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THE UNIQUENESS OF BOEING AND AIRBUS AIRCRAFT

Abstract. *This article analyzes the uniqueness of Boeing and Airbus aircraft, their structural structure, technological innovations, and manufacturing processes. It is analyzed how these companies differ from each other due to their different approaches to aerodynamics, automated processes, quality of passenger service and production efficiency. The main points that distinguish Boeing and Airbus from each other are analyzed, and the article provides detailed information about their contributions to the aviation industry.*

Keywords: *Boeing, Airbus, aircraft construction, technological innovation, production processes, market strategies.*

Introduction. Currently, it is possible to show Boeing and Airbus to large corporations that make modern airships in the aviation industry. Each company has its own constructive layout on airships, technological innovations, production processes, and has its own characteristics through market strategies. Both corporations are compared in the product portfolio, mainly large commercial aircraft and defense equipment, but differ in some ways. Boeing has a significantly larger Defense Department focused on research and development and production of military equipment and equipment. In contrast, Airbus profits are much more dependent on its passenger aircraft operations, with Boeing's relatively lower revenue stream as it is even smaller than the total number of companies, in addition, Airbus has relied extensively on subsidies and other government financial benefits throughout its history.

The main part. Boeing has historically focused on a pilot-oriented design philosophy. This approach emphasizes the role of pilots, allowing for more manual control and input at different flight stages. Boeing aircraft such as the Boeing 737 and revolutionary 787 Dreamliner are known for their powerful manual flight capabilities, providing pilots with direct control over the aircraft.

Airbus, on the other hand, supports a philosophy centered around automation and advanced wiring technology. Airbus aircraft, like the A320 and A350, are equipped with sophisticated computer systems that control many aspects of flight. This design minimizes pilot workload and increases security through automated systems that perform real-time adjustments [1].

Table - 1 shows the product types of the production industry of both corporates.

Table - 1

Product type	Boeing	Airbus
Passenger Aircraft	Yes	Yes
Cargo Aircraft	Yes	Yes
Corporate aircraft	No	Yes
Civil helicopters	No	Yes
Military helicopters	Yes	Yes
Corporate helicopters	No	Yes
Military aircraft	Yes	Yes
Satellites	Yes	Yes
Space Launchers	Yes	Yes
Weapon	Yes	No
Unmanned aerial vehicles	Yes	Yes
Reconnaissance aircraft	Yes	Yes

