

Analysis on the Driving Force, Obstacles and Countermeasures of the Integrated Development of General Aviation and Tourism Industries under the Background of New Economy

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ABSTRACT

The integrated development of general aviation and tourism industries is the inevitable trend of economic development and the inevitable result of the extension of the industrial value chain. China's general aviation industry has long been subject to a strict airspace management model with impeded development. However, with increasingly deep reforms in low-altitude airspace management, the general aviation industry is also in urgent need of pursuing new ways for development. This paper is based on the industrial and resource basis of general aviation and tourism, which is supported by the policy environment, market demand, industrial supply, and technological innovation, we will accelerate the innovative industrial industry by means of improving the industrial integration development mechanism, accelerating the layout of the general aviation industry, strengthening the building of industrial integration capabilities, and strengthening the role of cultural empowerment industries, so as to promote high-quality development of the general aviation industry.

Keywords: *General aviation, Tourism, Industry integration, Low-altitude economy, Driving force*

1. INTRODUCTION

Under the background of the new economy, general aviation, as the main industry of the low-altitude economy, has become a new engine for revitalizing the low-altitude economy and driving economic growth due to its long industrial chain, wide service scope, and strong driving effect ^[1]. International experience shows that the input-output ratio of the general aviation industry is 1:10, the R&D-output ratio is 1:80, and the employment-driven ratio is 1:12. The economic contribution of the general aviation industry is over trillion yuan, and the industrial formats are extremely rich. However, over the past few decades, the general aviation industry has been slow to develop due to China's emphasis on placing the sovereignty and security of airspace resources in primary position and implementing a strict model of low-altitude airspace management. How to break the bottleneck of the general aviation industry development and create the road of the

general aviation industry development with Chinese characteristics has gradually become the focus of attention. Since the implementation of the low-altitude airspace management reform in 2010, China's general aviation industry development ushered in historical new opportunities and achieved leapfrog development. Experience shows that when the per capita GDP reaches 8,000 dollars, the general aviation industry will usher in an explosive growth period ^[2]. In 2020, China's per capita GDP is 11,300 dollars, and it has the market basis and supporting conditions for the development of the general aviation industry. Nevertheless, China's general aviation industry is still facing a situation of "increased heat focus" but "less powered for development". And how to give full play to its industrial integration capability is the key to make the general aviation industry into a regional economic growth pole ^[3].

In recent years, in order to cater for the needs of industrial development and promote the innovative development of the general aviation industry, a series of

policies have pointed out a new development direction for the general aviation industry, especially in 2021 when China included the integrated development of general aviation and tourism into the national comprehensive three-dimensional transportation network. Tourism is known as "the most vital industry", and the proposal of "tourism +" strategy has also further enhanced its pivotal pillar role for economic growth. General aviation and tourism are hot spots in emerging industries, and the integrated development of the two is not only the general trend, but also a necessary move to achieve innovative development. After years of active exploration, general aviation and tourism have initially formed a good trend of mutual integration. The integration of general aviation and tourism industries can not only drive the growth of industrial value, but also is of great significance for cultivating new forms of market consumption and building a low-altitude economic ecosystem [4]. At present, general aviation and tourism are in a new era of favorable policies and industrial transformation, with opportunities and challenges coexisting. In this paper, we analyze the barriers that constrain the collaborative development of general aviation and tourism industries by exploring the driving forces for their integrated development, and propose countermeasures, so as to provide theoretical basis and practical reference for the common development of general aviation and tourism industries.

2. ANALYSIS ON THE DRIVING FORCE OF THE INTEGRATED DEVELOPMENT OF GENERAL AVIATION AND TOURISM INDUSTRIES

Although the integration of general aviation and tourism industries has just started and has not yet formed scale effect, they have deep roots and support each other [5-6], as shown in Figure 1.

