Saint Petersburg State University

Department of World Economy

**State support of the aircraft industry: international and Russian experience**

Thesis submitted in partial fulfillment of the requirements
for the degree of

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(International Trading System MA program)

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# Introduction

Being a kind of a global network of commercial aircraft operators, airports, air navigation service providers and the manufacturers of aircraft and components, aviation industry is characterized by a very high knowledge intensity and the need for significant capital investment. It is responsible for connecting the global economy, providing millions of jobs and making modern quality of life possible.

Level of aircraft development precisely describes the technological potential of the country's economy. Aviation industry is of great importance for the development of the state from the general economic and also scientific perspective. Futhermore, this branch of economy makes it possible to master and launch into production new military, civilian and dual-purpose products.

Nowadays, the Russian aviation industry is experiencing a critical stage in its development. Basically, the existing problems, in many respects, are a consequence of the difficult economic situation of the 1990s. The main constraining factor for growth is the low competitiveness of aircraft products. Thus, the share of Russia in the world civil aviation market is about 1%, while the corresponding indicator of major foreign competitors is many times greater. The reason for low competitiveness is a combination of barriers and problems, so the absence of fundamental changes in the industry may entail a final loss of competitiveness of domestic products on the world market.

It is often claimed that aviation is of significant importance for international trade and national development. Relatively great attention has been paid to the existence of subsidies in this sphere of economy, governments around the world have often been ready and able to intervene in stabilising possible imbalances and boost economy for the futher growth. This is especially so in this time of global economic crisis, when financial bailouts and state intervention by governments are employed to prop up economies. Despite the fact that membership in the WTO limits the range of methods of state support, Russia still has the opportunity to stimulate the industry by adapting the tools of world practice to regional peculiarities.

The relevance of the research study is mainly connected to the fact that state support in the aviation industry can boost the renewal of production assets, the replacement of a morally outdated equipment park, and an increase in the efficiency of aircraft use. The formation of a favorable economic climate is a fundamental factor for the development of domestic civil aviation. The aviation market is global and Russia's share in it is gradually growing. This sector of the economy has multiple problems that need to be addressed, so aviation industry can not be left without attention.

The aim of this work is to disclose the international and Russian experience in applying government support to the aviation industry, identifying the strengths and weaknesses of the Russian aviation industry, disclose the results of Russia's accession to the World Trade Organization in the context of the aviation industry, and to search for most favourable forms of state support that will facilitate competitiveness of this sphere of the economy.

In order to achieve the stated goal, it is necessary to distinguish the following tasks:

* to highlight the strengths and weaknesses of the Russian aircraft industry using M. Porter's "Diamond of Competitiveness";
* highlight key factors of competitive advantages of the world aviation market leaders;
* to study the consequences of Russia's accession to the World Trade Organization from the position of aircraft industry;
* to highlight most suitable instruments of state support to the Russian aircraft industry that meet the WTO requirements;
* to determine whether the state program for supporting aviation in the Russian Federation corresponds to the needs of the industry;
* to give recommendations on the most promising ways of aircraft industry development.

To achieve the research goal, a wide range of scientific literature dealing with both theoretical and practical questions of competitiveness was used, among them the fundamental research of foreign authors M. Porter, John H. Dunning, M. Enright, P. Krugman, K Lancaster should be mentioned.

The research object of the master's thesis is the aviation industry, while the subject are the mechanisms of state support for the development of the aviation industry, the identification of trends in the aviation market and the justification of the results obtained.

The statistical and analytical data of national and international organizations, such as the World Trade Organization, the Federal Air Transport Agency, the Analytical Center under the Government of the Russian Federation, UNESCO Institute for Statistics, Euromonitor, Central Bank of the Russian Federation, the Department for Business, Energy and Industrial Strategy of the United Kingdom, served as an information basis for the master's thesis.

The analysis of the Russian and foreign aviation industry was carried out on the basis of official data of Boeing, Airbus, IATA, United Aircraft Corporation, VSMPO-AVISMA, Rostec websites. Relevant information published on the Internet, as well as materials from the periodical press and news agencies was widely involved in the research work.

The scientific novelty of the thesis is determined by the following provisions:

* analyze the main merits and drawbacks of the Russian aviation industry and outline the factors affecting the competitiveness of the industry;
* consider forms of state support to the aircraft industry widely used in foreign countries;
* highlight the most promising instruments of state support to the aircraft industry in the context of WTO membership;

# Chapter 1. Theoretical premises of state support in the aircraft industry of Russian Federation.

##  Peculiarities of Russian aircraft industry

It is aircraft activity that largely contributes to the growth of the country's industrial and economic potential, the development of scientific, cultural and social spheres. That is why, aircraft industry is one of the leading branches of Russian defense-industrial sector.

The collapse of the USSR, among other things, violated production chains in the aircraft industry, which had a very negative impact. In addition, the airlines gained access to cheap second-hand imported equipment, which was more comfortable and easier to operate than Soviet and Russian aircraft. All this led to the fact that production in the aircraft industry was extremely reduced, and the fleet of Russian airlines began to consist mainly of Boeing and Airbus airplanes. At present, Tupolev's experimental bureaus («TU» planes) and Ilyushin («Il» planes), as well as enterprises engaged in the production and repair of these types of aircraft, are in a difficult economic situation.

Mainly because of that, an ambitious project to build a short-haul passenger aircraft «Sukhoi Superjet 100» in cooperation with foreign companies was launched.

Way more optimistic is production of aircraft for defense needs. Russia has traditionally been one of the world leaders of this market, especially with regard to heavy fighters such as Su-30MK, which today are, in various modifications, the basis for the export of military aviation.

In order to improve the situation in the aircraft industry, in 2006 the United Aircraft Corporation (UAC) was created. It has collected almost all government assets in aircraft construction. In 2016, the revenue of the United Aircraft Corporation was over 417 billion rubles. The corporation includes the following enterprises:

* Aviastar-SP, Ulyanovsk;
* Ilyushin Aviation Complex, Moscow;
* «Aviaexport», Moscow;
* Voronezh Aircraft Production Association, Voronezh;
* "Ilyushin Finance Co.", Moscow;
* "Irkut" Corporation, Moscow;
* "Sokol", Nizhny Novgorod;
* Sukhoi Company, Moscow;
* A.S. Yakovlev Design Bureau, Moscow;
* «TAVIA», Taganrog;
* Beriev Aircraft Company, Taganrog;
* Tupolev Design Bureau , Moscow;
* «Financial leasing company», Moscow;
* "UAC - Transport Aircraft", Moscow.

The second largest enterprise in Russia's aircraft industry is the «Russian Helicopters». Similarly, in 2007 all enterprises connected with helicopter production entered in one state holding. Nowadays, «Russian Helicopters» consists of the following enterprises:

* Mil Moscow Helicopter Plant, Moscow;
* Kamov Design Bureau, Lyubertsy;
* Ulan-Ude Aviation Plant, Ulan-Ude;
* Kazan Helicopters, Kazan;
* Rostvertol, Rostov-on-Don;
* «Progress», Arsenyev;
* «KumAPP», Kumertau;
* Stupino Machine-Building Plant, Stupino;
* "Reduktor-PM", Perm;
* Helicopter service company, Moscow;
* Novosibirsk Aircraft Repair Plant, Novosibirsk.

In total, the aircraft industry unites more than 280 enterprises located in 40 regions of Russia. The enterprises have basically the same geographical distribution as the majority of population: they are concentrated in the European part of Russia. One of the largest aircraft production centers is Moscow. Here all the main airplane design bureaus and several aviation plants (including Sukhoi, MiG, Ilyushin) are concentrated. A large number of factories make separate units for airplanes and helicopters (motors, avionics, life support systems, screws etc. These enterprises are mainly concentrated in the Central, North-Western, Povolzhye and Urals economic regions .The centers for the production of aircraft engines are located in Perm, Kazan, Moscow, St. Petersburg, and Samara.

Having overcome the peak of the crisis, in the 2000s the Russian aircraft industry entered a phase of moderate extensive growth. The total amount of budget financing for the industry for the period from 2002 to 2017 increased by 29 times, and totaled 758.5 ​​billion rubles.

In 2016, the aircraft industry produced 142 airplanes and 188 helicopters. It is expected that until 2025 government will purchase at least 133 airplanes and 224 helicopters for a total of more than 320 billion rubles for the needs of state agencies.

It should be noted that up to 2014, passenger traffic had grown steadly, reaching a peak in 2014 - 93.2 million people. While in 2015 and 2016 there were a clear trend to reduction in the nember of passengers carried. However, in 2017, Russian airlines carried 105 million passengers, which is 18.6% higher than in 2016 (88 million passengers). Thus, it is potentially possible that the transport industry in the sphere of civil aviation can be characterized by an intensive recovery after the crisis events of 2015-2016. Furthermore, in the total volume of passenger traffic, the share of the top 15 airlines, including Aeroflot, Russia, Siberia, Ural Airlines, Uteir and Pobeda, accounted for 90.8% in terms of the number of transported passengers and 92.4% in passenger turnover in 2017.

The process of creating a new product not only in the aviation sphere is fraught with many difficulties and risks. The launching of a new product on the market is always governed by the specifics of the product itself and with the characteristics of the market for which it is created (the product niche). Manufacturers of industrial high-tech products are even more at risk than manufacturers of consumer goods. At present, when the aviation industry of the Russian Federation, and its civil sector in particular, is still in a rather difficult position from the perspective of strategic development prospects, the problem of the competitiveness of the industry as a whole is vital nowadays, and, moreover, the competitiveness of the industry has a direct effect on the rivalry of its output.

Before proceeding to the deeper analyses it is important to introduce the clear definition of the aviation industry. According to the state program of the Russian Federation "Development of the aviation industry for 2013-2025" under the *aviation industry* is understood “an industrial sector in which development, production, testing, repair and utilization of aviation equipment are carried out”.

In order to have a complete overview of the Russian aviation industry at the present stage, it is interesting to analyze the industry by applying the theory of competitive advantage of **M. Porter**, the so-called **"Diamond of Competitiveness"**. It is widely known, that competitiveness is one of the main characteristics of any industry that government is concerned about. Trying to answer the questions about why a particular country has achieved leadership in a certain sphere of production; why the main players of the relevant industry are the descendants of a certain country; how they manage to retain leadership in the long term; person, along with other concepts, will face the notion of competitiveness.

 The answers to these questions are very important for firms that are going to compete on international market. The management of the firm should clearly represent which national characteristics of the country determine the firm's ability to create and retain a competitive advantage at the international level. Michael Porter was able to explain the role played by the country's economic environment, institutions and policies in ensuring the success of the firms of this country, and to formulate what is the country's advantage in the competitive struggle.

It is often noticed that presence of national competitiveness might be driven by government policy: targeting, protection, import promotion, and subsidies. Some of these tools have been used in Japanese and South Korean auto and steel industries in order to gain an advantage on global market. But at the same time, M. Porter noticed that these tools might not implicitly lead to expected results. For example, in Italy government intervention in auto industry had been ineffectual, but nevertheless they had faced a boom in world export share second only to Japan. Furthermore, in some countries the level of direct government intervention was modest, but anyway these countries had occupied leading positions in a wide range of spheres on the global market.[[1]](#footnote-1)

Another interesting feature of Porter’s explanation of the term national competitiveness is the fact that all of the abovementioned characteristics contain some truth in the explaining of this phenomenon, but they are not enough. So, according to his idea, the only meaningful concept of competitiveness at the national level is productivity. The ability of the country to establish a high standard of living for people depends on the productivity with which a nation’s labor and capital are employed. Given the fact, that productivity is one of the criterions for appearance of long run standard of living, as it reflects the indication of national income per capita, it is extremely important for companies to achieve high level of productivity and boost it over time. All in all, companies can obtain a capability to compete in absolutely new industries. Undoubtedly, a country cannot be implicitly competitive in all possible segments of economy, but the key challenge is to organize the most productive uses of limited resources. All of these statements have been used by M. Porter in the implementation of the first determinant of competitiveness – **factor conditions**.[[2]](#footnote-2)

**Firm Strategy, Structure and Rivalry**

**Demand**

**Conditions**

**Factor** **Conditions**

**Related and Supporting Industries**

*Government*

*Chance*

**Graph 1.1** Determinants of national competitive advantage

*Source*: Porter M. E. The Competitive Advantage of Nations // Harvard Business Review, March-April 1990, p.77

Porter assumed that in more sophisticated spheres of economy the classical approach of determining the factors of production as labor, land, natural resources, capital and infrastructure is not enough, as current competitive world forces nations to create such factors of production as skilled human resources and scientific base. It is also important to notice that Porter has included these characteristics in factors of competitiveness because they are valuable for knowledge-intensive industries. In order to support competitive advantage a factor has to be highly specialized to an industry’s especial needs, so the factor turns to be difficult to achieve and require certain investment.