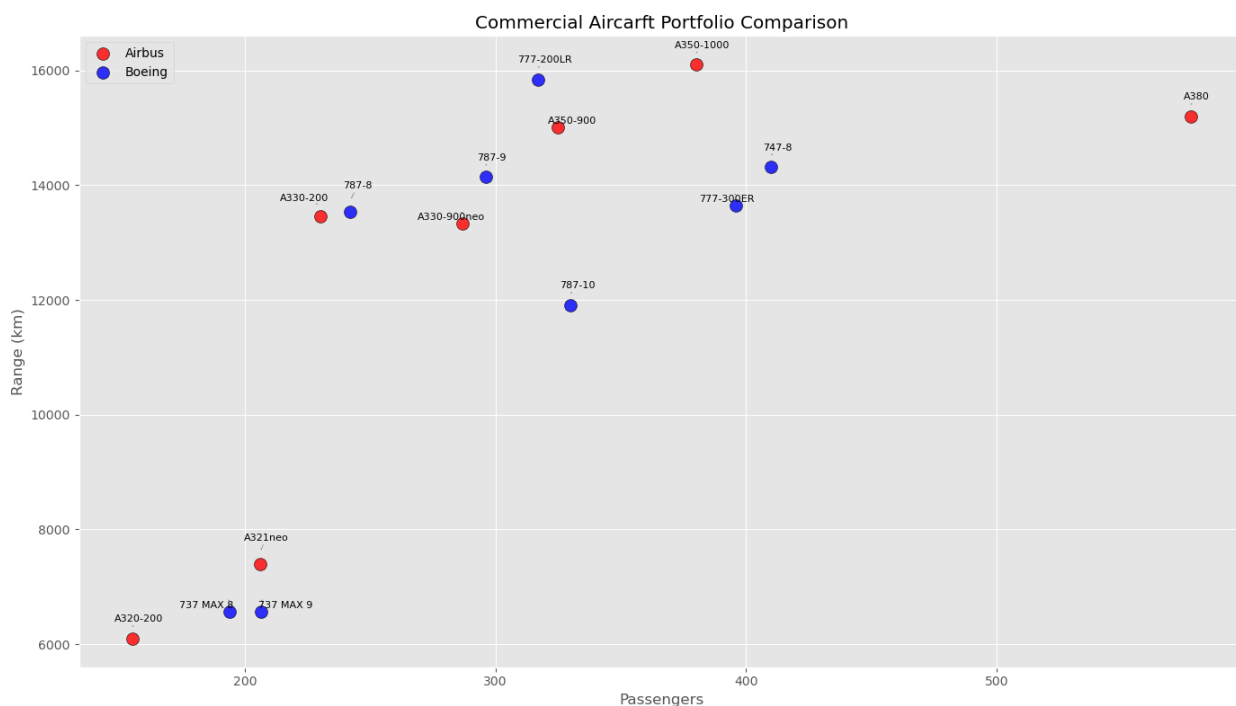


Figure 1. Graph of the height of flight of Boeing and Airbus aircraft and the dependence on the number of passengers

Through the graph above, we can obtain information about the flight Heights and passenger capacity of aircraft belonging to each privateer. The main factors that airlines take into account when deciding which aircraft to use on a particular route are mainly focused on the intensity-dependent route. Note in the graph two separate groups that clearly distinguish narrow-body aircraft from wide-body aircraft. Naturally, there is a

linear relationship between aircraft range and passenger capacity-more passenger-carrying aircraft have a longer range. For example, a particular airline prefers to operate multiple flights per day on a short but high-demand route using a short, narrow-distance body plane as opposed to a single flight on a high-powered aircraft. It is a financially precise choice of perspective, minimizing investment in large, expensive aircraft that remain most empty for part of the day and additionally offers travelers the flexibility to travel in the preferred time frame. In fact, an aircraft is an income-generating asset, and the aircraft increases its profits by making the maximum profit the time the aircraft is flying [2, 5].

Technological innovations are at the forefront of the integration of modern materials and technologies into Boeing's aircraft. The Boeing 787 Dreamliner is a prime example involving the extensive use of composite materials that reduce weight and increase fuel efficiency. Boeing also pioneered the use of braced wingtips and advanced aerodynamics to improve performance.

Airbus has made significant progress in introducing innovative technologies such as the "cockpit commonality" concept, which allows pilots to switch between different Airbus models with minimal retraining. Airbus also became a leader in the development of sustainable aviation technologies, focusing on reducing emissions and noise pollution through advanced engine designs and aerodynamic improvements [1].

