being sensitive to environmental issues for the well-being of the community it serves. The world has benefited from the expansion of the aviation industry, as it has contributed toward connecting the world through traveling and increased access to resources. The airline companies have facilitated the movement of people and cultures and expanded the world's market of goods. International trade has changed immensely since the invention of air transport, while politics has changed due to people's movement through immigration. The world has become better through aviation, as people can meet, share ideas, and contribute to creating more opportunities for making a living through the connection of cities and regions.

Sustainability has become essential in the aviation industry across the globe, owing to the need to satisfy the current generation without risking future generations' needs. According to Rudari and Johnson, sustainability has become a standard business practice across the world, where all sectors, including the aviation industry, have embraced sustainability reporting to enhance their performance in terms of social, economic, environmental, and organizational governance [28].

The success of many airline companies is tied to the capacity of minimizing costs. Popular aviation firms can minimize legitimacy costs by undertaking sustainability reporting. Sustainability reporting is part of the Global Reporting Initiative (GRI), where firms that operate internationally must adhere to the standards that enhance sustainability. These include good governance, respect to human rights, environmental conservation, and global climate [18]. GRI creates global standards that enable airline companies to serve their markets without risking the lives of their communities. GRI facilitates the inclusiveness of stakeholders, timeliness of information, as well as reliability of reporting.

However, sustainability in the aviation industry may not happen without having effective business models to direct operations. Most of the business models correspond with the airline's business design. The similarity among different airline companies is recognized through the framework of their business models. The framework incorporates ideas of how an airline company presents itself in the aviation industry, the structural design for value creation, and the resources and capacities of an airline firm to maintain its competitive advantage in the industry. The four business models include the full-service carriers (FSCs), or the network carriers, which operate within a broad geographic area; the low-cost carriers (LCCs), which offer short-range services, where they attract cost-sensitive customers; charter carriers, which follow strategic guidelines for another company and are usually hired by tourist companies; and regional carriers,

which serve a particular niche market and is usually related to a bigger alliance through signing an agreement.

The technological changes experienced in the aviation industry has necessitated some airline companies to adopt business models that merge features of both FSCs and LCCs. The expansion of the aviation industry has both positive and negative effects, as more companies entering the industry do not consider the impacts of increased air traffic. One of the growing concerns in the aviation industry is how airline firms have contributed to GHG emissions, which have become a risk to humans and other living organisms. Emissions that come from aircraft cause global warming; thus, they should be handled with extra vigor. Airlines have also affected the environment through noise pollution, where noise tends to increase during take-off and landing and engine testing.

The aviation industry is also perceived as unstable to withstand pressure in the long-run due to unpredictable growth and low natural resource levels. Researchers are also not sure whether sustained investment from aviation would generate high returns or encourage emissions policies. The industry is also linked to climate change, air and noise pollution, and other social effects. Additionally, the aviation industry is guided by the International Civil Aviation Organization (ICAO) on emission issues and how to improve air quality.

They strive to avoid environmental destruction and have seen airline companies shift to bio-jet fuels, which have been approved by agencies that manage environmental issues. The use of biofuels can help reduce life-cycle GHG emissions, which in turn improves local air quality by emitting lesser particulate matter. Additionally, biofuel has led to the creation of more industries to produce sustainable jet fuel and meet demand across the world. The need to maintain commercial air transport necessitate airline companies to shift towards more efficient fuels. Besides, adopting an appropriate business model is vital for the aviation industry's success, as it helps in the development of strategies aimed at saving costs through turning to alternative fuels and designing new aircraft models to reduce fuel intake. Ineffective models lead to low revenues and poor management, which restrict airline firms from attaining sustainability. The new ultra-low-cost carrier (ULCC) models, which have become popular in most airline companies, has contributed to maintaining competitive advantage through lowering unit costs.

The aviation industry should focus on intensifying innovation and research on sustainable jet fuel across the globe. The industry should bring together private, professional entrepreneurs, researchers, and public entities to assist in developing sustainable business models that incorporate both the social and economic needs of the community. Designing new lighter aircraft can help reduce noise pollution and keep the environment safe for the coming generations. Developing radically new aircraft through the new technology will also help minimize costs

incurred through fuel and contribute toward efficient air transport. Additionally, airline companies should support the commercialization of alternative aviation fuels, which saves on costs and improves air quality. Inventing new technology helps in avoiding environmental uncertainties, which interfere with business performance.