If we analyze the second determinant of the national competitiveness – **demand conditions**, it might seem that the globalization of competition has a tendency to decrease the significance of the local demand, but it is not exactly like this, the structure and nature of the internal market have a disproportionate impact on how companies understand the needs of buyers. Priority in this aspect is not the size, but the quality of the domestic market. Local demand forms the basis for gaining competitive advantages, if it provides companies with an earlier or more clear idea of ​​the need for customers. Fastidious buyers inside the country force companies to innovate more quickly and become more competitive both at the national and world level. Demand conditions inside the country help to install a competitive advantage when a particular sphere of the economy is larger and more visible in the domestic market than in foreign markets. The influence of the population's preferences on the structure of the economy can be illustrated by the example of the Japanese producers of air conditioners. As it is known, Japanese consumers, who live in small, tightly packed homes, must contend with hot, humid summers and high-cost electrical energy. In response, Japanese companies have pioneered compact, quite air-conditioning units powered by energy-saving rotary compressors. So, introduced innovations on Japanese market forced other companies to keep up with the tendency and produce a competitive product.

The given example is reduced to the conclusion that the company, being under the pressure of competitors, should strive for challenges, and not avoid them. In particular, the strategy is to take advantage of the country-based company, and to form on this basis the prerequisites for the development of innovation. To this end, companies are encouraged to: focus on the most demanding customers and consumers; use the services of the best suppliers; to focus on production standards more stringent than those adopted in the market standards; develop and improve the company's employees.

The third important component of national advantages is presence of **related and supporting industries**, which are competitive on the international level. This aspect, also as it was in the previous determinant, reflects the role of location. Domestic suppliers, that have significant weight in the world market, not only provide related industries with the most efficient economical equipment and technologies, but also provide innovation and modernization through close interaction. A close geographical location makes possible close business relationships, the advantages of which are short communication lines, fast and constant access to information, as well as the continuous exchange of ideas and innovations. National companies get the maximum benefits if they build a business with suppliers that are competitive on the international level. This allows companies to acquire modern materials, components and technologies that are in demand on the world market.

In terms of sustainable **strategy, structure and competition** in the industry, domestic competition plays an important role. For example, in Switzerland, competition among its pharmaceutical companies - Hoffmann-La Roche, Ciba-Geigy, and Sandoz - led to leading worldwide position. Unlike the prevailing view that the protection of large strategically important industries for the state from domestic competitors leads to an increase in their competitiveness in the world market, it is refuted by practice, as domestic rivals engage in active feuds; they compete for market share, highly qualified people, for technical excellence. In industries where there is only one leader the competition is practically gone. Often, this single national leader of the industry is not competitive in comparison to the leading companies of other countries. The role of internal competition lies in the fact that it stimulates companies to innovate and improve. At the same time, competition in the domestic market sometimes forces players to enter the markets of other countries, where demand is not yet satisfied enough. Thus, internal competition is a powerful incentive to achieve competitive advantages at the international level. When there are economies of scale, domestic competitors compel each other to draw attention on international market to possess greater efficiency and higher profitability.

The determinants of national competitiveness are influenced by two independent forces: "government" and "chance".

It is assumed that the state can not create competitive industries, and only the companies can do this, however, the state plays the role of catalyst and initiator, creating favorable conditions. Companies alone can achieve competitive advantages and preserve them. For each enterprise, it is necessary to turn our domestic environment into an enabling platform for success at the international level. The government has an indirect impact, but it does not diminish its significance, which is to create a national business environment in which companies can achieve competitive advantages.

As for the second force – chance – it is an almost unmanageable factor, which, at the same time, can play a tangible role in changing the competitive positions of countries. Casual events include natural disasters, wars, fires, changes in the world financial markets or exchange rates, sharp price changes in resources and other unforeseen circumstances. Events of this kind introduce uncertainty, which, in turn, can lead to a change in the structure of the industry.

In the new economic conditions determined by the growth of globalization, the "Diamond of Competitiveness" was partially transformed by followers, for example **John H. Dunning** suggested to include "the activity of international business" as a separate independent determinant of competitiveness. This factor stands outside the diamond and affects its four foundations, and it also has mutual influence with two other independent elements of "government" and "chance".[[3]](#footnote-3)

Dunning specified the important role of transnational corporations, acting through incoming and outgoing investment flows both to their competitiveness and to the competitiveness of host countries. External mobility of the company's assets reflects the application of company's competitive advantages outside the home country and the impact on the international economy.

One of the M. Porter's follower, **M. Enright**, who participated in the research and development of the rhombus, focused his attention on the geographical aspect of competitive advantages. He introduced the concept of "regional cluster" and concluded that the competitive advantages of countries are not formed at the national or supranational levels, but at the regional level and depend on the national and cultural traditions of doing business, the availability of necessary resources, the organization of production.[[4]](#footnote-4)

Using the methods and theoretical conclusions of **M. Porter's model** of international competitiveness, we will attempt to determine the strengths and weaknesses of the modern **Russian aviation industry**, the key determinants of the industry's competitiveness and the prospects for its further development.

* **Factor conditions**

As it was stated earlier, factor conditions in the “Diamond of Competitiveness” model are skilled labor and the scientific and technological base of production, according to this it is important to analyze Russian aviation industry from this perspective. It is often stated that Russian aviation industry has a certain gap between the potential opportunities and the current level of development.

In this regard, the projects with which the main hopes are connected today are completely new developments not based on Soviet models, but representing the result of technological cooperation with the largest international producers. So the model of the Sukhoi Superjet 100 (SSJ100) aircraft is considered to be the first Russian project, not based on the modernization of Soviet aircraft, but from the beginning to the end developed in a market environment and taking into account its requirements. Another breakthrough Russian project MС-21, in the development of which all major design bureaus participate, implies the use of the most modern technologies and materials.[[5]](#footnote-5) According to the development-engineers, this aircraft should have a number of advantages over potential competitors A320 and Boeing-737: a more spacious interior, a smaller mass (due to the use of composite materials and promising metal alloys), the introduction of on-board systems of a new generation, more economical (by 25%) engine and a lower price.

In modern economic conditions, only those air carriers, that have funds for the acquisition of modern high-tech equipment, are sustainable. Moreover, such companies have the means to maintain a qualified staff (including training and periodic retraining).

The physical deterioration of the aircraft fleet is also the cause of the Russian civil aviation crisis. Many airlines still use a large amount of Soviet-made equipment, the service life of which has already expired, or it will happen in the near future. In exceptional cases, the technical modernization carried out allows these aircraft to make irregular flights to countries where more liberal operational requirements remain. For example, approximately only quarter of top 15 Russian air companies have airplanes with average age less than 10 years, while all the others use planes nearly 15 years old. As a result of the aging of the fleet, the profitability of flights decreases, which can lead to the loss of the market.

**Graph 1.2** The average age of airplanes in Russian air companies in 2015

Source: based on the information of the Federal Air Transport Agency URL: [www.favt.ru](http://www.favt.ru) - Federal Air Transport Agency official website

The highest technological and professional level was achieved in the end of 1980s. Several generations of engineers, designers and scientists made a significant contribution to the development of the aviation industry, creating a scientific and technical and production base that allowed them to survive the recession. Nevertheless, in the absence of continuous improvement and updating, specialized factors quickly lose the potential for growth in competitiveness. Thus, the stagnation of experimental design and applied science and the simultaneous degradation of the majority of aircraft manufacturing serial production caused a lack of demand and a massive outflow of specialists in the major aircraft building professions.

However, it is important to notice the fact that some actions have already been taken in order to improve the situation with a high degree of depreciation of fixed assets and a large proportion of fully depreciated assets. According to the Ministry of Industry and Trade (Minpromtorg) Russian government approved the rules for granting subsidies to the regional budgets for co-financing investments and modernizing industrial enterprises. In particular, this program is going to reimburse the costs for developing and implementing lean manufacturing principles at industrial enterprises; modernization and technical re-equipment of new high-tech products, including import substitution sphere; purchase of domestic equipment. It is expected that such novation will set a new mechanism to stimulate regions to invent and implement their own, financed industrial development programs.[[6]](#footnote-6)

Furthermore, Minpromtorg states that the share of the modernized production base in the total volume of production in aviation sector is growing, so industry is already experiencing a positive tendency.

**Graph 1.3** Volume of production base in the aviation industry

*Source:* based on the data of the Ministry of Industry and Trade of Russian Federation. URL: [www.minpromtorg.gov.ru](http://www.minpromtorg.gov.ru) - Ministry of Industry and Trade of Russian Federation official website

Nowadays problems of Russian manufacturers associated not only with production technologies, but also with the backlog of marketing technologies, the undeveloped infrastructure of maintenance and repair, lack of a global system of logistics support. The maintenance of plane airworthiness and after-sales service in operation is an integral part of the strategies for the development of transport industry.

There is a strong need to deploy an effective after-sales service system for aviation equipment, taking into account the practical experience of its developers, manufacturers and operators.

Lagging in this area can be overcome, using the experience of world leaders and focusing on the needs of consumers, which however requires significant financial investments. A positive example is the interaction with the German Lufthansa Technician Logistics on after-sales service of the Sukhoi Super Jet 100.

Russian government has long been concerned about this issue, therefore, in the Strategy for the development of the aviation industry for the period up to 2030 special attention is paid to post-project and warranty services.

As it was previously noticed, for knowledge-intensive industries, to which aviation industry undoubtedly relates, it is extremely important to develop the scientific and technical base. However, nowadays, it can be clearly seen that there is a remission in the positions in the scientific, technical and technological support of the industry, also the methodology of the project design is outdated, moreover, there is a lack of effective mechanisms for introducing innovations and results of intellectual activity.

The following table shows the expenditures that were invested in R&D in different countries, based on this data it can be concluded that Russia is spending significantly less than main competitors in aviation industry.

Table 1.1

**Research and development expenditures in different countries**

|  |  |  |
| --- | --- | --- |
| Country | R&D expenditure as % of GDP | R&D spending in PPP$, millions $ |
| Republic of Korea | 4,3% | 73 216 |
| Japan | 3,4% | 170 589 |
| Germany | 2,9% | 110 170 |
| United States | 2,8% | 479 358 |
| France | 2,2% | 59 581 |
| China | 2% | 370 589 |
| United Kingdom | 1,7% | 44 202  |
| Canada | 1,6% | 25 740 |
| Brazil | 1,2% | 38 447 |
| Russian Federation | 1% | 39 863 |

Source: How much does your country spend on R&D? // UNESCO Institute for Statistics, 2017, p.56

Currently, annual expenditures for the aviation industry in Russia are approximately 2-3 billion dollars, while in the leading countries (like USA or some EU countries) the costs are equal to 20-30 billion dollars.[[7]](#footnote-7)

Moreover, if we compare the R&D expenditures as percentage of GDP in every country, taking into account the fact that among the aviation equipment manufacturers there are both more developed and less developed representatives and their ability to spend money on R&D are different, it can be seen that Russia spends the least among the list, which indicates the urgent need to stimulate greater investment in both the private and public sectors by setting national targets for R&D spending as a share of GDP.

For the elaboration of the sector, it is necessary to launch new projects of equipment creation, refurbishment of existing production sites and the establishment of global service support. Thus, production of competitive goods require huge amount of investment and constant improvement of enterprises.

 The modernization of production base and creating of scientific and technical facilities will help the industry to become more attractive for investors. In the situation of declining oil and gas revenues and diminishing amount of national funds reserves, there is no possibility of a significant increase in budget financing. At the same time, in order to build a competitive industrial model a serious amount of money have to be roped in, so there is no other way but to attract private capital.

The involvement of private business and inflow of new investments in aircraft construction will give a chance to boost the process of developing of complicated and money consuming high-tech products and increase the return on assets of the aviation industry complex. Foreign experience shows that private business can become a key investor in the sector: the largest American and Canadian companies have a significant part of private capital in their structure. However, the conditions for private investment in the aviation industry remain unfavorable. The interest rate of the Bank of Russia at the end of April 2018 was 7,25%, while a similar rate in the US, Canada, EU were around 1-2 %.[[8]](#footnote-8) Russian private companies operate in obviously more difficult financial conditions than foreign competitors.

**Graph 1.4** Central BankInterest rates in different countries, %

Source: Trading Economics, Bank of Canada, Federal Reserve, European Central Bank, Central Bank of Russia, URL: https://tradingeconomics.com (Date of the application 19.12.2017)

At the same time, among the weak parts of factor conditions in Porter’s model, there is one factor that is relatively developed, even though it is far from being flawless. Russian aviation industry has a potential in providing highly skilled workforce. Country has formed a system of specialized secondary schools and higher educational institutions, which prepare specialists of great demand in aviation sphere.

All in all, it is clear that main factor conditions in aviation industry are far from being flawless, so it is necessary to do considerable work in this direction in order to make the aviation industry competitive.

* **Demand Conditions**

Air transportation is an important indicator of the economy, as it reflects the dynamics of spending on business trips and on vacation. The air carriage market in Russia has a number of specific features, primarily air transport is still quite an expensive way to travel.

During the economic recession of 2015-2016, Russia experienced a contraction in the air transportation market and a change in its structure, switching to cheaper modes of transport and reduction in the number of trips. In 2015, for the first time since 2009, there has been a drop in the number of air passengers: from a historic maximum of 93.2 million people in 2014 to 92.1 million. This happened due to a decrease in transportation to non-CIS countries, partially offset by an increase in domestic traffic.