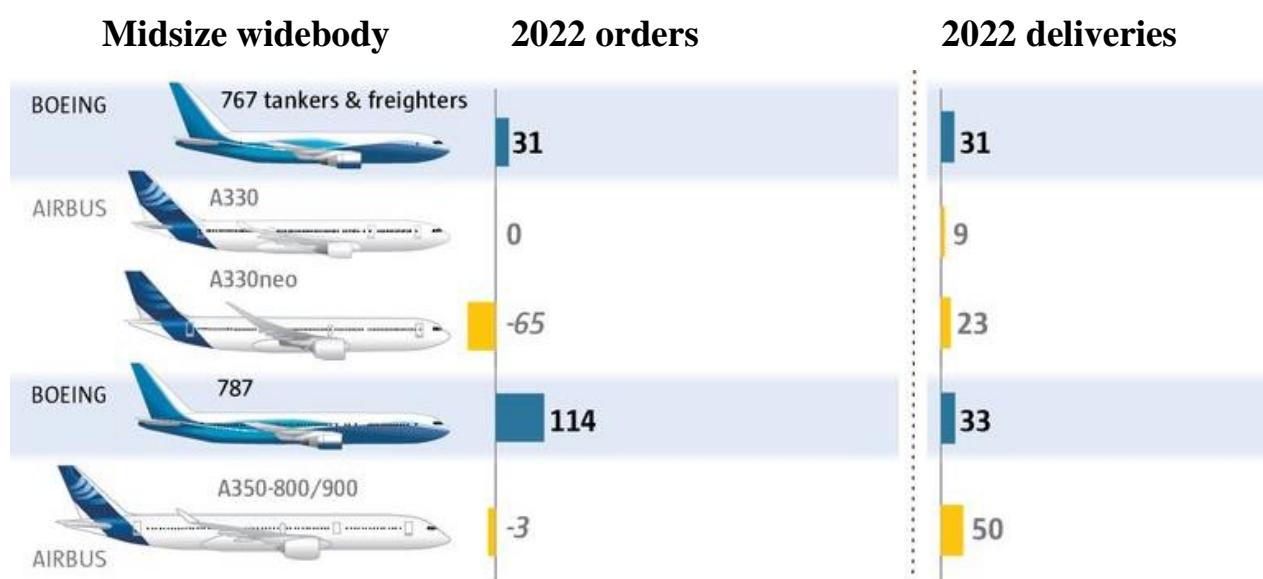


Figure 2. Mid-size and wide fuselage airships of Boeing and Airbus bodies



Figure 3. Large-scale and wide-fuselage airships of Boeing and Airbus bodies.



Figure 4. Jumbo / super jumbo aircraft

Production of the aircraft is seen to lag behind the plan in production due to delays in spare parts and lack of labor in suppliers. Processing on many of the aircraft collected in Boeing's inventory for over three years is slow and laborious. Still in December 2022, it brought the total delivery of Boeing aircraft to 480, with an average of 40 aircraft per month. Boeing Commercial Aircraft CEO Stan contract company, 737 continued to deliver 787 production stabilization, 777-8 cargo launch and, most importantly, 8 Worked hard to meet our customer obligations. Against Boeing's number 479, Airbus delivered 661 jets in 2022. However, 700 deliveries for this year were far below Airbus ' target. CEO Guillaume Faury cited delays in receiving parts due to the ongoing impact of the covid-19 pandemic, the war in Ukraine, energy supply problems, inflation and limited labor markets. "The supply chain remains fragile," Fauri said. And yet, Faury repeated his ambitious Airbus goal to expand its A320 single-lane production to 65 jets per month next year and 75 jets per month "mid-ten". Obviously, Airbus aims to continue the outproduce of Boeing, which is struggling to get higher MAX production than 31 jets per month. Airbus was the first to overtake Boeing in aircraft production in 2003 and then took this 1st place for nine years. At the

peak of 787 deliveries in 2012, Boeing regained 1st place and held it for seven years until 2019 when the second 737 MAX crashed in Ethiopia. Airbus has been on top since [5].

Manufacturing processes Boeing uses a global manufacturing network with significant parts of aircraft parts manufactured by suppliers around the world. The final assembly was held at Boeing's major U.S. plants, primarily in Everett and Renton, Washington. This decentralized approach allows Boeing to use global expertise and simplify production costs.

Airbus operates a more centralized production model in Europe, particularly with large assembly lines in Toulouse, France and Hamburg, Germany. Airbus also has assembly facilities in China and the United States that reflect its strategy to meet global demand. The Airbus manufacturing process is characterized by a highly integrated supply chain and the use of modular assembly techniques that increase efficiency and flexibility.