Although the future may be bright for airline companies, environmental issues are likely to restrain their capacity to sustain their operations. The lack of clear policy goals for developing sustainable alternative fuels could reduce investor confidence, affecting the possibility of a better future. International agencies should insist on the use of standards in the aviation industry to safeguard human nature and expand the connectivity of people across the globe. The world has become too dependent on the aviation industry; thus, policymakers would be compelled to work with governments to ensure that there are sound regulations to address issues that emerge from technological changes in aviation and provide adequate economic support to commercialized airline firms.

## REFERENCES

- [1] Agaçsapan, B. & Çabuk, A. (2019). "Sustainable aviation: GIS for the airport. GSI Journals Serie B": *Advancements in Business and Economics*, 1 (2): 26-34.
- [2] Albers, S., Baum, H., Auerbach, S., & Delfmann, W. (2017). *Aviation industry*. New York, NY: Routledge.
- [3] Andersson, U., Dasí, Á., Mudambi, R., & Pedersen, T. (2016). "Technology, innovation, and knowledge: The importance of ideas and international connectivity". *Journal of World Business*, 51(1), 153-162.
- [4] Bachwich, A. R., & Wittman, M. D. (2017). "The emergence and effects of the ultra-low-cost carrier (ULCC) business model in the U.S. airline industry". *Journal of Air Transport Management*, 62, 155-164.
- [5] Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2014). "A literature and practice review to develop sustainable business model archetypes". *Journal of Cleaner Production*, 65, 42-56.
- [6] Bowen, G. A. (2009). "Document analysis is a qualitative research method". *Qualitative Research Journal*, 9(2), 27-40.
- [7] Daft, J., & Albers, S. (2012). *A Conceptual Framework for Measuring Airline Business Model Convergence*. Working Paper 110 of the Department of Business Policy and Logistics, University of Cologne, Cologne.
- [8] Fernandes, A. A. R. (2017). "The mediating effect of strategic orientation and innovations on the effect of environmental uncertainties on business performance in the Indonesian aviation industry". *International Journal of Law and Management*, 59(6), 1269-1278.
- [9] Garg, R. (2016). *Methodology for research I*. *Indian Journal of Anaesthesia*, 60(9), 640-645.
- [10] Hari, T. K., Yaakob, Z., & Binitha, N. N. (2015). "Aviation biofuel from renewable resources: Routes, opportunities, and challenges". *Renewable and Sustainable Energy Reviews*, 42, 1234-1244.
- [11] Hart, S. L. (1995). "A natural-resource-based view of the firm. *Academy of management review*", 20(4), 986-1014.
- [12] Hart, S. L., & Sharma, S. (2004). "Engaging fringe stakeholders for competitive imagination". *Academy of Management Perspectives*, 18(1), 7-18.
- [13] Heinz, S., & O'Connell, J. F. (2013). "Air transport in Africa: toward sustainable business models for African airlines". *Journal of Transport Geography*, 31, 72-83. doi: 10.1016/j.jtrangeo.2013.05.004
- [14] Hvass, K. (2012). "A Boolean Approach to Airline Business Model Innovation." *Copenhagen Business School Journal*, 1,2-10. doi: 10.1504/jkml.2010.082732
- [15] Jagtap, S. S. (2019). "Assessment of feedstocks for blended alcohol-to-jet fuel manufacturing from the standalone and distributed scheme for sustainable aviation". In *AIAA Propulsion and Energy 2019 Forum* (p. 3887).
- [16] Japhe, B. (2018, Aug. 23). "What can airlines do to reduce carbon emissions?" *Forbes*. Retrieved from <https://www.forbes.com/sites/bradjaphe/2018/08/23/what-can-airlines-do-to-reduce-carbon-emissions/#7798e4766d5c>