**Graph 1.5** Passenger traffic on the Russian market (excluding foreign airlines) 2012-2016

Source: Federal Air Transport Agency URL: [www.favt.ru](http://www.favt.ru) (Date of the application 19.12.2017)

Changes in the international transportation market were caused not only by the devaluation of the ruble, increase in the price of tickets and reorientation to domestic tourism, but also by geopolitical conjuncture – limitation of flights to several popular destinations. It is expected that the resumption of these flights will help restore the industry and reach the pre-crisis level in 2018-2019.

Even though there was a decline in the number of passengers, there is still a great demand for airplanes in the aviation industry. The United Aircraft Corporation (UAC)[[9]](#footnote-9) expects that until 2035 Russian airlines will receive about 1,170 new aircraft. The existing firm orders, which are now placed by airlines for different products in various categories, cover about 47% of the expected future demand. It is worth mentioning that, nearly about 57% of this demand is observed in groups of single aisle aircraft, the size of more than 120 seats. Among this order a serious share is occupied by orders for the aircraft MС-21-300.[[10]](#footnote-10)

They also forecast high demand in the segment of aircraft with a capacity of 60-120 seats, somewhere around 15% of the total demand, which is higher than the world average. This is primarily due to the fact that currently active work is being carried out, including with the support of the state, to develop effective methods of stimulating sales, including the presentation of effective operational leasing. For instance, at the end of 2016, the revenue of UAC grew by 19%, to 417 billion rubles. The growth in revenue was affected by a 60% increase in after-sales support and modernization of aviation equipment, including the supply of components, which brought the company about 93 billion rubles. Another 219 billion rubles UAC received from aircraft deliveries. Revenue from exports doubled to 203.3 billion rubles, which may indicate an increase in the demand for domestic aircraft on the world market. However, as follows from the company's report, most of the UAC’s revenue comes from the military segment: 325.3 billion rubles, while from civil - only 69 billion rubles. Products of the military aircraft segment have been widely recognized both on the external and internal markets, which give the greater part of the profit of the United Aircraft Corporation. At the same time, the share of Russian manufacturers in the civil aviation market is relatively small. Thus, the main problem facing the aviation industry – the necessity to increase competitiveness of domestic civil aircraft - is still not completely solved.[[11]](#footnote-11)

Another important issue is that the structure of air transportation has changed because several companies have left the market. One of the most noticeable events of 2015 was bankruptcy of Transaero airlines. It was one of the leading companies in the industry, cessation of its operating activities led to a decrease in competition.

Changes in the composition of air carriers have affected not only Russian, but also a number of foreign airlines. For example, over the past two years, many foreign air carriers have left the Russian market (mainly European airliners Air Berlin, EasyJet, Fly Niki and Estonian Air, as well as Cathay Pacific and - temporarily - Thai Airways and Delta), while others - significantly reduced traffic volumes (Lufthansa, Finnair, Czech Airlines, Wizzair, Aigle Azur, Emirates, Etihad, EL AL).

Simultaneously with the decrease in the number of domestic passengers due to the devaluation of the ruble, the number of foreign transit passengers increased. Transit and interchange flights through Russia have become much more profitable for foreigners than direct flights or, for example, with connections in Turkey, the United Arab Emirates and other countries. Many passengers from China and the countries of Southeast Asia travel to Europe via Moscow, and vice versa, the Europeans, after making a transfer in Moscow, go further to the countries of East and South-East Asia.[[12]](#footnote-12)

The structure of demand for aircraft produced in the domestic market has a number of differences from the global trends:

* the regional transport is concentrated in the central part of the Russia and is mainly focused on the Moscow;
* lack of the low-cost airlines, niche of low-budget carriers in the East Europe is not occupied.

At the same time, the largest airlines are world-class players and place high demands on the machinery, its efficiency, safety and economy. In general, the needs of the Russian fleet are similar to those of the world average:

* the largest part in quantitative terms is occupied by short- and medium-haul narrow-bodied aircraft, which are necessary for economical charter or domestic regional transportation;
* wide-body vessels for long-distance foreign trips and long flights across the country are needed in a smaller amount, but they occupy a significant part of the demand in the valuation.

The greatest difference is observed in the field of local aircraft and private aviation, the use of which, unlike, for example, USA in Russia is practically not developed. This model of demand corresponds to the model range of Russian aircraft manufacturers: short-haul SSJ100 and An-148, medium-haul Tu-204/214 and MС-21, long-haul IL-96. In this case, new models, according to the calculations of the developers, should, first of all, win the local market. So the first and one of the largest customers of SSJ100 is Aeroflot. Among the operators should also note the airlines Interjet (Mexico), Sky Aviation (Indonesia), Lao Central Airlines (Laos), Gazpromavia (Russia). The list of key operators demonstrates that among the buyers of the SSJ100 aircraft there are foreign airlines, which indicates the growing competitiveness of this product.

* **Related and supporting industries**

Structure of the industry was formed in the last century and since then has not undergone significant changes. The fundamental base of enterprises necessary for aircraft production includes various research centers, aviation organizations and associations, higher education institutions, motor-building enterprises. Also, design bureaus and manufactures of rocket engineering, aircraft and helicopter construction are closely related between each other, sometimes, technical improvement in one direction influences on the development in others.

**Graph 1.6** Enterprises necessary for the aircraft production

Source: was made by the author

At the same time, the functioning process of air transport enterprises: airports and airlines cannot be focused only on the results of intra-industry interaction: in order to perform successfully and retain competitive positions in the market of transportation services, companies need resource suppliers (material, labor, financial, information), sales intermediaries, investors etc. The connection of the airport-airline in the civil aviation sector is an integral element, which includes a wider space and relationships.

It is necessary to note that aircraft construction has very close relationship with engineering, radio engineering, electronics, chemistry, metallurgy and other high-tech industries. Some of the related branches (chemistry, metallurgy, radio engineering) and related enterprises (helicopter construction, military aviation) have a fairly high competitiveness at the international level. At the same time, the absence, for example, of a developed automotive industry, a potential source of skilled personnel, technology and connections with international partners, is a limiting factor.

Regarding the suppliers working in the industry, it should be noted that modern models of Russian aircraft often use imported components. On the other hand, Russian companies are also suppliers of world leaders. For instance, all civil aircraft made by Boeing utilize Russian titanium. VSMPO – AVISMA and Boeing began their collaborative work in 1993. Today, the Russian corporation provides up to 40% of the US company’s titanium needs. In 2006, companies established Ural Boeing Manufacturing, a joint venture to process titanium forgings. In July 2014, Boeing and VSMPO – AVISMA extended their contract for the supply of titanium for another eight years, with the new agreement lasting through 2022. The Russian company will continue to supply Boeing with rolled titanium in the annual quantities agreed upon to meet the needs of the company’s civil aircraft production.

 Furthermore, in August 2015, Boeing reported that VSMPO – AVISMA had become a key supplier of titanium stamping for the composite wing of the largest and most efficient twin-engine jet in the world - Boeing 777X.[[13]](#footnote-13) The company also has partnerships with the world’s leading aircraft and engine building companies, including SNECMA, Rolls – Royce, Embraer, Bombardier Aerospace, PFW Aerospace GmbH, Pratt & Whitney, and others.[[14]](#footnote-14)

In addition, VSMPO – AVISMA Corporation provides more than half of the titanium need of European aircraft construction concern Airbus. During International Aviation and Space Salon MAKS in July 2017, companies entered a new stage of their partnership: Airbus chose VSMPO – AVISMA as a supplier of new types of products including machined forgings for А350 XWB project. As part of new contract Russian titanium producer will supply products of different configurations for A350-900 pylon and landing gear fixturing structures.

Besides, European aviation concern closely cooperates with other Russian manufacturers. The SUAL group of companies is engaged in the supply of aluminum materials for Airbus, the Sokol aircraft plant produces components for their aircraft, the Irkut Corporation is making orders for the manufacture of units for the A320 family aircraft.

One of the most important components of an aircraft that has the greatest added value and innovation is the engines. At present, Russian aircraft engines occupy only 1-2% of the world market. One of the reasons for this is the low degree of cooperation between the industry's enterprises, leading to a lack of new technological solutions and products that limit the capacity of enterprises in the domestic and foreign markets. In order to improve the international competitiveness of the industry, the National Institute for Competitiveness proposed the initiative to create an aircraft engine cluster in one of the Russian regions.

It is worth mentioning, that comparison of suppliers’ localization in Europe and the USA highlight the certain tendency to create clusters in this segment and to reveal the difference in their internal organization. For example, in the USA clusters of aircraft-building enterprises are part of the aerospace sector. In Europe, aviation engine building sphere do not have a strictly defined center, and the relationship between them is realized through the creation of strategic alliances and coordinated through associations.

In recent years, a number of cluster initiatives in the sphere of aircraft construction are also developing in Russia. Since 2008, the project "Ulyanovsk - the aviation capital of Russia" has been launched. Being an aviation capital of Russia, Ulyanovsk unites airplane manufacturing, component suppliers, a design bureau, two airports, number of airlines, service and logistics services, and educational institutions that train the entire spectrum of aviation specialists.

Another large project, aimed to develop the aircraft construction in the country, was started by Presidential decree on creation of the National Aviation Industry Center in Zhukovsky as a science city located on the territory of the Zhukovsky urban district of scientific institutions, educational institutions, industry organizations and creation of new objects of transport, engineering and social infrastructure.[[15]](#footnote-15) This region was chosen as a center of an aviation cluster because of the historical premises and presence of appropriate production and scientific base.

* **Firm Strategy, Structure and Rivalry**

In the early 2000s, the industry represented a number of individual companies with a complex ownership structure, created on the basis of design offices and aviation enterprises. Most of the aviation enterprises were joint-stock companies, the main share of which belonged to the state. Thus, with the disintegration of management and the absence of a unified strategy, all aircraft manufacturers, however, belonged to the same owner.

As a result, the whole aircraft industry characterized with artificially created competition. On the one hand, it forced enterprises to independently seek ways to increase economic efficiency in the market environment, but, on the other hand, led to duplication of efforts (for example, the intersection of market segments in the SSJ100 and An-148 models) and the loss of effect scale. In the described form industry was almost uncompetitive at the international level. In case the following situation had appeared under the market conditions, there might be either final recession in the industry, or a wave of mergers and acquisitions. Considering this scenario, it was decided to start the process of integration.

First of all, in accordance with Presidential Decree № 140 of February 20, 2006 "On Joint-Stock Company United Aircraft Corporation" in order to preserve and develop the scientific and production potential of the aircraft building complex of the Russian Federation, ensure the security and defense capability of the state, concentrate intellectual, industrial and financial resources for the implementation of programs in aircraft creation, a United Aircraft Corporation enterprise was established.[[16]](#footnote-16)

Nowadays, UAC unites about 30 companies and is one of the largest players in the world aircraft manufacturing market. Companies that are part of the Corporation structure have the rights to such world famous brands as Su, MiG, Il, Tu, Yak, Beriev and also new ones - SSJ, MС-21.

The largest share in the structure of production is occupied by military products, both for the Ministry of Defense of the Russian Federation and for foreign customers, however, the company seeks to increase the share of civil aviation in the sales structure.

In the product line of the UAC, there are "niche", "transitional" and "breakthrough" products. Russia has very strong "niche" products in the production of transport and special aircraft. Among them there are a unique amphibious aircraft Be-200 and cargo airplane An-124. Transitional products include Sukhoi Super Jet (SSJ), which is considered to be a key project for the whole industry. Release of a new medium-haul aircraft MС-21, which is claiming competitiveness in the most demanded segment of narrow-bodied medium-haul aircraft, is going to be a "breakthrough" product on the market. A significant portfolio of orders for these products ensures constant capacity utilization in the medium term.

Several market players have expressed a great interest in those projects: as it was announced at the International Aviation and Space Show (MAKS) in July 2017, Sukhoi Civil Aircraft and Aeroflot signed a contract for the supply of 20 SSJ100 airplanes. Thus, by mid-2018, the fleet of Aeroflot will expand to 50 SSJ100s. In addition, the leasing company "Ilyushin Finance Co." has concluded a contract for the supply of 16 MС-21 aircraft of the airline Red Wings. The parties signed a preliminary agreement for 10 MС-21-300 in 2013. In the period 2019-2022 the planes will be delivered on the basis of operational leasing for a period of 12 years.

It is interesting to notice that, Russian aviation sphere is almost completely controlled by 5 state integrated structures: UAC, and Rosteс Group: Helicopters of Russia JSC, ODK JSC, Technodinamika JSC and KRET JSC. Internal competition in the industry is maintained only through competition between individual bureaus and factories for the promotion of a particular project, as well as through competition with international producers in the domestic Russian market.

