

# **AVIATION INDUSTRY SUSTAINABILITY IN THE PERIOD OF COVID-19**

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## **ABSTRACT**

*Purpose. The purpose of article is the research of stability of the industry in the period of COVID-19 pandemic. Changes in various industries are considered under the influence of the crisis caused by coronavirus. An analysis of the decrease in production volumes and the actions of specific companies to increase the sustainability of industry is being carried out.*

*Methods. The methods used in the work are: bibliographic research on the topic of research and comparative analysis of statistical data in order to describe trends in business sustainability in the coronavirus pandemic. The analysis was based on the period 2015-2020 on global data on the state of the aerospace industry. Results. Four major challenges have been identified for the aerospace industry during the pandemic. The role of competition in the industry, the role of high capital costs for production, the possibility of a new player in the market is determined. These problems were exacerbated by the negative effects of coronavirus on industry as a whole.*

**Key words:** *COVID-19, business; aviation industry, world economy, crisis, sustainability*

**JEL Classification:** *F60, O11, O2, O38*

## **INTRODUCTION**

Today's crisis is the most serious that the aviation industry has faced. He affected the entire chain: aircraft manufacturers, airlines, suppliers, airports and other aviation structures. From the very beginning of the pandemic, many companies created an operational and crisis headquarters, which included specialists in sales, operations and

finance. Their tasks were to manage deliveries according to the current situation and determine further actions. For example, at Airbus in early April, to offset the short-term decline in demand from airlines, the rate of production of aircraft decreased by about 40%: for the A320 family is up to 40 aircraft per month, for A330 is up to two, for A350 is up to five. This adjustment of production rates made it possible to fulfill the obligations for the supply of aircraft to customers, as well as to better adapt to the changing situation in the market. Table 1 presents key challenges and scenarios in the aerospace industry that have been exacerbated by the pandemic. Table 1 also presents the results of the reduction in production in the basic sectors of the economy as a result of the crisis of 2008-2009.

*Table 1. Impact of the 2008-2009 crisis and the COVID-19 pandemic on the global economy*

Industry	Change for 2008-2009, %	Change at 2020 from COVID-19, %	Forecast for 2021, %
Automotive industry	-12	from -20 to -30	20-25
Aerospace industry	-24	from -25 to -35	from -4 to -6
Construction industry	-5	from -10 to -15	5-7
Electrical industry	10	from -5 to -8	6-8
Chemical industry	-19	from -6 to -10	8-12
Wind power	43	10	5-7

*Source: [1].*

How the aerospace industry copes with the difficulties caused by the COVID-19 epidemic also depends on the type of sub-sector. The situation with civil aviation, for example, is worse than with helicopters and military aircraft, which are less affected by the fact that other countries close borders, or a decline in the tourism industry. The same is true for air freight. Air cargo continues to operations, ensuring the distribution of the most necessary goods around the world, which emphasizes the importance of maintaining air traffic continuity, despite the reduction in passenger traffic.

In addition, industry response also depended heavily on COVID-19 responses in their country and region as the virus spread around the world. The unilateral decision of some countries to close borders not only failed to alleviate the heavy burden placed on the aerospace sector, but only closed the way to a more general approach. Of course, in Europe, every company in the civil aviation industry has received material support from country to overcome the difficulties of 2020, but this will probably not be enough to stay afloat for the next two years.

## **METHODOLOGY**

This study is based on a number of theoretical methods. World analysis considers as complex and adaptive social systems, some specific properties of which can be abstracted at micro levels, such systems consist of many objects with often complex interactions between them. Interactions between parts of a complex and adaptive system are controlled by specific laws and channels of interaction. Moreover, interactions can be subject to adjustments and appearances defined by entity actions and interactions.