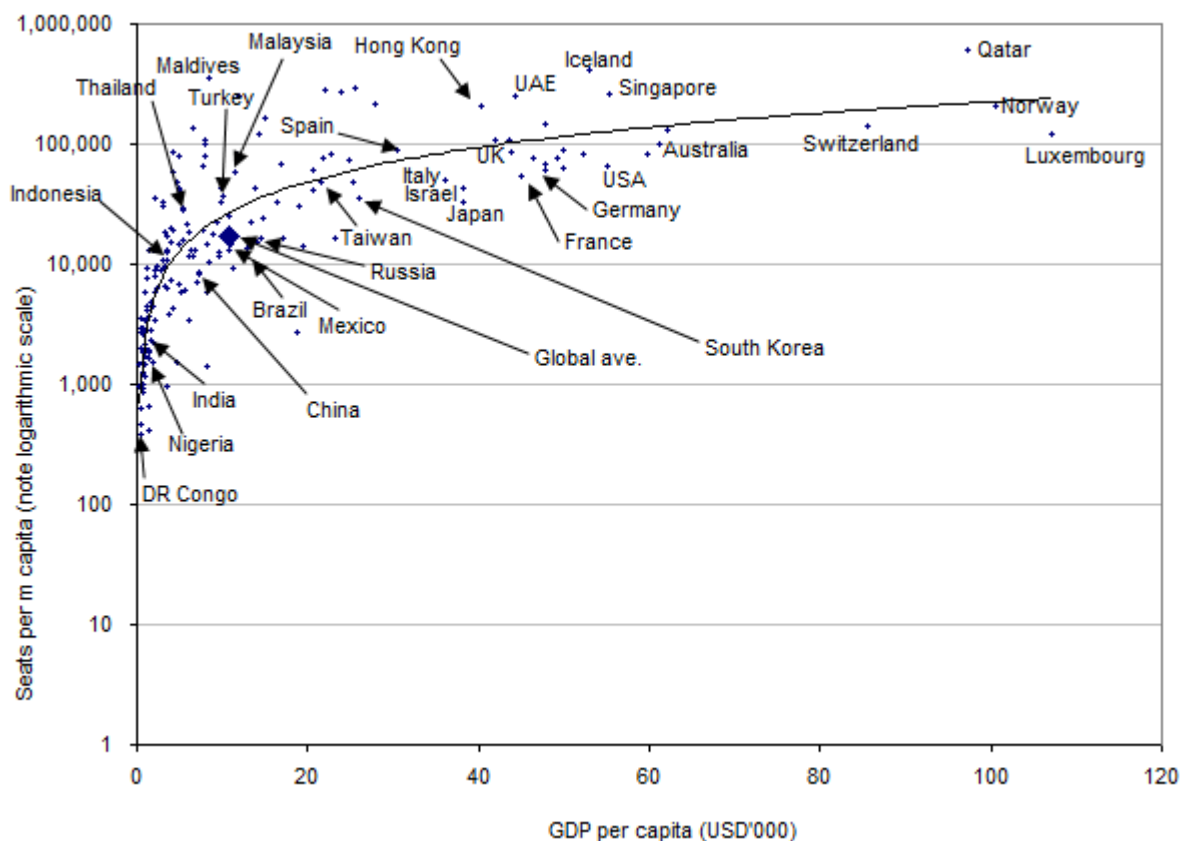


Figure 5. Airline options relative to GDP

This chart adjusted GDP per capita of several countries to the capabilities of its airlines-this Global market forecast includes an estimated growth forecast for travel from 2019 to 2038, divided by geographic regions). However, it can be noted that insider sources require air traffic to return to pre-pandemic levels by 2024 (Bouver et

al., 2021), the dynamics that drive this growth is expected to be a very long-term expectation.

Market Strategies Boeing traditionally addresses the American market and has a strong position in the Asia-Pacific region. Its market strategy is to produce aircraft sizes and types to meet the needs of different airlines. The strength of the Boeing market is strengthened by its strong ties with major U.S. airlines and a solid defense and space division that complements commercial aircraft sales.

Airbus has a more balanced market in Europe, Asia and the Americas. Airbus's strategy emphasizes innovative and customer-oriented solutions, offering a family of aircraft with common features and components, reducing the cost of airline maintenance and training. Airbus has also been aggressive in increasing the environmental efficiency of its aircraft in line with global sustainability goals.