In addition, recently, there have been heated discussions of the UAC and state-owned hi-tech corporation Rostec merger. As a result of such integration, Rosteс will invest approximately 30 billion rubles in the UAC to the program of creating a medium-range MС-21, in this scenario additional funds for this project from the federal budget will not be needed. If this business initiative will be implemented, Rosteс is going to be not only a producer of units, but also a manufacturer of aircraft equipment.[[17]](#footnote-17)

An analysis of the determinants of international competitiveness reveals all the ambiguity and uncertainty of the current situation of the industry. Strong global positions in the field of helicopter construction and military aircraft with the almost absolute absence of Russian civilian aircraft on the international market indicate the uneven development of the cluster and the incomplete use of technological and innovation potential. The “Diamond of Competitiveness” implies mutual reinforcement and interaction of factors. In this case, it is difficult to talk about the primary development or lagging of any of the determinants:

- *Factor conditions*.Such factor conditions like scientific and technological base of production experience remission in the positions, also the methodology of the project design is outdated. Problems of Russian manufacturers associated not only with production technologies, but also with the backlog of marketing technologies, the undeveloped infrastructure of maintenance and repair. But at the same time Russian market can be characterized with a strong potential in providing highly skilled workforce.

*- Demand Conditions***.** From the point of demand there is a clear need in single aisle airplanes with a capacity of 60-120 seats. Furthermore, aviation market is characterized with a concentration of regional transport in the central part of the Russia and is mainly focused on the Moscow, according to this, in the long term perspective there is a strong need in diversification of transport hubs.

*- Related and supporting industries*. First of all, it should be stated that aircraft construction has very close relationship with a wide variety of industries and spheres, because of that fascinating performance in one sector influences on the grow of other. Secondly, from the perspective of industry suppliers it has to be noted that even thought a vast majority of components used in the production of aircrafts are imported,Russian companies also tries to participate in the production cycle of world leading companies by supplying important components and establishing collaborations.

- *Firm Strategy, Structure and Rivalry.* Regarding the fourth factor in the “Diamond of Competitiveness” model, it can be concluded that basically Russian market can be characterized by the lack of market competition in the classical sense and the existence of artificially created competition between state corporations.

- *Independent forces: "government" and "chance".* From the perspective of the aircraft industry, the main event that can be attributed to the uncontrolled action that affected the development of the entire industry is the collapse of the USSR. After the break up, large aircraft enterprises remained outside the Russian borders: the Antonov scientific and technical complex in Kiev, the Kiev Aviant Aviation Plant, the Ivchenko-Progress State Enterprise, and others. As a result of the Soviet aviation industry devision, Russia completely lost the capacity to create civil and military aircraft.

## 1.2 Worldwide trends in the aircraft development

Another theoretical premise that will explain the current position of world aviation is the Paul Krugman’s theory of the scale effect.

In the early 1980's P. Krugman, K. Lancaster and some other economists have proposed an explanation for international trade based on the so-called economies of scale effect. The essence of this theory is that with a certain technology and organization of production, long-term average costs are reduced as the volume of output increases; there is a saving caused by mass production.

From the Krugman’s and Lancaster’s point of view, many countries (in particular, developed ones) are provided with the basic factors of production in similar proportions, and under these conditions it will be profitable for them to trade among themselves in industries characterized by the presence of the effect of mass production. In this case, specialization allows you to expand production volumes and produce the good at a lower cost, and therefore at a lower price. To realize the effect of mass production a sufficiently large market is needed. International trade plays a decisive role in this, because it allows expanding sales markets. In other words, international trade makes it possible to form a single integrated market, which is larger than the market of any single country, and thus makes it possible to offer consumers more products at lower prices.[[18]](#footnote-18)

At the same time, the implementation of the scale effect leads to the violation of perfect competition, since it is connected with the concentration of production and the strengthening of firms that become monopolists. Accordingly, the structure of markets is changing, which become either oligopolistic with the predominance of inter-industry trade in homogeneous products or markets of monopolistic competition with developed intra-industry trade in differentiated products.

The complex technological problems and high costs of production of aviation equipment form barriers in the market and are the reason that only a small number of countries and several large companies operate in the aircraft construction industry. In the world aircraft building market, thus, competition is oligopolistic in nature. Two main players compete on the market - Boeing Company (USA) and Airbus Corporation (Great Britain, France, Spain and Germany), actually they divide this market in half. The market of regional airplanes is in the hands of the Canadian company Bombardier and the Brazilian Embraer. At the moment, more than 70% of airplanes on this market are produced by three companies: Bombardier, Embraer and ATR (Italy). At the same time, China and Japan are very interested in producing their own medium-haul planes. Furthermore, the share of Russian manufacturers, united by UAC, in the market of civil aviation equipment supplies is about 1% for the last three years.

The economy of scale achieved by leaders makes it difficult for new players to enter the aviation market. So the small-scale nature of production and the lack of a stable pre-orders flow in the civil sector is an important restraining factor for the recovery of Russian aviation industry.

At the same time, international scientific and technical networks and the possibility of international cooperation, which are growing stronger under the influence of globalization, reduce entrance barriers, by decreasing the need for initial capital for the own production development of all components and financing of the corresponding R&D. The development of China's national aircraft industry also demonstrates the effectiveness of international cooperation strategy and the gradual integration into various segments of the value chain.

In 2015, the first developed and created single-aisle passenger liner C919 descended from the conveyor of the Chinese commercial aviation company Commercial Aircraft Corporation of China (COMAC). [[19]](#footnote-19) The C919 has a total of 785 orders, mostly from Chinese airlines and lessors. Furthermore, COMAC expects to start mass production of the plane after 2021 as it seeks to chase markets in Asia and Africa.[[20]](#footnote-20) The C919 liner is a passenger airplane designed for 150 seats. In terms of its dimensions and characteristics, it is comparable to the Airbus A320 and Boeing 737-800 aircrafts. As it is widely known, Airbus 320 and Boeing 737-800 are the most popular modifications, which are in high demand on the market. Now the world leaders are likely to have a worthy competitor in the global market of civil airplanes, at least due to the latest technology and materials, the C919 has an absolute advantage: the newest materials were widely used in the design of this aircraft. This draw increased attention in aviation business circles. The share of aluminum-lithium alloys of the third generation and progressive composite materials in the design of the C919 aircraft is 8.8% and 12% respectively.

The C919 release shows that China is able to produce high-class passenger aircraft and is able to become the world leader in civil aircraft production. In order to achieve such a dynamic growth, China needs to continuously innovate and raise the level of civil aircraft construction.[[21]](#footnote-21)

Significant pressure on competing companies is also provided by two other forces - suppliers and buyers of aviation equipment. The range of customers is quite limited, as the air transportation market is characterized by a high level of concentration, which means the client's ability to dictate a number of significant conditions to the manufacturer. Relations with the buyer acquire the character of long-term cooperation at all stages of the order fulfillment from the design of the aircraft to the complete exhaustion of its technical resource. Establishing long-term relationships between specific aircraft manufacturers and their customers complicates the task of winning a stake in existing segments for new players. In these relations, a third party plays an increasingly important role - leasing companies whose importance is increasing, since the high cost of modern aviation equipment and its rapid moral aging make the purchase of equipment unprofitable and in some cases impossible. As a result, direct trade in aircraft and related equipment is gradually replaced by their leasing.

The market for suppliers of major aviation aggregates is also characterized by high concentration. Thus, about 40% of engines’ market for passenger aircraft is controlled by Pratt & Whitney, whose products are used by manufacturers all around the world. For example, the Pure Power engines will be used both on Canadian C-Series aircraft and on the Russian MС-21. In relations with suppliers, two trends can be identified: intensive international cooperation and vertical integration. On the one hand, aircraft manufacturers cooperate with hundreds of suppliers around the world (for example, Airbus has about 1500 suppliers in 30 countries, in particular in the USA, Russia, Japan and China, Boeing cooperates with more than 5 200 suppliers in 100 countries) on the other hand, each of the aircraft construction concerns represents a vertically and horizontally integrated structure. Products of the Boeing Group, in addition to the well-known passenger aircraft, include communication and data processing systems, missiles, space satellites, helicopters and various defense complexes, so company, undoubtedly, belongs to the aerospace industry. The following graph describes the proportion of deliveries that company made in 2017, so the significant amount belongs to the defense, space and security sector.

**Graph 1.7** Boeing deliveries 2016-2017, pieces

Source: based on the information from the Boeing official website URL: <http://investors.boeing.com>

(Date of the application 11.02.2018)

 The products of the European Aeronautic Defense and Space Company (EADS) (the parent company of Airbus) also cover aircraft, helicopters and missiles. The synergetic effect of such a broad integration is seen as one of the competitive advantages of these groups. At the same time, the Russian Corporation UAC, not being integrated with the space industry, is engaged in production and maintenance of civil, military and dual-use aircraft.

Thus, such large corporations as Airbus, Boeing, Embraer, and Bombardier occupy leading positions mainly because of economies of scale and significant savings in the mass production of aircraft compared to smaller manufacturers.

Boeing has achieved such outstanding results mainly because of the state support to the industry provided through the procurement of military aircraft. Participation in the military contracts gives a chance to achieve economies of scale in commercial aircraft operations. Boeing, for instance, developed one of its most successful commercial airliners, the 707, as a modified version of a military tanker craft, the KC -135. This maneuver allowed company to spread costs over both types of aircraft, thereby reducing the average costs of each. Both jets in turn benefited from the experience Boeing had gained in developing the B – 47 and the B – 52 bombers.[[22]](#footnote-22) The obtained knowledge from both civil and military production gave the American producer a considerable advantage in the global market for commercial airliners sufficient to deter new entrants.

The establishment of Airbus challenged the Boeing dominance in the industry. French, German and British governments provided around 10-18 billion dollars of financial support, an amount equal to about 75% of the cost of developing Airbus airliners. As a result, by the early 1990s Airbus had developed series of commercial airplanes, which were capable of serving various types of routes. Undoubtedly, Airbus’s entry into the commercial aircraft industry had a dramatic impact on global market share.

The four aspects of the "Diamond of Competitiveness" model described above, can clearly explain main merits and drawbacks of the Russian aviation industry.

The analyses of factor conditions has shown, that on the one hand domestic aircraft fleet is quite old in terms of the physical state, even though government has already taken some actions to improve the situation with a high degree of depreciation of fixed assets and a large proportion of fully depreciated assets, furthermore, there has been a clear tendency towards remission in the positions of scientific, technical and technological support of aircraft production. On the other hand, among the weak parts of factor conditions in Porter’s model, there is one factor that is relatively developed: industry has a potential in providing highly skilled workforce, as Russian education system is very successful in preparing required specialists.

Moreover, despite the fact that in 2015 there had been a slight drop in the number of air passengers, there is still a great demand for airplanes. As it was announced at the International Aviation and Space Show (MAKS) in 2017, the Ministry of Transport of the Russian Federation assumes that until 2035 Russian airlines will need nearly 1130 new airplanes, 50% of which are single aisle airplanes. Part of the demand Russia intends to provide on its own: the country has already launched the production of short-haul Sukhoi Super jet 100, and from 2018 the medium-range MC – 21 will begin to be delivered. Still being at the stage of certification tests, MC – 21 already has orders for 175 planes. Nevertheless, it is obvious that Airbus and Boeing will still remain to be the main manufacturers of airplanes for Russian airlines.[[23]](#footnote-23) So, it is easy to see that aviation sector still has a perspective for growth.

According to Boeing's forecast,[[24]](#footnote-24) in the period from 2017 to 2036 the supply of new airplanes in the region of Commonwealth of Independent States will increase by an average of 1230 pieces. Over the next 20 years, international traffic is expected to grow at an annual rate of 5.3 percent driving a requirement in the region for more widebody airplanes. Concurrently, the development of low-cost carriers within the CIS market space is forecast to spur demand for single-aisle airplanes. CIS airlines are expected to need 830 single-aisle and 160 widebody airplanes to meet the increased demand for air travel. In addition, there is also requirement to replace an aging fleet of Russian and western-built airplanes. A little more than one quarter of the new deliveries to the region’s airlines are expected to replace existing stock. An estimated 220 regional jets, produced both in Russia and in western countries, will be required over the next 20 years, driven by air travel demand growth in the intra-CIS region. The structure of the aircraft delivery is expected to be the following:

**Graph 1.8** Boeing airplanes delivery forecast 2017 – 2036

Source: Current market outlook 2017-2036 URL: [www.boeing.com/cmo](http://www.boeing.com/cmo)

It is necessary to note that aircraft construction has close relationship with related industries. Having ramified production cycle, growth in aviation sector requires coordination of many spheres. Furthermore, some Russian companies are trying to participate in international projects, by supplying components for companies, like Airbus and Boeing. From the point of supporting and related industries as one of the factor for boosting competitiveness, Russia has strong potential to be one of the leaders on the market.

Another interesting feature is that aviation sphere is literally under control of main state integrated structures. Nevertheless, local producers have developed competitive "transitional" and "breakthrough" products: Sukhoi Super Jet (SSJ) and MС-21. A significant portfolio of orders for these products ensures constant capacity utilization in the medium term, but undoubtedly, lack of competition hinders dynamic sweep of the sector.

According to the Krugman’s theory of the scale effect while we talk about modest performance of Russian aviation industry on the global market it is vital to take into account the fact that the majority of international leaders have more favorable conditions in various aspects, at least they can maneuver costs and take advantage of scale effect. Considering all of the abovementioned facts, in order to boost competitiveness, Russian aviation industry at least need to increase the amount of production.