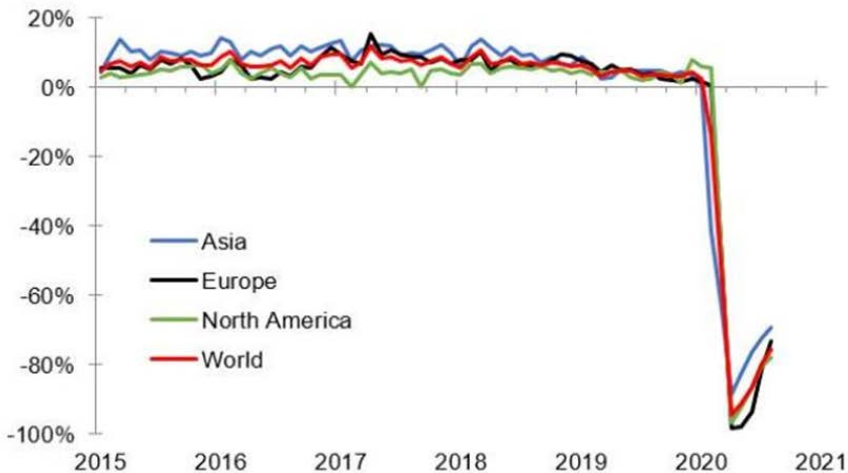
The methods used in the work are: bibliographic research on the topic of research and comparative analysis of statistical data in order to describe trends in business sustainability in the coronavirus pandemic. The analysis was based on the period 2015-2020 on global data on the state of the aerospace industry. In the context of the pandemic, COVID-19 resistance to disinformation and information literacy, or specific types of herd behavior in terms of opinion (or belief) dynamics, may be among these properties at the macroscopic level.

This study is based on the assumption that the sustainability characteristics of both the individual enterprise and the business as a whole are largely shaped by external factors. The ability to respond quickly to external changes, fact-checking skills, and mandatory rules, as well as a wide range of communication strategies, algorithms for automatic fact-checking information, or recommending information, also have a significant impact on industry resilience during a pandemic.

Examination of the literature has shown that perceptions of and responses to the current pandemic in both the long and short term tend to be quite diverse [2]. Integrating the disciplinary aspects addressed in this position paper into a holistic approach may help us understand which macroscopic patterns emerge from the microscopic dynamics illustrated above [3].

## **RESEARCH RESULTS**

This research are based on statistics and market data on aerospace & defense manufacturing. Airlines today operate with a very low load, at the level of 50%. The most affected industries also include hospitality and tourism; it is expected that in 2020 the reduction in this segment will be 40-50%. The following table shows the impact of COVID-19 on these global industries in different regions of the world. After a summer season cut short in Europe and North America by rising Covid-19 infections, along with continued low willingness to fly, global air traffic as measured by Revenue Passenger Kilometers (RPKs) contracted by -75% year-on-year in August, following an -80% drop in July (Fig.1).



Source: [4].

Figure 1. Air (passengers) demand, RPK change (m/m)

As can be seen from the table, the Pacific Asia was the least affected by the crisis [5]. China, taking control of the coronavirus spreading, resumed production. South Korea and Japan have also shown promising success in the fight against the pandemic.

Looking ahead, with the lack of convenient testing and compulsory quarantines on arrival, global air passenger demand will take longer to recover than previously expected [6]. For the full year 2020, we now expect air traffic to be down -60% (vs. a -40% decline in our previous forecast) compared to 2019. It will still be 35% below the 2019 level in 2021, and is not likely to recover to its pre-crisis level before 2024.

Based on bibliographic research and comparative analysis, the following key challenges for the aerospace industry, exacerbated by COVID-19, have been identified. The scenarios in the aerospace industry were also highlighted.

