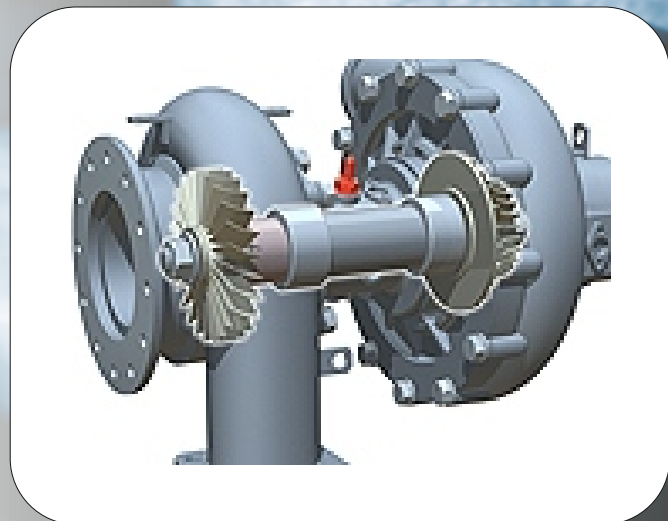


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# AIRCRAFT REPAIR MAINTENANCE IN UKRAINE: ECONOMIC AND ORGANIZATIONAL PROBLEMS OF DEVELOPMENT AND INVESTMENT SUPPORT

Авиаремонтное обслуживание в Украине: экономико-организационные проблемы  
развития и инвестиционного обеспечения

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**Annotation.** The article presents the structure of the aircraft repair industry in Ukraine. It is proved that the main customer of aircraft construction and aircraft repair enterprises are air carriers, which determine the demand for the services of aircraft repair enterprises. The features of aircraft repair enterprises and their economic and financial condition are considered. The problems, conditions and directions of development, as well as the prospects of the aircraft repair industry are clarified. The problems affecting the investment activity of the industry are identified. The investment directions for further development of aircraft repair enterprises are proposed.

**KEYWORDS:** REPAIR SERVICE, AIRCRAFT REPAIR ENTERPRISE, AIRCRAFT, INVESTMENT, DEVELOPMENT.

## 1. Introduction

Aircraft repair enterprises (AREs) in Ukraine are not going through the best times today, because the outdated material and technical base, focus on repairing airplanes manufactured in the USSR, the lack of innovation and international certification provoke loss of production and the hopelessness of development. In the process of management of the AREs, the problems of renewal of fixed assets, the development of international innovation technologies, the diversification of production (primarily, the development of repair of aircraft produced by foreign companies) are put forward.

Analysis of the structure, volume and dynamics of growth of world aviation market leads to active development of the aircraft maintenance market, with the annual growth rate of approximately 3-5%. The main indicators of the current state and the forecast of dynamics and structure of the world aircraft maintenance market by types of works are given in the Table 2.

**Table 1** Dynamics and Structure of the World Market of Aircraft Maintenance Services [1]

Works related to maintenance	Years					
	2008		2013		2018	
	billion dollars	%	billion dollars	%	billion dollars	%
Linear forms of maintenance	8,1	17,96	9,9	17,68	12,1	17,64
Repair and restoration of aircraft assets	8,7	19,29	10,7	19,11	13,1	19,10
Severe forms of maintenance, repair and modification	9,6	21,29	11,9	21,25	14,1	20,55
Engine maintenance and repair	18,8	41,69	23,6	42,14	29,2	42,57
Total	45,1	100,00	56,0	100,00	68,6	100,00

In Ukraine, 78 aviation organizations engaged in transportation or aeronautical chemical works were registered in January 2017. Almost a third of carriers specialize exclusively in passenger transportation. According to experts, more than 85% of passenger traffic is carried out on regular flights and only 15% – on charter flights, with the freight traffic the opposite is the case – almost 90% is on charter flights.

There were 33 domestic airlines operated on the passenger and freight market in 2016. According to the statistics, during the year, 66,300 commercial flights were performed (by 2015 – 74.8 thousand). The number of passengers carried decreased by 2.7 percent compared to the previous year and amounted to 6302.7 thousand people. The volume of cargo and mail was 69.1 thousand tons (in 2015 – 78.7 thousand tons) [2].

Air carriers occupy a significant part of the aviation industry, which established international relations during the Ukrainian independence. They have access to foreign and domestic financial assets and competitive advantages in the Ukrainian market. Air carriers, as an institution that directly interacts with the population and has access to national savings, is the main customer of aviation and aircraft repair enterprises. It determines the demand for AREs services and is one of the factors of pricing in the market of aircraft repair services.