Under the current conditions, the implementation of such an ambitious plan for modernization of the entire aviation industry will be extremely difficult without the appropriate support from the state. In addition, world experience shows that government support can have a beneficial stimulating effect on various interested parties, which will ultimately only accelerate the implementation of the plans. It should be noted that the development of the aviation industry is a contribution to national security, furthermore, the industry ensures the development of high technologies used in related sectors of the economy, and creates a significant number of jobs. Creation of appropriate conditions and structure of the industry is the first step towards increasing the competitiveness of the aviation industry in global markets in the interests of transition to a non-primary model of the country's economic development.

# Chapter 2. Regulation of the aircraft industry in the context of WTO membership

## 2.1 Russia and the WTO: the main requirements for the aircraft industry

The experience of relations between WTO member countries, which produce and which buy civil aviation equipment, shows that the commercial relations, differences and mutual claims of these countries with respect to aviation equipment are regulated mainly by the Agreement on Trade in Civil Aircraft.

The following agreement was developed in 1979 during the negotiations in the Tokyo Round and entered into force for the 23 countries that signed it (32 members in 2018). Negotiations on the modernization of this agreement were initiated during the Uruguay Round. The contradictions between the negotiators did not allow the provisions of the original version to be substantially advanced, and by the end of the Uruguay Round it has remained in its original form. However, the discussion under this agreement was reflected in a number of exceptions, which were formalized as notes to the Agreement on Subsidies and Countervailing Measures, namely:

* 5% threshold used to determine serious damage under this agreement will not apply to civil aircraft (note 15 to article 6, paragraph 1 (a));[[25]](#footnote-25)
* WTO member countries recognize that in cases where royalty-based funding for civil aviation programs is not fully reimbursed, this in itself is not considered to be a serious harm (note 16 to article 6, paragraph 1 (d));
* the definition of subsidies that do not provide a basis for taking compensatory measures, which is contained in note 24, article 8, in paragraph 2 (a) of the Agreement on Subsidies and Countervailing Measures does not apply to civil aviation equipment.

So, basically, the Agreement on Trade in Civil Aircraft establishes a sectoral duty-free trade zone for the countries that signed the agreement for the export and import of civil aircraft, spare parts for them, equipment for the training of flight personnel and some other goods. In addition, it is important to note that the agreement does not apply to military aircraft.

The participating countries are obliged to reduce and remove restrictions on the entire range of goods covered by the agreement. Formally, this agreement is voluntary and is not an indispensable condition for the accession of a country to the WTO.

Currently, almost all WTO member countries, producers of civil aircrafts, are members of this agreement. These states insistently require that new members of the WTO, aviation equipment producers, should join Agreement on Trade in Civil Aircraft. Thus, during the process of accession, Russia was under strong pressure from the public, but anyway did not sign the agreement.

Even thought Russia is not a member of the agreement, it is important to understand which potential requirements and conditions for the aviation equipment market does Agreement on Trade in Civil Aircraft implies. From this point of view, it is necessary to analyze the most sensitive requirements for Russia that arose in the process of accession, as well as the potential consequences for the aviation industry.

A) First of all, it should be noted that the agreement presumes elimination of import duties and other tax burdens such as VAT and customs duties for the importation into the country of all aircraft other than military, as well as other aviation products mentioned in the agreement - all components and units of civil aircraft, engines for airplanes, their parts and components, as well as aircraft simulators.[[26]](#footnote-26)

In fact, Russia supposed to legitimize such an order of preferential import of foreign aircraft products, which might trigger harmful effect on the civil sector of domestic aviation industry.

The introduction of this order would inevitably mean an uncontrolled increase in the number of foreign aircraft in the fleet of Russian airlines, as local aircraft manufacturers in the next few years are not able to fully provide necessary supply comparable to those that foreign producers can offer in pursuing a policy of aggressive penetration of new markets through crediting of deliveries, leasing, postponement of payments and after-sales service. For the Russian aviation industry, this would mean the instant loss of potential orders, reduction in the number of work places and, ultimately, the loss of the civil sector as a direction of aviation industry.

In accordance with the third edition of the Russian proposals developed in the framework of negotiations on the conditions of foreign goods accession to the Russian market, the final level of binding of import tariff rates for product group 88 "Aircraft, spacecraft and their parts" was offered at a rate of 20%. In addition, the reduction of import duties is expected to be implemented within 8 years, which will greatly facilitate the adaptation of Russian aircraft manufacturers to competition with international manufacturers.

It is expected that such a level of import tariff rates in the medium term can provide sufficient protection for domestic aircraft manufacturers. However, in case Russia had become the signatory of Agreement on Trade in Civil Aircraft, it would hardly be possible to maintain import tariffs at such level. In support of this, an example of China's accession to the WTO can be given.[[27]](#footnote-27) During the accession negotiations, countries that occupy leading positions in the production of aircraft goods insisted that China should join the Agreement on Trade in Civil Aircraft as one of the conditions for joining the WTO, finally China obtained the status of an observer, declared that the country was not in a position to join the agreement in the short run.

In case of China it can be seen, that from the year 2001 China’s customs duties on civil aircraft and aircraft production materials are bound at very low levels, and so that the majority of reductions be made extremely quickly, within just a few months. Furthermore, China agreed in a special commitment to eliminating all non – tariff measures, including quotas and import and export licenses, for all civil aviation products. When China joined the WTO, it agreed to relatively harsher conditions than other developing countries. The service sector was considerably liberalized and foreign investment was allowed; restrictions on retail, wholesale and distribution ended. Banking, financial services, insurance and telecommunications were also opened up to foreign investment. As a result, the entire economy of China literally instantly plunged into competition with foreign companies, without having any transition period.[[28]](#footnote-28)

B) In addition, the Agreement establishes that any government-controlled procurement of aircraft must be carried out solely through the results of competitions, to which foreign manufacturers must also be admitted. Governments should not exert pressure on airlines and final manufacturers of aircraft when they choose suppliers of finished products or components.[[29]](#footnote-29)

In accordance with this rule, for Russia, where the majority of large airlines are either state-owned enterprises, such as Rossiya, or joint-stock companies in which the controlling stake belongs to the state, such as Aeroflot, this means that the state does not have the right, through its representatives in the management bodies of these enterprises, directly or indirectly to determine the technical policy in the field of aircraft equipment purchases, which should be made through a competitive tender procedures with the participation of foreign manufacturers. Furthermore, the aircraft building and aircraft repair enterprises owned or controlled by the state supposed to be in a similar situation.

C) Thirdly, according to the agreement, government financial support for the creation of civil aviation equipment should be included in the cost of the aircraft. Moreover, the price of civil aircraft must also take into account some of the costs incurred by the state in military aircraft construction programs, if civil engineering equipment is used for scientific and technical reasons, as well as aircraft assemblies and components created during the implementation of military aircraft construction programs.[[30]](#footnote-30)

Realization of this provision inevitably means liquidation of the basic competitive advantage - relative cheapness of the Russian aircraft equipment, as the cost of aircraft should involve budget expenditures (including those previously incurred) under federal programs for the development of civil aircraft and conversion, as well as military programs, which under Russian conditions are almost universally realized at the same aircraft manufacturing enterprises as civil ones. Moreover, other members of the agreement would compare how much the prices for Russian airplanes correspond to their understanding of the aircraft cost of production.

From the point of assessing the impact of these requirements on the prospects of the Russian aviation industry development, it is interesting to analyze the experience of China’s accession to the WTO and practice of mutual relations regulation in this sphere between the two main potential competitors, the US and the EU.[[31]](#footnote-31)

During the negotiation period, China agreed that if any subsidies or benefits are granted to the industry and state enterprises will be their main recipients, then the United States had the right to unilaterally take retaliatory measures in accordance with its domestic law. In addition, China was forced to agree that the US itself determine whether there was any provision for any subsidies or benefits, such as the provision of soft loans or the increase of share capital from budget funds.

In 1992, the United States and the European Union signed a bilateral agreement on subsidizing the development of civil aircraft construction in order to settle numerous claims related in particular to the ambiguity in the interpretation of some issues contained in the Agreement on Trade in Civil Aircraft and the lack of quantitative criteria for determining acceptable levels of state support.[[32]](#footnote-32) In accordance with Article 3 of this agreement, the US and EU mutually agreed not to provide direct state support to the production of civil aircraft, and this prohibition applied to both future and current programs. As it is stated in the article 4, in the field of R&D, the parties agreed that direct government support in the creation of new civil aircraft can only be provided if an independent expert confirms that for a maximum of 17 years all costs associated with the implementation of this programs, including reimbursement of funds allocated as state support, were fully recovered. At the same time, the total amount of state financing cannot exceed 33% of the total cost of development and must be repaid with interest at a rate not lower than that for which state borrowings are carried out. In addition, in accordance with Article 5 of this agreement, the annual total volume of indirect government support measures in the field of development and production of civil aircraft cannot exceed 3% of the annual production of the civil aviation industry and 4% of the annual production for an individual enterprise.

The example of China’s negotiations shows what kind of strict conditions the aviation industry may face. Undoubtedly, in the case of Russia, such harsh requirements would lead to the extremely unfavorable conditions for the industry, moreover, any possible competitive advantages would be impossible to preserve.

Since Russia assumed to be a direct competitor to the US and the EU on both the domestic and foreign markets, it can be expected that under the Agreement on Trade in Civil Aircraft, United States of America and the EU would require Russia to accept similar, if not more strict, commitments in this area, that would also have an extremely negative impact on the prospects for the competitive development of the civil aviation industry.

**D)** Furthermore, according to article 3, the Agreement on Trade in Civil Aircraft supposes elimination of technical barriers to trade in civil aviation equipment. As applied to this type of technology, this means the harmonization of the rules for the certification of aircraft technology and its production standards.

There is no need to prove that for Russia this requirement can mean a transition to the Western standards of airworthiness and production standards as absolutely prevailing in world practice and thereby depriving it of an important tool for pursuing an independent industrial policy.

**E)** In addition, Article 7 of the agreement extends the abovementioned requirements to the regional and local levels. Several measures connected with support of domestic aircraft manufacturers are banned for implementation not only for the federal government, but also for regional and local authorities. Under the circumstances of Russian experience, this requirement is of paramount importance and is fraught with significant negative consequences for aircraft manufacturing enterprises.

The implementation of these requirements will have painful consequences, for example, in the aircraft industry of the Republic of Tatarstan, as one of the leading regions in terms of the aviation sector development level. More than 20 aviation enterprises are concentrated here. Among them, six companies produce aircrafts, more than 15 industry institutes involved in the development and design of components for the aircraft industry. As a result of an active participation in federal target programs and implementation of investment programs, local aviation enterprises have developed new modifications of Mi-17V5, Ansat, Mi-38 helicopters, (Kazan Helicopter Plant OJSC), NK-38 gas turbine engines, NK-25, (KMPO, KPP Aviamotor), composite production (KAPO-Composite CJSC), MVEN aircraft (Murena and Expedition aircraft, Farmer aircraft).[[33]](#footnote-33)

In addition, aircraft manufacturing enterprises located in other Russian regions such as Perm, Ulyanovsk, Voronezh, Samara - will also suffer considerably. Thus, joining to the Agreement on Trade in Civil Aircraft in the process of negotiations on Russia's accession to the WTO could lead to the loss of the main competitive advantage of Russian aircraft - its relative cheapness - due to the mechanism of price setting in the WTO.

In addition, one of the key consequences is the strengthening of competition in the domestic market, including in the market of components, spare parts and repair work. Despite significant progress in the industry, domestic aircraft construction still needs a gradual increase in the level of competition from foreign aircraft manufacturers, that is, the Russian market is not ready for an uncontrolled influx of imported products.

At the same time, it should be noted that as a result of the merger, the aviation industry of the Russian Federation still faces difficulties in increasing its competitiveness due to the rejection of existing and prospective plans to promote domestic aviation equipment to foreign markets due to their incompatibility with WTO requirements in terms of forms and methods of state support.

As Russia is not a member of Agreement on Trade in Civil Aircraft and is not obliged to reduce import duties on aircraft and their components until zero, it is still has a duty to set tariffs in accordance with the General Agreement on Tariffs and Trade (GATT), which means that import customs duties on foreign aviation equipment will decrease in strictly defined terms.[[34]](#footnote-34) The final values ​​of rates (bonding levels) and the time periods for achieving them (implementation periods) were determined in the course of bilateral negotiations conducted by the Russian delegation with representatives of WTO member countries and recorded in the annex to the Protocol on Russia's Accession to this organization.

According to the reached agreements, import duties for civil aircraft of various classes should be reduced within four to seven years from an initial level of 20% to 7.5%, 8%, 10%, 12.5%, depending on the class of aircraft.