- [17] Johnson, M. E., & Gonzalez, A. (2018). "Estimating Cost Savings for Aviation Fuel and CO2 Emission Reductions Strategies". *The Collegiate Aviation Review International*, 31(2), 79-102.
- [18] Karaman, AS, Kilic, M & Uyar, 2018, 'Sustainability reporting in the aviation industry: worldwide evidence,' *Sustainability Accounting, Management, and Policy Journal*, vol. 9, no. 4, pp. 362-391.
- [19] Leung, L. (2015). "Validity, reliability, and generalizability in qualitative research". *Journal of Family Medicine and Primary Care*, 4(3), 324-327.
- [20] Lohmann, G., & Koo, T. T. (2013). "The airline business model spectrum". *Journal of Air Transport Management*, 31, 7-9.
- [21] Mrazova, M. (2014). "The sustainable development-the key for green aviation". *INCAS Bulletin*, 6(1), 109.
- [22] Nair, S. K., Palacios, M., & Ruiz, F. (2011). "The analysis of airline business models in the development of possible future business options". *World Journal of Management*, 3(1), 48-59.
- [23] Payán-Sánchez, B., Pérez-Valls, M., & Plaza-Úbeda, J. A. (2019). "The Contribution of Global Alliances to Airlines' Environmental Performance. *Sustainability*", 11(17), 4606.
- [24] Pereira, B. A., & Caetano, M. (2015). "A conceptual business model framework applied to air transport". *Journal of Air Transport Management*, 44, 70-76.
- [25] Petrini, M., & Pozzebon, M. (2010). "Integrating sustainability into business practices: learning from Brazilian firms". *BAR-Brazilian Administration Review*, 7(4), 362-378.
- [26] Ranasinghe, K., Guan, K., Gardi, A., & Sabatini, R. (2019). "Review of advanced low-emission technologies for sustainable aviation". *Energy*, 188, 115945.
- [27] Rouby, I. (2018). "A New Business Model: Low-Cost Carriers". *Global Business Research Journal*, 4(1), 608-628. doi: 10.1019/j.tgnrs.2018.01.001
- [28] Rudari, L., & Johnson, M. E. (2015). "Sustainability Reporting Practices of Group III U.S. Air "
- [29] Schneider, S., Spieth, P., & Clauss, T. (2013). "Business model innovation in the aviation industry". *International Journal of Product Development* 12, 18(3-4), 286-310.
- [30] Sengur, Y., & Sengur, F. K. (2017). "Airlines define their business models: a content analysis". *World Review of Intermodal Transportation Research*, 6(2), 141-154.
- [31] Sharma, S., & Vredenburg, H. (1998). "Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities". *Strategic management journal*, 19(8), 729-753.
- [32] Teece, D. J. (2010). "Business models, business strategy, and innovation". *Long-range planning*, 43(2-3), 172-194.
- [33] Tsalis, T. A., Malamateniou, K. E., Koulouriotis, D., & Nikolaou, I. E. (2020). "New challenges for corporate sustainability reporting: United Nations' 2030 Agenda for sustainable development and the sustainable development goals". *Corporate Social Responsibility and Environmental Management*.
- [34] Vahora, S., & Mishra, C. B. (2017). "Benchmarking: Green Aviation Transport System". *Kalpa Publications in Civil Engineering*, 1, 259-264.
- [35] Whelan, T., & Fink, C. (2016, Oct. 21). "The comprehensive business case for sustainability. *Harvard Business Review*". Retrieved from <https://hbr.org/2016/10/the-comprehensive-business-case-for-sustainability>
- [36] Williamson, G. R., & Whittaker, A. (2017). "Succeeding in literature reviews and research project plans for nursing students". London: Learning Matters.
- [37] Pereira, B. A., & Caetano, M. (2017). "Business model innovation in airlines". *International Journal of Innovation: IJI Journal*, 5(2), 184-198.
- [38] Mfon S. Jeremiah, Raphael S. Etim, "Corporate Social Responsibility, Environmental Sustainability, and Theory of Reasoned Action: An Overview" *SSRG International Journal of Economics and Management Studies* 6.5 (2019): 102-112.