## 2. The Structure of the Aircraft Repair Industry in Ukraine

Historically, the AREs of Ukraine have highly skilled personnel, scientific and technical potential, with an expanded infrastructure. The Ukrainian aviation and repair industry includes 13 factories of industrial value today (Figure 1). Soviet-made aircraft and their repair technology are not only obsolete, but also physically unsuitable for use. This tendency reflects the dependence of the aircraft repair industry on state policy and the aviation-building industry.

Therefore, there is a need to find new customers and enter international markets, expand services, introduce innovative technologies for repair and modernization of aircraft.

Today 89 private enterprises have been certified by the Ministry of Transport and Communications of Ukraine for maintenance and repair of airplanes [3]. Mostly repair of aircraft such companies is their additional activities and production scale have no national significance. An example of private enterprises is the CJSC "Ukrainian Aviation and Technical Center" (JSC UATC).

A significant part of the industry is under the jurisdiction of the Ministry of Defense of Ukraine. According to studies conducted on the economic condition of military aircraft repair companies, they are not only profitable but also implement strategic modernization and development programs. This is due to significant state support, which is being implemented through government contracts, privileges and subsidies, certification for export services, as well as a significant volume of foreign orders (mostly from Asian countries that have Soviet-made aircraft).

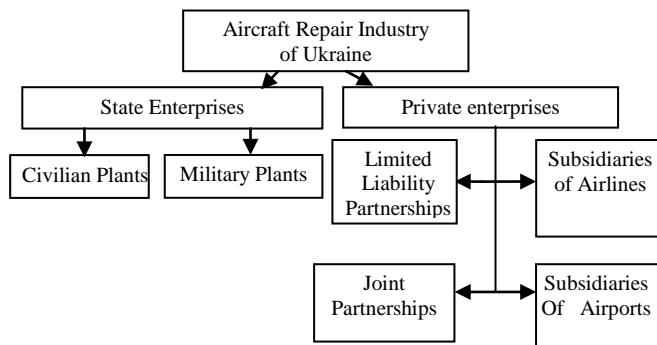


Figure 1 Structure of Aircraft Repair Industry of Ukraine

### 3. Financial and Economic Condition and Features of Aircraft Repair Enterprises

Civil aviation repair companies are in poor condition because they are state-owned and have no economic independence or proper funding. At the same time, the lack of orders for aircraft repair provokes an enforced idleness and unprofitable production.

However, the Strategy of the aviation industry development by 2020, worked out by the Government of Ukraine [4], can increase the potential of enterprises by:

- increasing financing;
- corporatization and establishment of associations on a corporate basis;
- the transition to mass production of airplanes and other aviation equipment with the creation of a wide range of their modifications, in particular, the aircraft Antonov An-3, An-32, An-38, An-140, An-74, An-148, An-124, An-70, which in the future will increase the production of AREs;
- privatization of aviation industry enterprises taking into account the specifics of the industry and preserving the state influence on making strategic decisions.

The main characteristic of the AREs is to provide and restore the airworthiness of fixed assets (in particular, aircraft) in the aviation industry, which is carried out by repair works or modernization of the aircrafts, and the development and production of facilities for the implementation of the main production

functions. We distinguish the following features of the AREs activity:

- focus on the restoration and modernization of existing aircraft;
- large scale production, the need for an expanded infrastructure;
- the long-term nature of the production cycle and investments;
- significant depreciation and, in addition, high level of wear and tear of fixed assets;
- a significant proportion of state-owned enterprises, which are an obstacle to private investment;
- dependence on national development and GDP;
- defined market niches of enterprises provoking low competition within the country and competitiveness in foreign markets;
- needs for innovative development, mastering of repairs and obtaining certificates for the repair of foreign aircrafts.

The need for AREs activity depends on the state of the aircraft and the financial capabilities of their owners. According to statistics, the general level of depreciation of fixed assets of the Ukrainian enterprises is 45-50%, and in the transport sector - 50-60% [5], while the tendency to increase the proportion of wear and tear remains. That is, the need for upgraded aircraft and their modernization is relevant to the aviation industry.

Another factor necessary for the development of the aircraft repair industry is a powerful production base, formed over the years of the USSR. By that time, a large proportion of the AREs of the USSR was in Ukraine, and they serviced the entire aviation industry of the USSR. After the collapse of the Soviet Union, the AREs failed to find a market corresponded to the existing production capacity. Today, the development of the aircraft industry and the policy of the Ukrainian government open up new perspectives to the AREs. Also, Ukraine is actively moving into international air transport markets, which provokes an increase in demand for aircraft repair services. In order to meet the demand of Ukrainian AREs, there is a lack of international certification for the repair of foreign-made aircraft. This direction of development is also promising, since most air transportation is carried out on foreign-made aircraft.