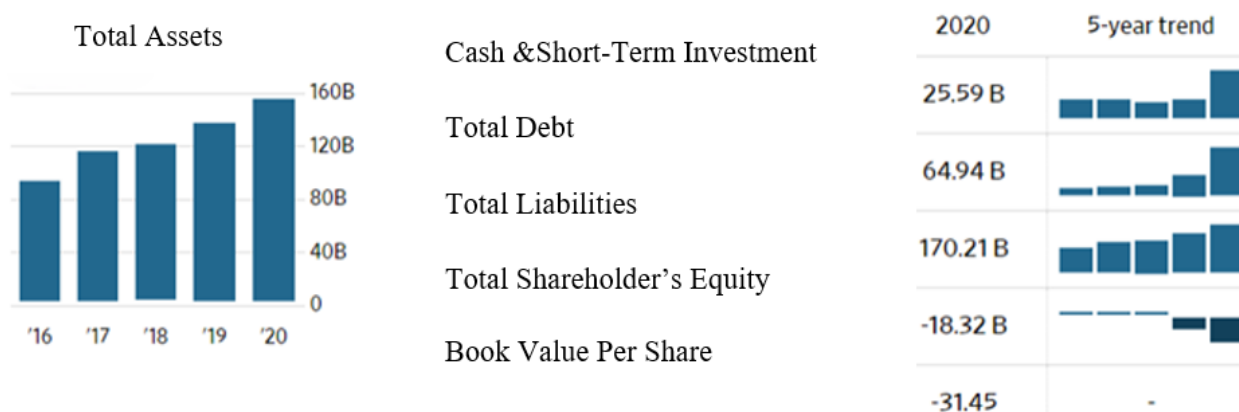


Figure 5. Boeing Balance Sheet Overview

The most surprising thing about Boeing's balance sheet is the sharp increase in cash and short-term investments and total debt in 2020, which coincided with the additional measures taken by the firm to maintain its liquidity. In addition, shareholders' equity reached negative values for the first time in 2019, when the firm reached negative equity after 737MAX groundings, which was further exacerbated by the pandemic, reaching more than us \$ 18b [6, 7].



Figure 6. Airbus Balance Sheet Overview

The Airbus balance shows a similar trend, let it be less heavy. The firm's cash and short-term debt investments grew rapidly in 2020, while its overall liabilities remained relatively constant. In contrast to Boeing the firm did not record the capital of negative shareholders after the pandemic

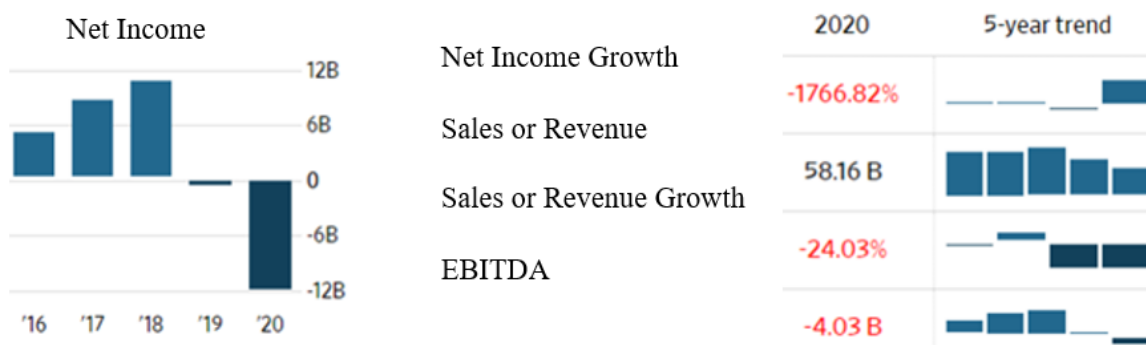


Figure 7. Boeing Revenue Statement

The Boeing revenue report gives a negative picture of the companies revenue-related operations deep from scratch in FY 2020. At the quarterly level, after a heavy loss in the last quarter of 2020, the company reported significantly higher revenue in the first quarter of 2021. Sales and revenue growth have already declined sharply in 2019 and have remained similar in 2020.