**Table 2. Deconstruction of the 16 identified studies**

<b>Authors and year</b>	<b>Title</b>	<b>Aim of the study</b>	<b>Research variables</b>	<b>Research sample</b>	<b>Findings</b>	<b>Conclusion</b>
Karaman, A. S., Kilic, M., & Uyar, A. (2018).	Sustainability Reporting in the Aviation Industry: Worldwide Evidence	This study investigates the Global Reporting Initiative (GRI) effects on the aviation industry's performance.	Firm size, growth, TOBINQ, leverage, profitability, and ownership. GRI	A sample of 284 companies was used, where only 105 had a GRI report.	There is a positive, as well as statistically significant relationship between reporting of GRI and firm size.	Large and highly leverage aviation companies can minimize legitimacy costs through undertaking sustainability reporting.
Payán-Sánchez, B., Pérez-Valls, M., & Plaza-Úbeda, J. A. (2019).	The Contribution of Global Alliances to Airlines' Environmental Performance	This study aims to illustrate that global alliances are linked to improvements in airline companies' operational performances.	Alliance, member_below5, member_5-10, and member_above1, Efficiency Class (E.C.)	A sample of 252 airlines	Belonging to a given alliance, as well as the environmental performance, are negatively related.	There is a need for more proactive environmental responses within the alliances to enhance performance.
Jagtap, S. S. (2019).	Assessment of Feedstocks for Blended Alcohol-to-jet Fuel Manufacturing from Standalone and Distributed Scheme for Sustainable Aviation	A predicted increase in global air travel necessitates the use of alternative jet fuels to mitigate both human and environmental health impacts in the future	Feedstocks Manufacturing schemes	18 combinations of feedstock, as well as a manufacturing scheme, were evaluated for performance.	An improvement of 1.18% in GHG emissions was noted when using 30% synthetic paraffinic kerosene (SPK) fuels compared to conventional jet (C.J.) fuels.	A comprehensive approach can assist decision-makers in technology development and encourage airlines to utilize alternative fuels.
Fernandes, A. A. R. (2017).	The Mediating Effect of Strategic Orientation and Innovations on The Effect of Environmental Uncertainties on the Performance of Business in the Indonesian Aviation Industry.	The study aims at examining how environmental uncertainties affect business performance in the aviation industry.	Environmental uncertainties Business performance	250 airline branches were used.	Activities that promote innovations in airline branches contribute to business performance.	Organizations should act more intensively in accelerating innovations to enhance the survival of their business.
Bachwich, A. R., & Wittman, M. D. (2017).	The emergence and effects of the ultra-low-cost carrier (ULCC) business model in the U.S. airline industry.	This study aims at explaining how the emergence of Ultra-Low-Cost Carriers (ULCCs) have transformed the U.S. airline business model due to their cost	Airline business models, Costs Air transport markets	A total of 16,127 observations were made.	Although both ULCCs and LCCs have caused a decline in average market fares, they have little statistical difference.	The growth of ULCCs is likely to affect operations in the aviation industry, as airline companies using other business models focus on reviewing how they can compete with the new changes.