1. *High capital intensity.* The commercial space sector is a capital-intensive industry with limited number of large players. Though development of the new plane costs billions of dollars and reaches two-digit numbers here, the margin remains low: about 2-4 percent. For large suppliers, especially for producers of engines, the gross margin is much higher. The reason of it is connected on so many with production of engines how many with their extremely profitable maintenance and repair, including capital, in the market of after-sale services. These enormous financial expenses find reflection in balance sheets of airlines. Not so long ago some airlines spent billions of dollars for updating and/or replenishment of the plane fleet, leaning on the considerable profits. Today, after annual check on durability to which they were subjected by coronavirus many of the same companies are on the threshold of insolvency.

2. *The ongoing duel between Boeing and Airbus.* Two superairplanes dominate commercial aircraft construction: Boeing and Airbus. When Airbus absorbed Bombardier's large facilities, and Boeing was preparing to conclude a similar deal

with Embraer, this dual power seemed to be even stronger. Another important chapter in this duel is the relentless accusations of dishonest business practices and illegal state support/subsidies related to the production of large civilian aircraft. Since 2005, the United States and the EU (four of its countries with large Aerobus enterprises, France, Germany, Spain and the UK) have spent significant funds in connection with the dispute at the World Trade Organization that affected them. Today, after the shock of the pandemic, both companies faced a new situation: instead of adding new contracts to already crowded order books, they suddenly found that they had to make concessions to sell at least a few aircraft. Both operators are forced to agree to postponement and cancellation of orders, because otherwise they risk provoking bankruptcy major customers.

3. *Emergence of a new competitor.* In the shadow of this duel a third competitor appeared the Chinese state-owned company COMAC. Although experts argue that the new manufacturer still needs time to become fully competitive internationally, COMAC has a good chance to drag on future business in China and Asia, and this region is projected to give the most confident growth rates in the future. Moreover, it should not be forgotten that the Brazilian company Embraer is now again an independent manufacturer with a noticeable presence in the market. The Russian aerospace industry could potentially play a more important role, partly in cooperation with COMAC, with which it is implementing a joint CR929 project (wide-body long-haul aircraft). And finally, Mitsubishi is also serious about becoming an important player in the regional airliner market [7].

4. *Environmental requirements* for the production and operation of aircraft. Reducing greenhouse gas emissions from the aviation industry is one of the world's most important challenges. As noted by the International Civil Aviation Organization, reducing greenhouse gas emissions from aviation will help prevent the dire consequences of global warming for the industry itself [8]. Earlier in February 2016, ICAO developed new standard requirements that will limit greenhouse gas emissions and improve the efficiency of all commercial and private aircraft. In accordance with these requirements, the production of models that do not meet the new standards should be completely discontinued in 2028. Therefore, for the Russian aircraft industry, it is very important to more fully take into account environmental and "green" indicators both in the sector of aircraft production and its operation [9].

5. If recovery does not occur in the next 6-12 months, one of the most acute problems for the industry will be *liquidity* [10]. The rate of burnout of cash from major manufacturers such as Boeing and Airbus is from \$2.5 to \$3.5 billion per month. As in the automotive industry, companies lay off employees or reduce their salaries to minimize losses. Surveys of the largest manufacturers indicate a possible decrease in total industry revenues in 2020, as a result of travel bans due to COVID-19, by 20-30% [11]. Large companies and their suppliers of a number of levels have announced a reduction in the production of some aircraft models. Airbus said, in particular, that it would reduce production by 30%; the company stopped production at plants in Spain,

France, the UK and even in China. Boeing expects some market recovery no earlier than Q4 2020.

To increase liquidity, Airbus canceled the dividends announced earlier for 2019, suspended the replenishment of pension funds, and began to use credit lines more widely. The total liquidity available to Airbus is currently approximately \$30 billion [12].

Boeing reported a loss of \$641 million in the first quarter of 2020. The company plans to reduce 10-15% of jobs through layoffs and reduce production volumes major commercial aircraft, including 787 and 777. She turned to the US government for support in the amount of \$60 billion to increase liquidity, and also received \$25 billion through the placement of bonds. The US government has supported commercial airlines in the amount of \$50 billion, which will undoubtedly have a positive impact on aircraft manufacturers during the crisis [13].