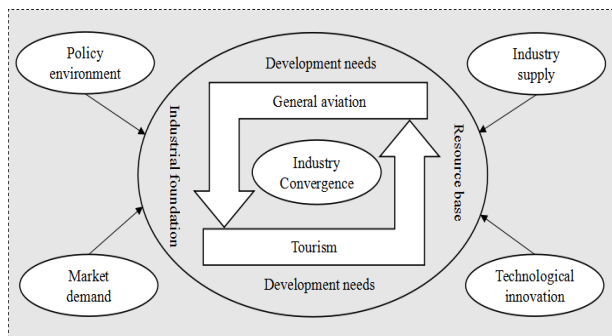


Figure 1 Schematic diagram of the integrated development of general aviation and tourism industry

2.1. Analysis of Endogenous Dynamics

Endogenous dynamics mainly refers to the correlation and dynamic factors existing in the general aviation and tourism industries, mainly including three aspects: industrial base, resource base and self-development needs.

(1) General aviation and tourism industry chain is relatively complete. As one of the "two wings" of civil aviation, the general aviation industry has gradually formed industrial clusters through several decades of development, and has some foundation in aviation manufacturing, security services, and general aviation operations. And as a more comprehensive industry, tourism depends on both the development of related industries, as well as the strong driving and radiating effect to them [7]. Since 2002, more than 30% of China airlines' passenger sources have come from tourism. Tourism has become an important engine for aviation development, providing a foundation for the integrated development of general aviation and tourism.

(2) General aviation and tourism complementary resources. In order to realize the leapfrog development of general aviation and tourism, it is necessary to make a new design in the effective development of resources, innovation of product system, and enrichment of customer experience. The integration of the two is an important way to realize the integration of industrial resources and the sharing of technological resources. General aviation takes advantage of tourism to promote its development in short-distance transportation and low-altitude sightseeing. At the same time, tourism can develop low-altitude tourism projects using the general aviation and tourism resource base to achieve tourism innovation development.

(3) General aviation and tourism self-development needs. With the upgrading of tourism consumption structure, conditions such as location, transportation, environment, and supporting facilities have become necessary but insufficient for tourists [8]. How to create new attractions in tourism and stimulate market consumption is a new challenge facing tourism. With the increasingly relaxed development environment, the general aviation industry also urgently needs to break free from the shackles of development, break through the predicament and create a new situation. The organic integration of general aviation and tourism industries is the best choice for both to achieve self-development needs and break industry restrictions.

2.2. Analysis of Exogenous Dynamics

Exogenous dynamics mainly refers to the external driving factors that affect the integrated development of the general aviation and tourism industries, including policy environment, market demand, industrial supply and technological innovation.

(1) Policy environment is improving. In recent years, the general aviation industry has ushered in "policy loosening". On the one hand, the government has continuously deepened airspace management reforms, revised the regulatory system for low-altitude flight, while reducing barriers to entry for general aviation and

encouraging the development of the general aviation industry. On the other hand, the government encourages all regions to develop high-quality tourism routes based on general aviation and accelerate the cultivation of consumer general aviation market, so as to promote the transformation of local economic momentum.

(2) Market demand is growing. Consumption is the foundation of industrial development. In 2019, China's tourism per capita consumption increased by 3.8 times that of 2015. People have higher requirements for the diversification and experience of tourism products. And low-altitude tourism products are gradually sought after by consumers for their uniqueness and novelty. Local governments and general aviation enterprises are enthusiastic about general aviation tourism. The continuous strong market demand has opened up greater development space for the general aviation tourism market.

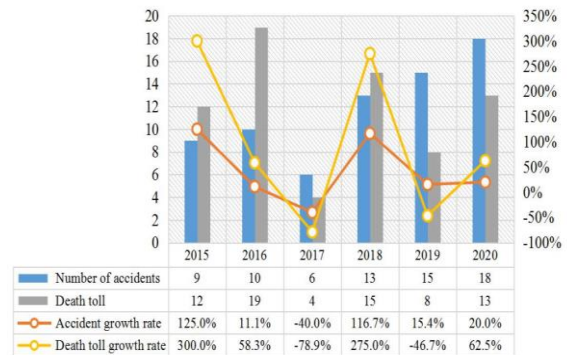
(3) Industry supply has been optimized. Under the background of supply-side reform, how to optimize the industrial structure and expand the product supply of tourist destinations has become the top priority of tourism development. With the gradual opening of the low-altitude field, general aviation enterprises have begun to play an important role in the development of the general aviation industry. General aviation enterprises can maximize the value of General aviation resources and extend the tourism product value chain to meet new market consumption needs by making use of their internal innovative operation mode.

