

Research on the Development of China's General Aviation Industry from the Perspective of Scale Growth

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Abstract

General aviation and transport aviation are collectively known as the "wings of birds" and "wheels of vehicles" in the development of civil aviation. The general aviation industry is an important component of the national air transportation system, which as the characteristics of a long industrial chain, wide service areas, and strong driving force. The paper reviews and analyzes the scale and quantity of the general aviation industry, the development momentum of enterprises, the effectiveness of industrial policies, and the development of key areas, which can provide ideas and reference for the future development of the general aviation industry.

Keywords

General Aviation; Low-altitude Economy; Industry; Digital Twin.

1. Introduction

Since the 18th National Congress of the Communist Party of China, China's general aviation industry has continued to develop, with both its industrial scale and growth rate reaching historic highs. The agglomeration effect of the industrial chain has become more significant, playing an important role in promoting the transformation and upgrading of the national economic structure, expanding domestic demand, ensuring people's livelihoods, and enhancing the overall innovation capacity of the country; Played an important role in addressing the contradiction between the growing needs of the people for a better life and addressing imbalanced and insufficient development; Played an important role in cultivating new forms and models of economic growth; It has played an important role in strengthening industrial integration and coordinated development, and forming a joint force for industrial development; It has played an important role in increasing employment opportunities, accepting a large amount of labor resources, and stabilizing employment; Opening up new growth points for urban economic development and injecting new vitality into urban development plays an important role; The effective integration of the national epidemic prevention and control system has played an important role in improving the operational efficiency of the epidemic prevention and control system.

2. Review of the Development of China's General Aviation Industry from the Perspective of Scale Growth

2.1. Analysis from the Perspective of Sustained Growth in Industrial Scale and Quantity

In November 2010, the State Council and the Central Military Commission issued and implemented the "Opinions on Deepening the Reform of Low Altitude Airspace Management in China" (Guo Fa [2010] No. 25), which opened the curtain on the reform and development of China's general aviation industry, promoting a considerable increase in the scale of China's general aviation industry. This is mainly reflected in: firstly, the total number of registered

general aircraft in China continues to increase. Data shows that as of the end of 2023, the number of general aviation aircraft (excluding drones) in China was about 5000, an increase of 5% from 2022 and nearly 30% from the 12th Five Year Plan period, indicating that the general aviation industry is gradually developing into an important component of the national economy; Secondly, the total number of general aviation enterprises in China continues to grow. Data shows that as of the end of 2023, there were 690 traditional general aviation operating enterprises (excluding drones), an increase of 4% compared to 2022, indicating that the general aviation industry is moving from an initial stage to an accelerated stage. The development of general aviation has become a consensus, and the external environment for the development of general aviation is forming; Thirdly, the total duration of general aviation operations in China continues to increase. Data shows that as of the end of 2023, the traditional aviation flight volume (excluding drones) was about 1.35 million hours, an increase of 11% from 2022 and a new historical high, indicating that the general aviation industry is highlighting its role in forming industrial clusters, enriching industrial forms, and unleashing its economic benefits; Fourthly, the number of general airports in China continues to grow. According to data, as of December 31, 2023, the number of registered general airports in China has reached 449, an increase of 50 compared to 2022, including 105 certified general airports and 344 registered general airports. Newly built general airports such as Majiadu in Zhushan, Hubei, Suwu in Minqin, Gansu, Yongchang in Beichuan, Sichuan, and Jimo in Qingdao, Shandong have been granted airport use permits. Compared to the same period last year in 2022, the number of general airports in China increased by 50, with a year-on-year growth rate of 12.5%; The number of general airports in China increased by 79 compared to the same period last year in 2021, with a year-on-year growth rate of 21.4%, indicating that the comprehensive planning and layout of airport clusters are more reasonable and the trend of coordinated development with urban clusters is becoming prominent.