In general, due to the pandemic, the aerospace industry could lose about \$60 billion, which is approximately 23% of company revenues in 2020. The restoration of the aerospace industry may be more slowly compared to other industries. According to the CEO of Airbus, "the restoration will certainly take place, but it may take 2 years" to return to the indicators of the beginning of 2020 [13]. At the same time large producers gradually began preparation for resumption of work. Boeing in Seattle resumed production numbering workers at the level of 17% from a payroll. Airbus brought together about 3000 people (about 50%) at the plant in Great Britain. The companies also allow the workers to work remotely where it is possible, and give a holiday to those who treat risk groups in respect of COVID-19 infection, require child care, have the sick family member or just are afraid to come to work because of a pandemic. The space industry of 15-25% of employees can work remotely at home without considerable loss of performance. However it is difficult to factory workers and technicians.

Problems with supply chains in this industry aren't so serious in comparison with automotive and electronic industry where the considerable percent of crucial components is manufactured in China and other regions of the world. Nevertheless and there is a certain dependence on purchases in different countries. It concerns a number of materials, cabins of planes, components of wings, etc.

As a result of crisis of COVID-19 the bubble which was inflated owing to the global economic growth, increase in air transportation of businessmen and tourists burst. It led to sharp reduction of use of plane fleet, dismissals and refusal of deliveries on all global cost chain. For the beginning of summer of 2020 about 70% of world aviation merchant fleet weren't operated: from 27500 planes operated at the beginning of 2020 less than 7500 [14] flew. The space industry faced congestion in warehouses of the unclaimed planes ordered even during market blossoming, and desorption of these stocks can take about five years.

As a result from 100 to 200 planes will be unclaimed by the market. Such imbalance between production and deliveries is unprecedented. Certainly, these planes will be sold the first after recovery of the market, but with big discount. Despite surplus, producers can't stop completely production as it is fraught with destruction of supply chains [15].

## **CONCLUSIONS AND FURTHER RESEARCH**

Breaking down the data, we find that the Covid-19 crisis has hit demand for wide-body (twin-aisle) aircraft more than narrow-body (single-aisle) ones, given the fact international travel have suffered the most. Moreover, longer-range narrow-bodies such as the Airbus A320neo and Boeing 737 Max – once it is allowed to fly again – are likely to keep taking market share at the expenses of wide-bodies such as the A350 or the B777. Deliveries of wide-body jets are expected to slump by -67% in 2020 and -57% in 2021, compared to declines of -51% and -11% for narrow-body jets [16].

In general, the air transportation market is starting to revive slightly: global domestic transport has recovered by about 65%, while international - by only 25%. On the one hand, a number of countries, for example, France, Germany, Great Britain, are tightening restrictions, which, of course, will negatively affect flights. On the other hand, domestic transportation in China and South Korea, for example, returned to the level of 100%. Domestic transportation in Russia according to the results of the summer season of 2020 also broke all records.

If we talk about forecasts, then, according to our estimates, the segment of narrow-body aircraft will recover faster than wide-body ones. In this context, the long-haul aircraft will A321XLR be the most appropriate solution for airlines, giving them flexibility in planning a long-haul route network, allowing them to carry out flights as efficiently as possible both on old routes and on new ones. According to our optimistic estimates, air transportation will be able to return to the level of 2019 somewhere in 2023-2025.

With regard to new research development of the aviation industry after COVID-19, it is necessary to note that the aerospace sector must step up its efforts to make air travel cleaner and more environmentally friendly. Hopefully, claims of a 40 percent reduction in carbon emissions by modern commercial airliners compared to their previous generations are fact-based rather than wishful thinking. So far, no breakthrough technical solution has appeared for aviation traction without kerosene. Electric motors can be used to reduce emissions, for example, during taxiing on the ground, but the environmental effect of this will be very small.

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