(4) Technological innovation ability has been improved. The ability of technological innovation is a key factor in the development and progress of an industry. Although China's general aviation manufacturing started late and has a weak foundation, there has been a great improvement in China's general aviation industry manufacturing technology with the joint efforts of the government and enterprises. Among Chinese general aircraft manufacturers, 56% of them produce self-developed models. More and more self-developed general aviation aircraft are widely used in the tourism industry, providing technical support for the integrated development of the general aviation and tourism industries.

3. ANALYSIS ON THE OBSTACLES OF THE INTEGRATED DEVELOPMENT OF GENERAL AVIATION AND TOURISM INDUSTRIES

Although the integration of general aviation and tourism industries has been initially fundamental and shows great prospects for development, the general aviation industry still faces some obstacles from the perspective of the existing integration system and mechanism.

(1) The relevant institutional mechanisms are not sound enough. The high risk of flight^[9] and the imbalance between operation cost and operation efficiency of general aviation are difficulties for the development of the general aviation industry in all countries around the world. General aviation involves more than 70 disciplines and industrial fields, and the industrial chain structure is complex. It is necessary to set up special institutions and formulate corresponding institutional mechanisms management. However, for a long time, due to the weak development of China's civil aviation industry and the dominant position of early transport aviation, general aviation has followed the transport aviation management model in terms of flight and operation. Although China introduced a series of related policy regulations^[10] to support the development of general aviation in recent years, general aviation has not yet achieved professional management, and the flight risk situation is still severe (as shown in Figure 2). The institutional mechanistic issues that constrain general aviation development remain unresolved, and a robust management system for effective prevention, regulation, and evaluation is required.

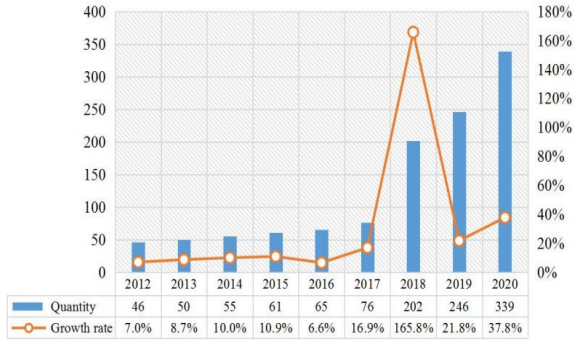


Source: Civil Aviation Industry Development Statistical Bulletin

Figure 2 Number of general aviation accidents, deaths, and growth in China from 2015 to 2020

(2) General aviation infrastructure needs to be improved. Infrastructure is the basic guarantee for industrial development, and the construction of a general airport is essential for general aviation industry development. In recent years, although the number of general airport construction in China is rising year by year (shown in Figure 3), it is far from the expected number. The layout density of general aviation airports is low, which is far from meeting the voyage requirements. In addition, the relevant supporting facilities are even more blank. At present, there is no service station dedicated to providing flight support for general aviation in China. The reason is that compared with the transport airport, although the general airport has a small investment and a short construction period, the construction of the general airport is often expensive

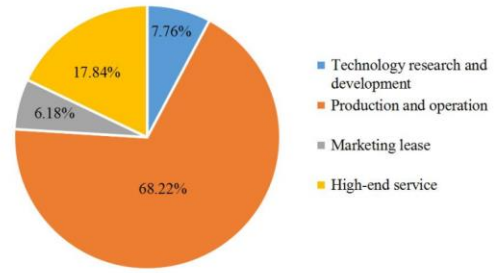
due to the lack of appropriate standards, resulting in complicated approval procedures and high construction standards. Moreover, the government's subsidy policy for the construction of general airports is still blank, which has seriously affected the enthusiasm and progress of local construction of general airports.