Table 2 Indicators of Financial and Economic Activity of Aircraft Repair Enterprises, Ukraine, 2016

№	Indicators	Units	SE "Konotop Aircraft Repair Plant "Aviakom"	SE "Chuguev Aircraft Repair Plant"	SE "Plant 410 CA"	SE "Zaporizhzhya State Aircraft Repair Plant "MiG repair"	SE "Lutsk Repair Plant "Motor"	SE "Lviv State Aircraft Repair Plant"	SE "Nikolaev Aircraft Repair Plant "Narp"	SE "Odessa Aircraft Plant"
1	The capital of the enterprise	thousand UAH	901243,0	58152,0	357282,0	290440,0	785597,0	289999,0	209964,0	205634,0
2	Production capacity of the enterprise	%	90,4	87,0	50,0	71,0	109,0	90,0	85,0	74,6
3	The average number of full-time employees	persons	927,0	288	1022,0	670,0	1093,0	904,0	611,0	777,0
4	The payroll of full-time employees actually	thousand UAH	119378,2	12213,2	86429,0	66841,7	131387,4	92562,0	50872,8	73449,1
5	The average monthly wage actually	UAH	10731,6	3533,9	7047,4	8313,6	10017,3	8532,6	6938,5	7877,4
6	Production volumes (rendered services) at current prices	thousand UAH	608092,0	67773,0	532809,0	272199,0	1058773,5	276720,0	340170,0	250101,0
7	Sales of products (goods, works, services) for the reporting period	thousand UAH	733756,0	61528,0	528542,0	286788,0	661633,0	348101,0	357295,0	240328,0
8	Net Sales of products (goods, works, services)	thousand UAH	733756,0	59400,0	500712,0	265531,0	636940,0	311777,0	348368,0	220089,0
9	Cost of Goods Sold	thousand UAH	428292,0	33277,0	199940,0	127395,0	199672,0	221415,0	130333,0	128915,0
10	Net Profits for the Reporting Period	thousand UAH	100335,0	8315,0	150208,0	65057,0	49985,0	13942,0	83582,0	6818,0

#### 4. Terms of Aircraft Repair Enterprises Development in Ukraine

In general, the aviation industry in Ukraine has a great potential for development, which has been inherited since the Soviet Union. It consists not only of aircraft factories, but also of personnel and a highly developed scientific base for the industry. Involving and using them as effectively as possible is a goal that will help raise not only the industry, but also numerous research institutions, fundamental science. Today it is necessary to modernize the equipment, update the material and technical base, switch to energy-saving production, and improve existing methods of managing airlines.

Consequently, the main possibilities (Figure 2) that will ensure the development of the AREs in Ukraine are:

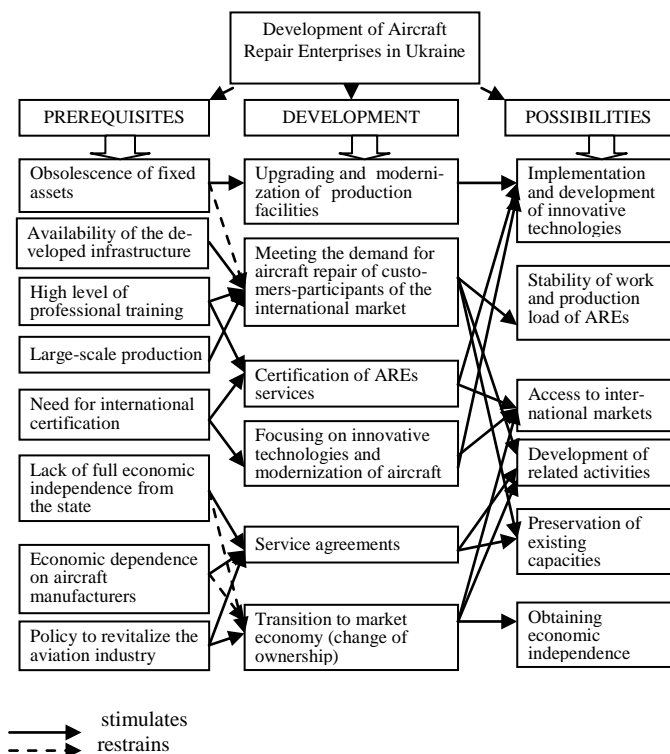


Figure 2 Conditions for Development of Aircraft Repair Enterprises in Ukraine [6]

1. Updating and modernizing the existing production base.
2. The preservation of AREs infrastructure, formed in the USSR, and its modernization.
3. Economic interdependence with aircraft manufacturers will reduce the cost of certification and will ensure the stability of the AREs.
4. Passage of international certification, which will allow repairing aircraft of foreign production.
5. The policy of activating the production of Ukrainian aircraft.
6. Production of Ukrainian equipment and components to ensure the production process and reduce its cost.
7. Use of international experience in the management of enterprises.