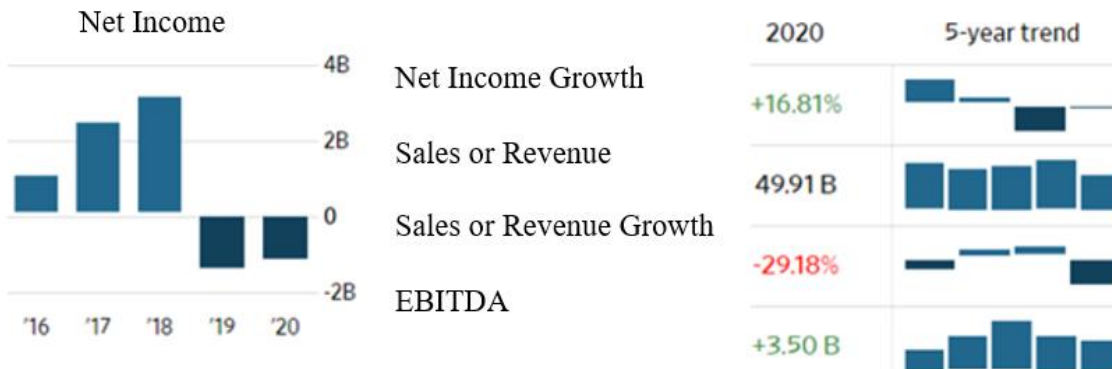


Figure 8. Airbus Revenue Statement

Conclusions. Boeing and Airbus are the main competitors in the commercial aviation market. Their struggle for market share is in the segments of narrow-body and wide-body aircraft. Airbus is actively implementing the latest technologies such as composite materials and automation, which makes its aircraft more economical and environmentally friendly. And Boeing is also focusing on innovation, including developments in autonomous flight and safety systems. Both manufacturers offer low-maintenance models, but specifications may vary depending on specific models and airline requirements. Boeing has faced problems such as incidents with the 737 MAX, which has affected its reputation. Airbus, in turn, also had its difficulties, but generally enjoyed stable trust. Both manufacturers are focused on sustainable development, introducing technologies to reduce their carbon footprint and increase fuel efficiency. Boeing and Airbus have a wide network of service centers and support, which is critically important for airlines in terms of maintenance and spare parts. Overall, both companies continue to evolve and adapt to changes in the industry, offering competitive solutions to their customers. The choice between them often depends on the specific needs and strategies of the airlines.

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BOEING ЖӘНЕ AIRBUS ҰШАҚТАРЫНЫҢ БІРЕГЕЙЛІГІ

Аңдатпа. Бұл мақалада Boeing және Airbus ұшақтарының бірегейлігі, олардың құрылымдық құрылымы, технологиялық инновациялары, өндірістік процестері талданады. Бұл компаниялардың аэродинамикаға, автоматтандырылған процестерге, жолаушыларға қызмет көрсету сапасына және өндіріс тиімділігіне деген әртүрлі көзқарастарына байланысты бір-бірінен қалай ерекшеленетіні талданады. Boeing пен Airbus-ты бір-бірінен ерекшелендіретін негізгі ойлар талданады және мақалада олардың авиация саласына қосқан үлестері туралы толық ақпарат берілген.

Түйін сөздер: Boeing, Airbus, ұшақ жасау, технологиялық инновациялар, өндірістік процестер, нарықтық стратегиялар.

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УНИКАЛЬНОСТЬ САМОЛЕТОВ BOEING И AIRBUS

Аннотация. В данной статье анализируется уникальность самолетов Boeing и Airbus, их конструктивное устройство, технологические инновации и производственные процессы. Анализируется, чем эти компании отличаются друг от друга из-за различных подходов к аэродинамике, автоматизированным процессам, качеству обслуживания пассажиров и эффективности производства. Проанализированы основные моменты, отличающие Boeing и

Airbus друг от друга, и в статье представлена подробная информация об их вкладе в авиационную отрасль.

Ключевые слова: Boeing, Airbus, авиастроение, технологические инновации, производственные процессы, рыночные стратегии.

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