Table 2.1

**Russia's obligations to reduce import customs duties on airplanes under WTO**

|  |  |  |
| --- | --- | --- |
| Weight of the airplane, tons | **Passenger Airplanes** | **Freighters** |
| *≤ 50 places* | *50-300 places* | *≥ 300 places* |
| **≤ 2** | **20 % -> 10 %** until 2019 |
| **2-15** | **20 % -> 8 %**until 2017ATR 42, EMB-120, Q200/300, QRJ200 | **20 % -> 8 %**until 2017ART72, Saab 2000, Ан- 140 |
| **15-20** | **20 % -> 7,5 %** until 2016 | **20 % -> 7,5 %** until 2016 |
| **20 % -> 12,5 %**until 2019 | **20 % -> 12,5 %**until 2019CRJ700, Q400, Ил-114 | **20 % -> 12,5 %**until 2019 |
| **20-90** | **20% -> 7,5%** until 2016B767 (BJ) | **20% -> 7,5%** until 2016B767 | **20% -> 7,5%** until 2016 | **20% -> 7,5%** until 2016B767F |
| **20 % -> 12,5 %**until 2019Business jets | **20 % -> 12,5 %**until 2019SSJ-100/NG Ан-148MC – 21, Ту – 204 A320, B737 | **20 % -> 12,5 %**until 2019 | **20 % -> 12,5 %**until 2019 |
| **90-120** | **20% -> 7,5%** until 2016B767(BJ), B787(BJ)A330(BJ) | **20% -> 7,5%** until 2016B767, B787, A330 | **20% -> 7,5%** until 2016B767, B787 | **20% -> 7,5%** until 2016B787F, A330F |
| **20 % -> 12,5 %** until 2019 | **20 % -> 12,5 %** until 2019 | **20 % -> 12,5 %** until 2019 |
| **≥ 120** | **20% -> 7,5%** until 2016A330, A340, A350, B777, B747, A380, Ил-96 | **20% -> 7,5%** until 2016A340F, A350F, B777FИл-96Т, B747F, A380F, Ан-124 |
| **20 % -> 12,5 %** until 2019 | **20 % -> 12,5 %** until 2019 |

Source: based on the information from the Report of the Working Party on the accession of the Russian Federation to the WTO, 2011 URL: <https://www.wto.org/english/thewto_e/acc_e/a1_russie_e.htm> (Date of the application 21.02.2018)

According to the initial requirements of the negotiations, the US sought the Russian Federation to completely abolish duties on aircraft and components, however, during the negotiation process in December 2003, softened the requirements and asked to set the level of import duties at least 10%, while the Russian side insisted on lowering rates from 20% to 15%. Especial interest of the USA conditioned with the prospects of the sales market in Russia and CIS countries, as the world's largest producer of airliners.

Throughout the negotiation process, issues related to the aviation equipment were among the most problematic, disagreements in this field were maintained for a long time. In the end, the Russian side tried to come to a consensus on the most favorable terms for itself.[[35]](#footnote-35)

The two crucial features of Russian tariff obligations are worth mentioning. The first of these is that, for a number of commodity groups, de facto import duties have already been nullified (indicated in darker color in Table 3), despite the possibility of keeping them at a non-zero level. Perhaps the most typical example of this situation is the commodity groups to which the passenger wide-body aircraft belong. The second feature is that commodity groups that are the most sensitive to Russian aircraft building have received the highest level of protection - both at the final level of the import tariff and the duration of the implementation period. For example, the group to which the regional An-148 belongs, the Sukhoi Super jet 100 and its modification Sukhoi Super jet NG, as well as domestic trunk airplanes (Tu-204 and the prospective MС-21), is protected from competitors in the largest degree: the final binding level is the maximum – 12,5% and the implementation period is the longest – 7 years. Russia undertook similar obligations for the commodity groups of helicopters and aircraft engines.

It should be noted that the reduction of import duties can be compensated by protective measures introduced in accordance with WTO rules in case of threat that domestic producers can be ruined due to a sharp increase in imports or the use of unfair trade practices by importers.

The WTO recognizes that governments can provide subsidies to a national producer, pursuing various trade and political goals. The WTO system regulates only those subsidies that distort the conditions of competition in international trade. The basic principles and approaches to this problem were elaborated in the Agreement on Subsidies and Countervailing Measures. [[36]](#footnote-36)

The agreement divides industrial subsidies provided by governments into forbidden and permitted ones. Prohibited subsidies are called red subsidies; permitted, but punishable subsidies, in cases where subsidized exports cause damage – yellow; permitted and non-punishable subsidies – green.

The prohibited subsidies (the so-called "red basket") include export subsidies and subsidies aimed at encouraging the use of local goods in relation to imported ones. Annex I to the Agreement on subsidies and countervailing measures provides an indicative list of export subsidies. These, for example, include direct export subsidies; programs that allow for the retention of currencies, any such practice that entails the payment of a premium when exporting; domestic transport and freight tariffs for export shipments, established or levied on more favorable terms in comparison with transportations on the domestic market.[[37]](#footnote-37) Firstly, GATT-47 prohibited the granting of export industrial subsidies only to developed countries, after the Uruguay Round this provision also applies to developing countries, they are given an 8-year transition period to amend the practice of subsidizing. They cannot increase the level of their export subsidies during this period. At the same time, LDCs and members with a GNP per capita of less than $1000 per year are exempted from the prohibition on export subsidies.

Actionable subsidies (the so-called "yellow basket"), in turn, are divided into two categories: "specific" and "non-specific." "Specific" subsidies are those cases, when the import of subsidized goods leads to a negative impact on trade in the importing country. As a consequence, the importing country has the right to take retaliatory measures to remedy the situation. Such retaliatory measures may take the form of countervailing duties. But it is necessary to prove the fact that subsidized imports cause serious damage or directly threaten the serious damage to the national industry. In addition, the importing country has the right to bring the matter to the consideration of the Trade Dispute Settlement Body and to abolish or change the subsidy system of the country whose subsidized exports distort trade. A subsidy is specific if it is provided:

* to an enterprise or group of enterprises;
* to the industrial sector or a group of sectors;
* to a specific geographic region.

For example, low domestic energy prices are considered as a subsidy, but it is provided to all Russian enterprises and, therefore, is not specific.

Non-actionable subsidies (the "green basket") are subsidies that do not provide a basis for the proceedings, that is, in fact, subsidies that are actually permitted. Such subsidies include the financing of research and implementation of results; subsidies to regions in unfavorable conditions; funds allocated for environmental protection.

However, subsidy programs should be notified to the Committee on Subsidies and Countervailing Measures established in accordance with the Agreement. In addition, if an allowable subsidy entails "serious adverse effects" for the national industry of a WTO member, causing it "damage that is difficult to eliminate", then that WTO member may initiate consultations within the committee and he may authorize the application countermeasures in proportion to the damage caused.

The government can influence on the implementation of innovative and investment processes by various methods. As a rule, state support is aimed to create favorable conditions for the development of the industry, regulation and active participation of the state in its financing.[[38]](#footnote-38)

The Russian Federation's accession to the World Trade Organization significantly influenced the support tools for aviation industry enterprises, because a number of measures that were applied by the Russian government contradicted the WTO norms, as they were included in the red basket. Before the accession there were the following types of government support in aviation industry:

* state contributions to the capital of the United Aircraft Corporation (UAC), used to repay corporate debts to credit institutions and to finance R&D;
* subsidizing of Russian lessors in terms of the costs of paying interest on loans received from Russian credit institutions for the purchase of Russian aircraft with subsequent transfer to Russian airlines under leasing agreements in accordance with Russian Federation Government Decree № 1073 of October 22, 2012;
* reimbursement of part of leasing payments for technological equipment supplied by Russian leasing companies of the aviation industry;
* reimbursement of lease payments costs for Russian-made aircraft leasing to Russian airlines and interest on loans taken by Russian airlines for this purpose;
* financing of R&D and capital investments in accordance with the Federal program "Development of Civil Aviation Equipment in Russia for 2002-2010 and for the Period until 2015"[[39]](#footnote-39);
* stimulation of the growth of production of high technology products through the provision of state orders for the acquisition of Russian aviation equipment.[[40]](#footnote-40)

Recognition of subsidy facts required corresponding explanations and obligations. So, in terms of increasing the capital of the UAC, the Working Group adopted and recorded the explanations of the Russian representative that the measure was an anti-crisis measure (liquidation of the consequences of the global financial crisis of 2008-2009) and was of a one-off nature.[[41]](#footnote-41) With regard to subsidizing interest rates on loans and leasing payments carried out by enterprises of the aviation industry for technical re-equipment, it was noted that it does not have a "specific" nature, the effect of these instruments of state support extends to technological equipment of both domestic and foreign production (in fact - mostly foreign). Regarding the reimbursement of leasing payments to Russian airlines on Russian-made aircraft leasing, as an emergency measure of support, government has revised the subsidy program, which was in force since 2002, in part of the leasing costs of new domestic airplanes: instead of subsidizing directly interest rates, subsidies were introduced to banks, which, therefore, should provide lower interest rates to leasing companies.[[42]](#footnote-42)

As for the budget financing of R&D and capital investments of the Federal program "Development of Civil Aviation Equipment of Russia for 2002-2010 and for the Period until 2015", this type of state support is one of the main allowed within the WTO rules. After Russia's accession to the WTO in accordance with the agreement on government procurement, public procurement should be fully open for the participation of foreign competitors. The implementation of this agreement blocks one of the most important mechanisms for the development of science-intensive machine building. Without the acquisition of domestic technology by state-controlled corporations, the resuscitation of the domestic aviation, shipbuilding, machine production, electrotechnical and a number of other branches of the high-tech industry will be impossible.[[43]](#footnote-43)

## 2.2 Russia and the WTO: arrangements reached in the regulation of the aircraft industry

Historically, the production of aircraft is linked with the military industry. Today, the strategic importance of aircraft construction is based not only on maintaining the military, but also, to a greater extent, the economic power of the country, which forces governments to actively support aircraft manufacturers. So Canada, Brazil, Japan, China and India openly support the development of the national aerospace industry, investing in it significant funds and financing specific projects, which, from the point of market leaders, does not fully meet the requirements of fair competition.

At the same time, leading aircraft manufacturers resort to state support at certain stages. For example, government support for Airbus when creating the A-300 was 100% of the costs, while the A-330 / A-340 was 60%. At the same time, the funding of scientific research was carried out on non- reimbursable basis.

The competition of key market players often goes to the state level. So in 2005, Boeing and Airbus filed a mutual complaint with the World Trade Organization about the violation of the US-EU agreement signed in 1992, in which the parties refused state subsidies to the national aviation industry. The settlement of the conflict was already at the state level. The Russian aviation industry at the current stage has substantial state support and is developing an appropriate state program.

The basic principles of the state policy of the Russian Federation in the field of such a high-tech area as aircraft construction for a long-term perspective include: maintaining Russia's status as a world aviation state; updating the fleet of civil aircraft to ensure transport accessibility throughout the country; maintenance of scientific, research, technical, production and technological and human resources at the level, which will ensure effective aviation activity; the buildup of the combat potential of military aviation in accordance with the requirements for ensuring the country's defense capability; maintenance of domestic aviation equipment quality, so that it will be competitive in the world market; the development of international cooperation and the expansion of domestic aviation organizations in the markets of aviation equipment and aviation services.

The main problem areas of the Russian aviation sector, described earlier, and its targets were reflected in the state program of the Russian Federation "Development of the aviation industry for 2013-2025", approved by the decree of the Government of the Russian Federation in 2012.[[44]](#footnote-44) The main objective of the state program is to create a highly competitive aviation industry and to consolidate its position in the world market as a third manufacturer in terms of the output of aviation equipment (graph 6). Quantitative indicators of the competitiveness of the aircraft building industry are its share in the world market and the level of labor productivity.

\*Revenue for the production of civil aircraft in the largest US companies: Boeing ~ $ 59 billion (final assembly only in the US), Gulfstream Aerospace Corporation ~ $ 7 billion (final assembly only in the US), Textron ~ $ 3 billion (final assembly only in the US)

\*\*The revenue of the EU companies in civil airplanes of the Airbus Group is ~ $ 52 billion (the final assembly in the EU and China), Falcon (Dassault Aviation) ~ $ 3 billion (the final assembly only in the EU)

\*\*\*AVIC assembled ~ 50 Airbus 320 and a number of small aircraft models

**Graph 2.1** Production of civil aircraft by country in percentage

Source: based on the information from official websites of Euromonitor, Boeing Corporation, Airbus Corporation, United Aircraft Corporation, Strategy Partners Group

State participation in the management of final integrators (aircraft and helicopter construction) and manufacturers of aviation components (engines, avionics, units) will be differentiated, since these industries require different methods of support, and the sustainability of their development can be ensured only if each of them is self-sufficient. The state program consists of the following subprograms:

* Sub-program 1 "Aircraft construction"
* Sub-program 2 "Helicopter construction"
* Sub-program 3 "Aviation engines construction"
* Sub-program 4 "Aviation machine construction"
* Sub-program 5 "Aviation equipment construction"
* Sub-program 6 “Small Aviation”
* Sub-program 7 “Aviation Science and Technology”
* Sub-program 8 "Ensuring the implementation of the state program"

In order to assess the implementation of measures, 8 out of 9 of these subprograms are invited to introduce and monitor their own set of so-called integrated indicators (indicators), which includes revenues from the sale of goods, products, works and services; return on assets; labor productivity at enterprises of the aircraft construction

The total volume of budget allocations for the implementation of the state program will be approximately 137.1 trillion rub.