2.2. Analysis from the Perspective of Enterprise Development Momentum

In 2016, the State Council issued the Guiding Opinions on Promoting the Development of the General Aviation Industry (State Council Document No. 38 [2016]), which clarified the attributes and status of strategic emerging industries in the general aviation industry and enhanced the endogenous driving force for the development of general aviation enterprises. Mainly reflected in: firstly, the revenue capacity of large-scale general aviation enterprises has achieved a qualitative improvement, with a clear driving, demonstration, and leading role, indicating that the general aviation industry is forming a trend of spatial agglomeration, diversified development entities, and upstream and downstream coordinated development; Secondly, the market share of small and medium-sized general aviation enterprises continues to increase, indicating that the core competitiveness of small and medium-sized general aviation enterprises based on brand, technology, and key resources is forming; Thirdly, the homogenization of the business scope of various types of general aviation enterprises has decreased, and new business models such as "airport+industry service chain" and "general aviation+emergency" have emerged, indicating the formation of a new intelligent general aviation industry chain pattern with full data, full links, and full green, and the continuous expansion of new consumer demand in the general aviation industry; Fourthly, various types of general aviation enterprises should accelerate their integration with the emergency industry, explore the development of general aviation emergency services such as aviation medical emergency rescue and general aviation fire rescue, and form a "aviation+emergency" industry integration development model; Fifthly, various types of general aviation enterprises actively promote technological innovation and research and development, enhance their independent innovation capabilities and core competitiveness, continuously explore new business and service models, improve operational efficiency and service quality, and enhance customer satisfaction and loyalty.

2.3. Analysis from the Perspective of Industrial Policy Effects

In 2017, the Civil Aviation Administration of China issued the 13th Five Year Plan for the Development of General Aviation, which proposed the development goal of focusing on supply, grasping reform, unleashing potential, and promoting development, enhancing the accuracy of various policy guidelines for the general aviation industry. Mainly manifested in: firstly, it has achieved a shift in policy formulation from "selective policies" to "functional incentive policies", providing support for resource allocation in weak links of the upgrading of the general aviation industry; Secondly, the policy has shifted from a "tilted" to a "competitive" direction, creating a fair competition policy environment for the general aviation industry and various general aviation enterprises; Thirdly, the transformation from a "scale oriented" policy to an "innovation capability oriented" policy has been achieved, providing support for comprehensively enhancing the independent innovation capability of the general aviation industry; Fourthly, the transformation from a "traditional" industrial policy to a "transformational" industrial policy has been achieved, promoting the transformation and upgrading of the general aviation industry and ensuring a sustained new vitality engine for the industry. In 2023, the central government issued multiple policies to support the development of the aviation industry and low altitude economy. In July 2023, the Provisional Regulations on the Administration of Unmanned Aerial Vehicle Flight were officially released, which standardized the flight and related activities of unmanned aerial vehicles and provided a legal basis for their sustainable and healthy development; In October, the Ministry of Industry and Information Technology and four other departments issued the "Outline for the Development of Green Aviation Manufacturing Industry (2023-2035)", proposing that electric general aviation aircraft will be put into commercial application by 2025, which will strengthen the integration of the general aviation industry with green aviation manufacturing, enhance its technological innovation capabilities, and create conditions for industrial upgrading and transformation; In November, the landmark draft of the People's Republic of China's airspace management regulations (soliciting opinions) was released, which means that China's low altitude airspace opening will make breakthrough progress.

2.4. Analysis from the Perspective of Key Areas

In 2019, the Central Committee of the Communist Party of China and the State Council issued the "Outline for Building a Strong Transportation Country", proposing to include the construction of general tourism airports, the promotion of low altitude airspace collaborative management reform, and express delivery drones in the pilot tasks of building a strong transportation country, enhancing the goal of developing key areas in the general aviation industry. Mainly manifested in: firstly, the traditional public welfare service sector continues to develop, and the application prospects of general aviation in emergency rescue, aviation medical assistance, aviation environmental monitoring, and other aspects are more broad; Secondly, the demand for emerging consumer sectors continues to grow, and the market share of private flights, air travel, parachuting, and other industries is gradually increasing. The business forms of the general aviation industry are further enriched; Thirdly, the traditional field of operations remains an important support for the general aviation industry. In the fields of industrial manufacturing, aviation photography, and aerial advertising, general aviation enterprises rely on their professional skills and rich experience to continuously innovate service models and technical means, injecting new vitality into the development of traditional operational fields; Fourthly, the drone industry continues to lead the development of China's general aviation industry, and the research and innovation capabilities of drones continue to improve. Manned drones have made their debut in the domestic market, and the application scope of drones continues to expand. The application of drones in agricultural plant protection, power line inspection, logistics distribution and other fields is becoming increasingly

widespread, and social capital continues to invest, gradually shifting from "Made in China" to "Created in China"; Fifthly, drones have a wider range of application scenarios and their role in national economic and social development is becoming increasingly prominent; Fourthly, breakthroughs have been made in the integrated operation of manned and unmanned aerial vehicles, with the integration of new technologies such as artificial intelligence, 5G, and digital twins gradually deepening, and new product concepts constantly emerging.