#### 5. The Main Problems of Investing in Aircraft Repair Companies

To determine trends in investment activity, the AREs will investigate the factors that affect it. The first step is to analyze the investment climate, in which AREs function. Investment climate in

Ukraine cannot be called favorable. It is characterized by general instability of legislation, underdevelopment of the banking system and the stock market, etc. In order to assess the current innovative climate in Ukraine, it is necessary to take into account the international business rankings and competitiveness of the national economy of our country by the main indicators [7].

The main problems of investing in modern market conditions and proposed ways to solve them are given in Table 3.

The conducted research on the investment market of aviation repair industry showed that the level of general economic development and the state of the political and legislative climate had the greatest impact on the development of investment activity. The factors contributing to overcoming or reducing the risks for investors in Ukraine include [8]:

- the level of development of productive forces and the state of the investment market;
- legislative framework; political will of all branches of government;
- state of the financial and credit system of the country;
- the status of a foreign investor and the investment activity of the population.

Under conditions of economic instability, state support for the implementation of investment projects for the development of priority industries (industrial policy) is important, as well as the introduction of economic regulators to intensify domestic investment activity.

Table 3 Problems and Prospects of Investing in the Aircraft Repair Industry

Existing Problems	Proposed Activities to Address Problems	Prospects for Development
Narrow range of investment projects	Financing of scientific and technical developments	Enhancing capacity of aviation industry
	Legal protection of intellectual property	
	Product differentiation	
Partner search problem	Entering the international market	Development of domestic aviation market
	International certification and compliance with international market conditions	
	Participation in international exhibitions and forums	
Lack of adequate funding	Providing economic independence	Growing financial capacity
	Implementation of public credit system	
	Opening access of private investors and creditors to participate in financing of enterprises	
	Government funding and development programs	

Investment expectations are conditioned by the understanding of the urgent need for expanding production volumes, updating the existing material and technical base, innovation development, implementation of long-term programs with long payback periods.

The volume of attracted investments is one of the main characteristics of economic activity as separate economic entities and the state as a whole, taking into account that the investment climate is determined primarily by the political and economic situation in the country.

The described situation defines the main ways for the development of investment activity of the AREs, which include:

- growth of foreign investors' activity and increase of the share of their investments in aviation sphere;
- growth of investment activity of domestic AREs, provoked by the needs for the physical and moral renewal of fixed assets;
- development of the financial and credit system and private lending;



- activation of insurance relations, which positively influence the development of investment attractiveness of Ukrainian AREs, minimizing investment risks.

In general, today there are negative trends in the investment sphere of Ukraine's economy due to military actions in the East of the country and the instability of the national economy, which led to decrease in production volumes, instability and riskiness of the currency and financial markets, rising unemployment and fall in household incomes. However, the market demand for AREs services requires finding ways out of a crisis and opens prospects for the industry.

The study of the resource availability of APEs in Ukraine and their structure (by classifying the resources that can participate in investment activities) shows that enterprises have significant material resources. The amount of resources that AREs can use in investing activities are determined by the following factors:

1. Need for resources, determined by the investment strategy of the enterprise.
2. The amount of funding that affects the attraction of a resource to the investment process.
3. Availability of substitute resources, which allows for the formulation of alternative projects or identifies the alternative cost of the project.

Therefore, the investment resources of the AREs include all non-financial resources of the enterprise, and some of financial resources – net profit and depreciation fund (internal resources), as well as available borrowed and attracted funds (external resources). The basis of AREs investment resources is financial resources, while enterprises use their own funds.

## 6. Conclusions

Insufficient state support is a major factor among the political factors. There is no basic state policy for Ukrainian airlines in a difficult competitive environment. The weak point is also a discrepancy legislation of Ukraine in the field of air transport to international and European standards, including the International Civil Aviation Organization (ICAO), the European Union, the European Civil Aviation Conference (ECAC), and the European Organization for the Safety of Air Navigation (EUROCONTROL). Gradual displacement of a domestic air carrier to foreigners is due to weak state regulation of competition in the aviation market.

The research of investment strategies of the Ukrainian AREs showed their focus on upgrading production capacities. This tendency is caused by a high level of depreciation of fixed assets. In this case, the AREs cannot independently ensure the introduction of innovative technologies. The authors propose to work out the following directions for investment development of enterprises:

1. Diversification of production (necessarily - development of repair of foreign manufactured aircraft and development of technologies for the modernization of domestically manufactured aircraft).
2. Implementation of energy and resource-saving technologies.
3. International certification programs.
4. Development of international methods of economic management and analysis.

For each of these directions, it is expedient to justify an investment project based on efficiency, compliance with the investment strategy and the level of the investment potential use, which in turn will ensure the intensive development of the AREs.

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