**Graph 2.2** Budget allocations for the implementation of the state program of the Russian Federation "Development of the Aviation Industry for 2013-2025"

Source: Development of the aviation industry for 2013-2025 URL: <http://programs.gov.ru/Portal/programs/passport/19>

The key tasks of the aviation industry are to create conditions for ensuring the country's security and transport accessibility for the population of all regions of the Russian Federation. The main features of the world market of aviation equipment and components over the past decades are a significant volume and a stable growth in demand. It is expected that the main driving force for the development of aircraft construction will be the increase in passenger traffic, which is going to double until 2025 according to the forecast (graph 7).

\*RPK - Revenue Passenger Kilometres

**Graph 2.3** World annual passenger traffic

Source: Airbus Global Market Forecast Growing Horizons 2017 – 2036 URL: <http://www.airbus.com>

One of the main trends in the development of the aviation industry in the world over the past decades has been the separation of final integrators roles, first-tier integrators (suppliers) and suppliers of levels 2 to 4 within the concept of "from production to integration". The first level include the Boeing and the Airbus, they are engaged in the development, integration and final assembly of aircraft. The second level includes such companies as Hamilton, Rockwell Collins, Safran, engaged in the development and production of major airborne systems and aircraft systems. At the same time, 1st level integrators (suppliers) increasingly determine the development of the aircraft manufacturing market as a whole.

The fourth level of integrators is responsible for the systems, technology control and assembly of the aircrafts. They also provide design support function. The existence of 1st and 2nd level integrators (suppliers) allowed the final integrators to share the risks of implementing projects and attract additional investments in their programs, which positively affected the sustainability of their development. Integrators (suppliers) of the 1st level are responsible for the development and integration of large systems and form their own cooperation and supply chains. At the same time, only 10% of components produced by suppliers of 2 - 4 levels go directly to the final integrator.

For instance, in Boeing 777 program in 1995 there were 200 suppliers, while 10 years later in program Boeing 787 only 40 suppliers - integrators of the 1st level participated. The suppliers themselves had the opportunity to increase the scale effect in production, which had a positive impact on the cost of components production.

In Russia, such a division is not completed yet: competitive integrators (suppliers) of the 1st level have not been formed, and final integrators have a high degree of vertical integration. In addition, with the exception of the SSJ-100 aircraft, Russian manufacturers use mainly domestic components, furthermore, they do not effectively use the methods of electronic design and are not included into the chain of international cooperation.

The implementation of the measures envisaged by the state program will make it possible to generate profitable, world-class corporations in key segments of aircraft manufacturing, which offer competitive products on the world market. The needs of the Russian Federation in aircraft will be largely met by Russian technology (the share of the domestic market of aircraft with a capacity of more than 85 seats, provided by domestic aircraft, will grow from 30% in 2012 to 49% in 2025).

Target values of the State Program indicators are represented for individual years, and in the period from 2020 to 2025 they are presented indicatively. The program implementation will result in the achievement of the following target values by 2025:

* increase in the total revenue of the aviation industry to 1775 billion rubles (in 2011 - 504 billion rubles);
* increase in the world market share in the civil and military aircraft manufacturing segment to 3.6% and 11.9% respectively;
* increase in profitability of sales on net profits of industrial aviation construction organizations to 8.5% (in 2011 - 3.7%);
* increase in the return on assets of industrial organizations in the aviation industry to 7.5% (in 2011 - 5.9%).

Within the framework of the State Program, the tools for supporting aircraft construction were substantially adapted to the conditions of the WTO. The government took certain steps to support the aircraft industry. For example, in the Ulyanovsk region, authorities have created a system for attracting investments and technologies, moreover, an infrastructure for the development was organized, including a special economic zone, regional industrial zones, industrial parks, clusters, and technology parks. Also, more comprehensive legislation was adapted. Furthermore, enterprises that produce aircraft are granted a property tax exemption in the form of a reduced rate of 0.95%.[[45]](#footnote-45) For Aviastar – SP company, one of the leaders in the country's aircraft building industry operating in the region, the total amount of the tax savings for the period 2012-2014 amounted to about 260 million rubles.[[46]](#footnote-46)

At the end of 2012 in the Ulyanovsk several regional laws began to operate, providing tax benefits to organizations that provide leasing services for aircraft. Due to these normative acts, zero rates for property and transport taxes, and a profit tax of 15.5% were set. Thus, in comparison with 2012 the volume of the aircraft building industry increased by 100 billion rubles in 2013.

One of the main directions in the reforming of the industry was a significant increase in the volume of funding for scientific research, a tool, which is not prohibited by the WTO rules. In addition, the current mechanisms for supporting sales (subsidizing leasing, subsidies for loans for the production of export products, subsidies for loans for technological upgrades) have been adjusted so that they do not conflict with WTO rules. An important incentive contributing to the development of the aviation industry in Russia is still state support provided in the form of industrial subsidies. Providing state support to aircraft building companies is a common form in the world practice related to the specifics of production and financial and economic activities. It is known that aircraft construction is characterized by:

* significant volumes of equipment procurement;
* significant amounts of lending and borrowing;
* irregular payments and financial income;
* high material and labor intensity of production;
* the significant duration in creation of the main products.

And thirdly, and this is currently the most important element in supporting the aviation industry, the Ministry of Industry and Trade has developed new mechanisms that will provide favorable starting conditions for the domestic developers and manufacturers of aviation equipment, in particular:

* provision of state guarantees for the residual value of domestic aircraft;
* subsidizing of primary sales;
* budget financing on a returnable basis

In accordance with the first mechanism, in the process of aircraft acquisition, the supplier is obliged to resell (for example, in the 6th and 12th years after the sale) and pay up to 25% of the estimated **residual value** if the selling price in the market is below the established residual value or will be 10% of the starting price.

However, at the initial sales period there is no market estimation of the new product’s residual value. Therefore, at the time of the sale, both buyers and financial institutions, fairly insuring themselves against risks, put forward substantially more stringent requirements both for the time of possible repurchase (without restrictions) and on repurchase guarantees (in the limit of the full amount of the residual value). Thus, in order to ensure that such guarantees are acceptable by aircraft buyers, they must be provided by a financial institution with a reliable credit rating. It is suggested that "Bank of Foreign Economic Activity" (Vnesheconombank) should be involved in certain transactions for this purpose as an additional guarantor for the manufacturer's obligations under guarantees of the residual value. The mechanism for granting guarantees of the residual value from the manufacturer with the provision of Vnesheconombank is proposed to be implemented as follows: the producer (the guarantor) guarantees the recipient of state guarantees of the residual value (to airlines, leasing companies, creditor banks) that, under the terms of the guarantee agreed upon, airplane can be sold on the market at a price not lower than stipulated in the contract. Otherwise, the guarantor compensates the difference between the sale price and the guaranteed price, but no more than the limit set by the contract or purchases the aircraft at the price specified in the contract. Thus, Vnesheconombank will act as sponsor of the manufacturer for guarantees if the guarantor is unable to fulfill its obligations under the guarantees of the residual value due to financial insolvency. Accordingly, Vnesheconombank will need to create reserves for possible aircraft remarketing.

The Ministry of Industry and Trade also proposed a mechanism for **subsidizing primary sales** of aviation equipment. The only way to enter the market is to subsidize the producer at a level that allows the buyer to purchase the product at a lower price. In parallel, guarantees of residual value will be provided and investments will be made in the establishment of the after-sales service system.

Primary sales remain the most risky and unpredictable, which means that the aircraft manufacturer is the most vulnerable at the moment when it introduces new equipment to the market. According to the state program, when the player has a well-established reputation and after-sales service system, he does not need to create additional reserves for maintaining airworthiness and give the buyer significant discounts - just enough to reduce the price of the first 50-80 planes by 10-20%. The cost will increase to the market value only when the aggregate fleet of the appropriate type of aircraft will be 100-150 units.[[47]](#footnote-47)

Of special interest is the mechanism of **budget financing on a returnable basis**, which is currently not used in Russia, but is widely used abroad. This tool is designed to provide the aviation industry with long-term borrowings to carry out development work in new and ongoing projects of the aviation industry, while retaining a strong market motivation.

The use of this mechanism should provide companies with access to significant amounts of financing with conditions no worse than those of competitors. According to the strategy, it is expected that within the framework of this mechanism, companies will receive funds for up to 25 years in tranches within the first 10 years, and the amount of funding, of course, will depend on the specific project, but can only cover up to 75% of its needs. The beginning of payments to the budget will depend on reaching a certain level of sales, and the scheme for repayment of funds will be calculated individually for each company. In order to avoid unfair use of the funds, companies need to undergo a certain kind of control, which may be stricter than for the remaining projects of the aviation industry.

It is important to note that the money will be provided only if the organization cannot attract funds by other methods, therefore the program is aimed at helping companies that really need financing. Such steps will be extremely useful in order to enable small companies that do not have a noticeable competitive advantage to implement projects and compete with large market players. In addition, there are several advantages of using this mechanism:

Firstly, this form of state support provides access to financial resources, under the conditions of limited supply from the capital markets, because of the significant volume of initial investment needed and the length of payback period.

Secondly, it attracts the significant amount of financial resources of commercial banks. This happens mainly because budget financing on a returnable basis leaves the company free cash flow to service commercial loans in the early periods of sales (due to the long-term nature of government support, determined in accordance with the timing of sales).

And finally, this mechanism increases the reliability of the company in servicing commercial loans, since the state takes on a significant part of the risks associated with the possible reduction of cash flow.

In order to form a full picture of the impact of state support on the aviation industry, it is necessary to consider the experience of foreign countries in applying various subsidies For instance, the scheme of repayable financing has some differences among the countries: Japan’s repayable launch investment works differently than Europe’s on Airbus A320, A330, A340 and A380 aircraft. For example, in Europe Airbus pays back royalties to the European governments for each aircraft delivered (est. $1m per A320). In Japan, the repayable portion of aircraft subsidies on the 767, 777 and now 787 go back to a fund for investing in future programs, so in reality the Japanese government never really gets its money back. It has been estimated that the Japanese government will be funding over $1.5 billion in subsidies to support the 787 program, consisting of 30% non-repayable grants and 70% in repayable loans.[[48]](#footnote-48)

Furthermore, as it was announced at the beginning of 2017 government of Canada had taken a decision to provide $372.5 million as repayable loans to Bombardier. These funds have been allocated for research and development (R&D) activities for the Global 7000 and CSeries business jet programs. [[49]](#footnote-49)

If we take into account the example of United Kingdom, it can be seen that the main tool of state support in UK is subsidies in research and development projects.

First of all, as part of the government-industry 3.9 billion pounds commitment to the sector, there were a joint investment of 14 million pounds with Rolls – Royce and Loughborough University in a collaborative research and technology project to reduce engine emissions. The confidence provided by this type of support has helped Rolls – Royce to invest 75 million pounds in the new facility, to design and develop engine control systems. These systems are integral to the production of the company’s latest aircraft engines, for which they have an order book of over 70 billion pounds supporting thousands of jobs across the UK. The 3.9 billion pounds mentioned here was a commitment made by the Government in 2013, than extended by 6 years until 2026.[[50]](#footnote-50)

Secondly, government is participating in activities on the basis of a long-term partnership, reinforced by a joint government-industry commitment to funding 3.9 billion pounds of R&D projects between 2013 and 2026. Even though UK aircraft sector is one of the leading, competition is still quite intense.

Answering the burning question which instruments of state support, consistent with WTO rules, can be used in Russian aircraft industry – investment in R&D is one of the solutions. On average development of a new aircraft takes 10-15 years, according to this fact long-term and stable R&D funding is a key factor in deciding whether, and where, investments are made.

UK government also tries to use other paths to help aircraft industry, for instance, thought Aerospace Growth Partnership (AGP) and Aerospace Technology Institute (ATI). There is a list of proceedings AGP has taken to support aircraft production:

* The first one is launching of the UK Aerospace Supply Chain Competitiveness Charter. It gives an opportunity for companies to share technologies and experience;
* Authorities are willing to support 114 collaborative projects in over 250 companies through the National Aerospace Technology Exploitation Program (NATEP);[[51]](#footnote-51)

UK government also supports export of aircraft products. For example, UK Export Finance provides insurance to exporters and guarantees to banks in order to share the risk of financing UK exporters. The body also provides loans to foreign companies, which are interested to buy goods and services from English companies. Aircraft industry, being a vital exporting industry, has benefited significantly from UKEF support, even thought, it has been reduced in 2016-2017 in comparison to the previous year.

In order to fully disclose the role of the state in the aviation industry of the Russian Federation, it is also necessary to consider the participation of the authorities in the development of ground-based infrastructure. Management of non-core commercial activities has become a key issue for the improving of airport performance. Today airports have increased dramatically their dependence on non-aeronautical revenues, which on average account for half of all revenues with this share being highly heterogeneous across regions and airports.[[52]](#footnote-52)

 For various reasons, the development of non-aeronautical activities in Russian airports began relatively recently - approximately since the mid-1990s. Firstly, this is due to the peculiarities of the civil aviation economy of the Soviet period, and secondly, to the organizational and legal form of airports’ existence.