2.5. Initial Incubation of Emerging Fields

In 2022, the Civil Aviation Administration of China issued the "Smart Civil Aviation Construction Roadmap" (Civil Aviation Development [2022] No. 1), which clarified the phased goals and specific tasks of smart civil aviation construction, providing a clear direction for the development of the general aviation industry to achieve intelligent development. Mainly manifested in: firstly, UAM (Urban Air Traffic) focusing on the application of urban low altitude transportation resources, as well as eVTOL (Electric Vertical Takeoff and Landing Vehicles) based on clean energy, green and low-carbon, and artificial intelligence, have become important directions for aviation innovation; Secondly, the development, production, and operation of new energy powered aircraft have become a key focus and layout direction for general aviation enterprises; Third, the general aviation industry should strengthen its integration with the digital economy industry, accelerate the integration of the Internet, big data, artificial intelligence, blockchain and the value chain of the general aviation industry, and form a new mode of industrial integration and development of "general aviation+digital informatization"; Fourthly, in the context of promoting supply side structural reform, the general aviation industry has shifted from quantitative growth to quality-oriented efficiency, with the general aviation manufacturing chain as the core, relying on emerging technologies such as cloud computing, big data, the Internet of Things, and artificial intelligence, and relying on reform and innovation as the two driving forces, becoming a new driving force for the development of the general aviation industry.

3. Analysis of the Development of General Aviation Industry from the Perspective of Scale Growth

The advantage of industrial scale is not obvious. The general aviation industry has seen rapid growth in quantity, but its scale advantage is not yet obvious. It is still in the development stage of gathering resources, improving production capacity, expanding scale, and enhancing industrial competitiveness. Although the number of registered general aircraft has grown rapidly, it is still dominated by imported foreign aircraft, with a relatively low level of independent research and innovation; Although there has been a significant increase in the total number of general aviation enterprises, the distribution of growth enterprises is uneven, mainly in developed regions in the central and eastern regions, making it difficult to form a synergy with regional economic growth; Although the aviation flight volume has repeatedly reached historical highs, traditional businesses such as pilot training still dominate, and the emerging field of general aviation urgently needs to be expanded; The number of general airports is growing rapidly, but there are few airports that can carry out commercial passenger flight activities. The functions of airports are relatively single, mainly serving industrial and agricultural professional operations, making it difficult to meet the needs of diversified aviation services.

The phenomenon of industrial homogenization is severe. The role of general aviation as a strategic emerging industry in driving economic development has become a consensus among all sectors of society. Local governments are laying out the general aviation industry in order to better serve the local economy. However, due to the lack of systematic research, the understanding of the connotation and role of the general aviation industry is not clear, and

there is a lack of innovative awareness and technology. There is a lack of overall coordination between national policies and local policies, as well as between local policies and local policies, resulting in a high degree of similarity in the layout of the general aviation industry between regions. Taking the general aviation industrial park invested and constructed by local governments as an example, some general aviation industrial parks have severe homogenization of industrial positioning, convergence of industrial park structure, single profit model of the park, and the introduction of similar enterprises, making it difficult to form an effective industrial chain. Internal competition is fierce, which is detrimental to the healthy development of the entire industry; Taking the construction of general aviation airports as an example, some local governments blindly invest in aviation airports. Due to the lack of effective industrial support and a lack of operational management personnel, hastily launched aviation airports have become a burden.

The core competitiveness of the general aviation industry is relatively low. From a technical perspective, the overall technological level of the general aviation industry is relatively low, lacking core technologies and key components with independent intellectual property rights, which makes the development of the industry constrained by others and difficult to form a competitive advantage; From a market perspective, the general aviation industry has a relatively small market size, insufficient market development, and a lack of enterprises and products with brand influence and market share; From the perspective of customers, the marketing and service system of the industry is not perfect enough, which limits consumer awareness and trust in general aviation products and limits the development space of the industry.

4. Conclusion

In short, China's general aviation industry will face a historic opportunity of transformation and upgrading in the context of deepening supply-side reform in the future. It will move from quantity growth to quality growth, from scale growth to value growth, pay more attention to the overall improvement of quality and efficiency, and its layout will be more reasonable in the future development, the structure will be more perfect and become an important industry to strengthen our national self-confidence and realize the beautiful Chinese Dream.

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