		efficiencies				
Daft, J., & Albers, S. (2013).	A Conceptual Framework for Measuring Airline Business Model Convergence	This study focuses on developing a measurement framework for converging airline business models.	Airline business models Performance, profitability	The study incorporated 1,600 entries, which involved 5 German airlines.	Despite the exemplary convergence analysis on 11 items, a fundamental indication of a converging trend within the German airline industry was possible.	This study helps airline managers analyze airline performance and make recommendations on how to overcome the challenges of having similar business models.
Pereira, B. A., & Caetano, M. (2015).	A conceptual business model framework applied to air transport.	This study aims at developing a conceptual business model for airlines.	Business models Revenue generation, passengers' value.	A conceptual framework was developed using 38 key components identified through business models, but only 37 components were used.	The business model created from the framework demonstrated how key stakeholders contribute to the configuration of the airline.	The effectiveness of airline business models is determined by numerous factors, including internal restructuring and external deregulation.
Schneider, S., Spieth, P., & Clauss, T. (2013).	Business model innovation in the aviation industry.	This study focuses on explaining how supply and demand-driven effects necessitate the aviation industry to develop business model innovation	MRO business models Airlines' products and services	The study covered 12 MRO service providers.	The establishment of MRO business models is driven by market characteristics and structural characteristics in the aviation industry.	This study helped in understanding how business model innovation among MRO providers serves the demand-driven aviation industry.
Ağaçsapan, B., & Çabuk, A. (2019).	Sustainable aviation: GIS for the airport.	This study focuses on the contribution of GIS in attaining sustainability in the aviation industry.	GIS Decision making, airline management	No sample was developed in this study.	The use of GIS has helped in reducing bird strikes, thus, minimizing aircraft accidents.	The use of GIS in aviation has helped in planning, designing, and maintenance of operations.
Nair, S. K., Palacios, M., & Ruiz, F. (2011).	The analysis of airline business models in the development of possible future business options	This study aims at comparing different airline business models to choose the one with the highest potential.	Technological changes, business models Aircraft productivity, profitability, revenue achievement, cost drivers, and labor productivity.	The study compares 4 main business models	An increase in uncertainties leads to a high ratio of uncertainty in terms of knowledge.	Comparing different airline business models is essential in case of developing a merger between companies.
Pereira, B.	Business Model	Through indicators, the	Business models	Three Brazilian	Business models and	Airlines seek the innovation

A., & Caetano, M. (2017).	Innovation in Airlines	innovation characteristics of the business models adopted by airlines to the pursuit of value creation, competitive advantage, and profitability contribute to the verification.	and innovation indicators.	Airlines.	innovations pursued are linear to the competitors in the market.	of their business models linearly as their rivals. The perception of their internal change leaders in business models is considered major organizational innovations.
Rouby, I. (2018).	A New Business Model: Low-Cost Carriers.	To examine Low-Cost Carriers (LCCs) ' business model, which is considered the key driver to cost reductions giving them the opportunity for lower-priced offerings.	Air Passenger Traffic Worldwide and Total Passenger Traffic EasyJet.	Easyjet Airline Company.	LCCs have majorly impacted the aviation service industry. Elements such as air liberalization and deregulation of the aviation sector contributed significantly to the growth of LCCs.	LCCs have primarily succeeded due to their exceptional ability to adapt to market changes.
Hvass, K. (2012).	A Boolean Approach to Airline Business Model Innovation	To analyze the business models of low-cost carriers and identify which among them or a combination of them leads to operational profitability.	Business models of North America Low-Cost Carriers.	North America Low-Cost Carriers	The results indicate a constant transformation of the traditional LCC model to adapt to market dynamism and appeal to broader customer segments.	The airline industry is in a new dynamic era. Changes in regulatory, technological, and market forces require continuous innovation of business models by airlines to create a competitive advantage.
Sengur, Y., & Sengur, F. K. (2017).	Airlines Define Their Business Models: a Content Analysis	To determine how airlines define their business models based on business model components. It also aims to explore how airlines describe their business models.	Various airline business models.	50 biggest airlines worldwide.	Airlines defined their business models based on market demands and dynamics.	The emergence of new business models and changes in the existing ones is the driving force of the airline industry's transformation. The aviation industry innovates and vamps new business models to create a competitive advantage.
Heinz, S., & O'Connell, J. F. (2013).	Air Transport in Africa: Toward Sustainable Business Models for African Airlines	Aims to determine and define the African aviation environment's uniqueness to warrant its	Business models of airlines on the African continent.	8 airlines sampled for analysis based on Product and Organizational	Traditional models were followed in Africa, but with mixed and variant results. Full-service	Dense networks and connectivity are necessary for profitability in the African context.

		host of strategies to form new business models.		structure.	network carriers and regional carriers were stable.	
Lohmann, G., & Koo, T. T. (2013).	The Airline Business Model Spectrum.	To establish the airline business model spectrum in recognition of the idea that airlines are often better considered along a continuum of business models rather than categorized into discrete groups.	Different types of business models.	9 major US carriers.	The airline business model spectrum enables a comparative positioning of different airlines.	The LCC-FSNC spectrum can be a tool to understand better hybrid airlines – the nature of their business and how they can cooperate and compete with LCCs, FSNCs, or partner with airports.