Nowadays, there are three main forms of public-private partnership in the operation of Russian airports: direct sale to a private investor, special project vehicle (SPV), concession (table 2.2).

In case of the direct sales to a private investor, it is assumed that funds will be quickly received and there will be minimum administrative costs in the project. Later private investor determines the ways of development for the main airport operator, based on the business logic. At the same time, the existing legislation of the Russian Federation on privatization does not allow to impose any obligations on the private investor to develop the airport, leaving the implementation of the investment program at the airport at the discretion of the new owner. In theory, the owner is interested in the development and capitalization of his asset, but the practice in reality is different.

The creation of the SPV involves the signing of an investment agreement and the gradual exit of the state from the capital of the main airport operator at certain phases of the project. The core differences from direct sale are that the state retains control over the implementation of the investment program by the private partner and that with this form of partnership the budget revenues are minimal or equal to zero at all.

In case of concession, the investor has a right to conduct commercial activities at the airport (including the obligation to implement the investment program) for the period of the concession agreement. According to the standard scheme Built - Operate - Transfer (BOT) of project financing, the property is first transferred to the investor, then it is returned to the concessor (state), including all newly created objects.

Thus, in fact, it is not the property that is alienated, but the right to receive income from the activity of being main operator. At the end of the concession agreement, the state (federal or regional government) may decide the future destiny of the main operator at their will.

Table 2.2

**Main forms of public - private partnership (PPP) development in airports of the Russian Federation**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct sale to a private investor | Special Project Vehicle (SPV) | Concession |
| Distribution in the Russian Federation | **Medium***(Novosibirsk, Krasnodar, Sochi, Volgograd, Rostov-on-Don, Khabarovsk)* | **High***(Ekaterinburg, Kazan, Samara, Nizhny Novgorod)*At the implementation stage: *Perm and Mineralnye Vody* | **Low**in comparison to foreign countries and the CIS *(Pulkovo, Domodedovo)* |
| The degree of state control of a private investor | **Low**In the case of partial sale, the possibility of certain control remainsFormally, the state's influence on the investment process is absent in the event of complete alienation of property | **Medium/Low**The agreement within the framework of SPV presupposes the investor's obligations to the entity (volume of investments, terms, penalties). | **Medium**Preservation of the possibility to control the quality of services and fulfill the obligations of the investor through a special company *(Pulkovo)* |
| Profit for the government | **One-time** | **One-time****(usually)**It may be absent if the state retains a stake | A **constant** during the term of the agreement - at the expense of a concession payment.Payments do not give a one-time income to the budget, but in the long term - are comparable with sales proceeds |
| The overall effectiveness of the model (for the state and for the enterprise) | **Low**Investment projects have been implemented in Sochi and Novosibirsk.The investment phase did not start against the backdrop of infrastructure restrictions in Krasnodar, Volgograd | **Medium/High**Implemented investment projects in Kazan, Yekaterinburg.In Samara and Nizhny Novgorod, the construction of a new terminal has begun. | **Medium**Under favorable financial conditions, there is a contradictory normative base of the Russian Federation and its inconsistency with the generally accepted approaches to structuring concession agreements. |

Source: was made by the author

As it can be seen from the comparison of the main forms of PPP, a much more complete approximation to the western model of airport management was created in Pulkovo and Domodedovo. The introduction of a concession in Russian airports is quite a problem, because when the airport is operating as a state unitary enterprise, federal authorities may issue their own requirements to the terms of the concession agreement as they issue permits for a commercial concession, up to the transfer of concession payments to their settlement account with subsequent payment to the airport in accordance with the concluded contract, which in practice may not meet the interests of airports.

For the promotion of concession activities in Russia the local legislation has objective prerequisites and a set of fundamental laws. The fact that Russian airports have significantly more modest concession incomes (if they exist at all) in comparison with international airports can be explained by the fact that the legal institution of concession is new for Russian legislation, therefore, the practice of its use is not that developed as it could be.

Thus, for a full-fledged development of the industry, a diversified increase in competitiveness is needed, so that not only to the production of aircraft is becoming more competitive, but also to the development of the related spheres of the aviation industry.

If we consider airports around the world, it can be seen that they are funded in widely differing ways, with a variety of ownership structures. Authorities arounf the world help finance expansion of airport infrastructure, viewing them as key drivers for economic growth and essential for connectivity to the global economy. For example, Australia in 20th century has build and finance airports around the country and they were in public ownership for a half century until recent privatisation efforts. The four runways at Paris Charles de Gaulle were built by Aéroports de Paris, which was wholly owned by the French Government for 22 years until its privatisation in 2006. The French federal and regional governments still, however, retain significant stakes in the company. Vienna Airport was government held for 50 years until its partial privatisation in the 1990s; it is now 40% state controlled. A similar history is found at Munich and Frankfurt. Frankfurt Airport (Fraport) is now 51% controlled by the German regional and city government (with Lufthansa owning 10%, and private investors holding the rest). For the first five decades of its existence, however, it was fully government owned.

It is interesting to notice, that even governments that claim to be out of the airport business, like Canada, are not immune from funding airport projects. For example, since 2006, Canada’s federal government has set aside CA$65 million for projects at Quebec City’s airport.

On the world aviation market, subsidies are addressed not only to the manufacturers of planes, but also airlines. State support to airlines might take different forms. Distinctions can be made according to jurisdictions, types of instruments, and justifications for subsidies.

First widely known way of subsidies to airlines is **bailouts**, a kind of government grants without payback demands.[[53]](#footnote-53) This type of support assisted loss-making airlines, and were often classified as «restructuration aid» for formerly state-owned carriers. However, some privately owned airlines like German LTU also benefitted from state aid. In order to prevent distortions to competition, the EU implemented and enforces rules on state aid, that it may only be granted once in a ten-year period.[[54]](#footnote-54)

**Loan guarantees** by government are apparently widely provided to airlines. For example, Scandinavian Airlines (SAS) received  400 million euro in public support from the Danish, Swedish and Norwegian governments which are also shareholders of this airline. It is interesting, that the EC ruled that the money did not constitute state aid, on the basis of the argument that a private player operating under market conditions would have accepted the terms of the revolving credit. However, state aid had to be provided in the first place because banks refused to renew an existing revolving credit.[[55]](#footnote-55)

These examples indicate the wide range of subsidies in the form of grants, loans, and guarantees being made to airlines.

Despite the abovementioned types of state support there is also one that was drawing attention worldwide - **public service obligations (PSO).** In the EU, **PSO** provide access and enhance mobility, and may include subsidies to airlines through national and regional governments. The number of PSOs has increased rapidly in many countries. According to the EU PSO inventory table, an “economic compensation” was granted on 169 PSO routes in 2015 whereas only 38 PSO routes did not include any compensation for the operating airline.

For instance, in Spain, residents of several islands can receive a 50% discount on the cost of a regular ticket on flights to/from their places of residence, which is an example for indirect subsidies.[[56]](#footnote-56)Examples of government grants to provide air transport services to remote regions also include the US Essential Air Service Program and the Australian Remote Air Service Subsidy (RASS), which finances regular weekly air transport to communities with 6–200 people in isolated parts of Australia, transporting both passengers and goods. In total, 366 communities are included in the scheme, which is carried out by seven air operators.

The given examples have revealed that a wide range of subsidies is actually used in the contemporary world, including grants (research and development, exports, investments, loss coverage), equity infusions, loans and loan guarantees, public service obligations. Very often these subsidies become public only because of cases brought by governments, airlines, or other entities before the World Trade Organization, the Directorate General Competition of the European Commission, or other dispute resolution bodies.[[57]](#footnote-57)

As a result of the analysis, it can be concluded that over the last couple of decades the industry has significantly consolidated, moreover, integrated aviation structures have also appeared. This process developed in accordance with the approved program. Compared to the early 2000s, the volume of government support for aircraft construction in 2017 increased to about 60 billion rubles, which is, by the way, a record figure.[[58]](#footnote-58) The government takes the necessary steps to ensure that local aviation industry to be coherent with WTO requirements.

The implementation of the state program assumes the solution of the following priority tasks of the industry development: creation of world-class corporations in key segments of aircraft construction; formation of a scientific and technical reserve, which provides world leadership in aviation technologies; improvement of the regulatory framework of the aviation industry; strengthening of the personnel potential of the industry; promotion of domestic aviation equipment in domestic and foreign markets, localization of productions of leading foreign companies and import substitution, access to advanced foreign technologies.

Secondly, the implementation of the state program is characterized by the following features: concentration of resources only on priority areas; a differentiated approach to final integrators and manufacturers of aviation components, the development of small and medium-sized businesses, innovative clusters, a decrease in the monopolization level of suppliers while preserving the preferential right of Russian bundlers; management of the life cycle of manufactured products and development of a network of after-sales service of aviation equipment; integration into the global aviation market and participation in international cooperation in accordance with the WTO conditions.[[59]](#footnote-59)

The adoption of the State Program "Development of the aviation industry" allows the aviation industry to receive serious guarantees of its development, the ability to use state support for the formation of a new technological order. In addition, the industry has a time lag of 12 years, during which there is an opportunity to switch to a self-sufficiency and self-financing regime, which means the transition of the industry to a new level.

# Conclusion

Due to the close ties with other industries, the aviation industry plays a vital role in the economy of the Russian Federation. Nevertheless, in recent years domestic aircraft manufacturers face serious problems. So, the number of civil aircraft produced in Russia is much less than in the US and the EU. The reasons for such a significant difference lie in many respects in the high degree of depreciation of fixed assets and the large proportion of completely outdated assets.

Significant influence on the aviation industry condition was provided by the accession of the Russian Federation to the WTO. During the negotiations, a gradual reduction of customs duties on imported aircraft was agreed, this step allowed domestic aircraft industry to steadily adapt to the conditions of competition.

It should be noted that the full development of the aviation industry can not be achieved without the domestic enterprises integration into the chain of international cooperation. In recent decades, the division of roles between suppliers in accordance with the stages of aircraft assembly has been one of the main world trends. The suppliers themselves get the opportunity to increase the scale effect in production, which positively affects the cost of components.

Taking into account the positive experience of collobaration between domestic and foreign producers, the overall degree of involvement of Russian companies in international projects is still low and its increase is extremely necessary for the formation of competitiveness.

Most Russian companies continue to implement literally the full cycle of the final good production and all its main components, such a complex technological chain involves working with a large number of suppliers, which affects the cost of individual components and, as a result, the competitiveness and attractiveness of the final product for the buyers as a whole.

The analyses of Russian aviation industry from the perspective of M. Porter’s “Diamond of Competitiveness” model have shown that core factor conditions such as scientific and technological base of production, the methodology of the project design, the marketing technologies experience remission in the positions, but at the same time Russian market can be characterized with a strong potential in providing highly skilled workforce.

From the point of demand there is a clear need in single aisle airplanes with a capacity of 60-120 seats. Furthermore, aviation market is characterized with a concentration of regional transport in the central part of the Russia and is mainly focused on the Moscow, according to this, in the long-term position there is a strong need in diversification of transport hubs.

Secondly, from the perspective of industry suppliers it has to be noted that even thought a vast majority of components used in the production of aircrafts are imported,Russian companies also tries to participate in the production cycle of world leading companies by supplying important components and establishing collaborations.

Overall it can be concluded that basically Russian market can be characterized by the lack of market competition in the classical sense and the existence of artificially created competition between state corporations.

A study of the determinants of international competitiveness reveals all the ambiguity and uncertainty of the current situation of the industry. Strong global positions in the field of helicopter construction and military aircraft with the almost absolute absence of Russian civilian aircraft on the international market indicate the uneven development of the cluster and the incomplete use of technological and innovation potential.

After analyzing the experience of other foreign countries it can be concluded that Russian aviation market has a strong need in development of ground-based infrastructure, as management of non-core commercial activities has become a key issue for the improving of airport performance. Moreover, another instrument of state support that is consistent with WTO rules and can be effectively used in Russian aircraft industry is investment in R&D. In the recent years, R&D expenditures in Russia were way more modest that in other countries.

 The main problem areas of the Russian aviation sector, described earlier, and its targets were reflected in the state program of the Russian Federation "Development of the aviation industry for 2013-2025". The main objective of the state program is to create a highly competitive aviation industry and to consolidate its position in the world market as a third manufacturer in terms of the output of aviation equipment.

A great attention in this program is paid to the forms of government support of the aviation industry. Relying on the experience of foreign countries, several potentially successful forms of state support for Russia can be outlined. The first one is the provision of state guarantees for the residual value of domestic aircraft, the next one is a mechanism for subsidizing primary sales of aviation equipment, according to this program a producer will have a chance to ease the most risky and vulnerable stage when it introduces new equipment to the market. The last instrument that can be successfully implemented in the Russian aviation industry is a mechanism of budget financing on a returnable basis, it is designed to provide the aviation industry with long-term borrowings to carry out development work in new and ongoing projects of the aviation industry, while retaining a strong market motivation.

All of the abovementioned ways of government support are widely used in different countries, at the same time one experience differs from the others because of some regional peculiarities. Nevertheless, the analyses provided in this master thesis have shown that the following forms of state interventions in the aviation industry significantly changed countries’ performance on the global market and helped to achieve a great success.

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