Source: China General Aviation Development Report

Figure 3 Changes in the number of registered general aviation airports in China from 2012 to 2020

(3) Industrial integration and innovation capacity is insufficient. At present, the integration of general aviation and tourism industries is not deep enough, and problems such as difficulty in making profits for general aviation enterprises and high prices of general aviation tourism products are prominent. The problem of product development and market price is essentially due to the lack of industrial integration and innovation capabilities, resulting in an imbalance of supply and demand. The ability of industrial integration and innovation is mainly reflected in two aspects. First, the independent innovation ability of enterprises. General aviation is an industry with high input and slow output. Most of China's general aviation enterprises are in their infancy. In addition, due to the lack of policies, funds, and professional R&D institutions (Figure 4), general aviation enterprises lack the ability to create autonomous brands, which in turn affects the deep integration of general aviation and tourism. Second, enterprise business model innovation. Due to the short development time of general aviation tourism and the lack of mature consumer groups, related enterprises have a lot of profit points, but the profit model is still unclear. With a single product system and high operational costs, the consumption chain is short and has poor continuity, which leads to high prices of products and mismatches in supply capacity and demand.



Source: Reference [10]

Figure 4 China's general aviation industry policy distribution

(4) Aviation consumer culture has not yet formed. The development of aviation technology and aviation manufacturing gave birth to aviation culture, which in turn fosters both. Essentially, the significance of developing general aviation tourism lies in cultivating the general aviation market. Through the development of aviation culture, more "aviation blindness" can be turned into "aviation fever" at the lowest cost, thus forming a basic consumer market for general aviation. However, due to the slow development of China's general aviation, the construction of aviation culture is not only weak, but also lacks effective carriers [11], resulting in a weak cultural atmosphere in the entire industry. Without aviation culture as the starting point, no matter it is general aviation technology innovation, industrial upgrading or enterprise development, there is a lack of strong ideological backing, which also leads to the general low awareness and consumption awareness among tourists of general aviation tourism consumption. Despite the richness of cultural communication channels and platforms in new economic contexts, the means of aviation cultural communication are still more traditional and less abundant, and communication strategies have failed to enable precision. Overall, China's aviation consumer culture is still in the stage of market cultivation.

4. CONCLUSION

The integrated development of general aviation and tourism industries is not only the need of economic and social development, but also the result of both endogenous and exogenous dynamics. Among them, a complete industrial chain, complementary resource advantages and meeting their own development needs are the endogenous dynamics to promote the integrated development of the general aviation and tourism industries. And policy environment, market demand, industry supply and technological innovation ability are the exogenous dynamics to promote the integrated development of the general aviation and tourism industries.

At present, although general aviation and tourism have a good industrial foundation and development environment, there are still some problems. For example, the relevant institutional mechanisms and infrastructure construction of the general aviation industry have yet to be improved. In addition, the aviation consumer culture has not yet been formed, and Industrial integration and innovation capacity is insufficient. These are important reasons for the difficulty in the integrated development of the general aviation and tourism industries.

5. COUNTERMEASURES

In response to the current obstacles facing the integration of the general aviation and tourism industries, strategies should be integrated to promote sustainable development of the general aviation industry.

(1) Improve the industrial integration development mechanism and unify the construction of market norms. Deepening airspace management reform is a prerequisite for the development of the general aviation industry, based on which the role of macro regulation by the government can be fully realized, followed by scientific and rational planning of related projects. Firstly, there are many management departments involved in the general aviation and tourism industries. The government should consider establishing a leading group for the integrated development of the general aviation and tourism industries, and coordinate various management agencies through specialized managers to promote in-depth cooperation between the two industries. Secondly, the government should establish and improve the low-altitude flight service guarantee system, while planning to establish and improve the corresponding management regulations and pilot training plans to ensure the safety of general aviation flight. Moreover, drawing on the experience of developed countries such as Europe and the United States, there is methodical relaxation of market regulation for general-purpose aviation, which is supported by certain funds.

(2) Accelerate the layout of the general aviation industry and improve general aviation infrastructure. The matched general aviation infrastructure support is the basis for the integrated development of general aviation and tourism industries. The construction of aviation infrastructure involves various units departments, and the planning and design requirements are high. Firstly, it is necessary to formulate norms and standards for the construction and operation of general aviation infrastructure, and implement special approvals to simplify the approval process. Secondly, because in recent years, the construction of general airports in China has been dominated by private capital investment, which has high expectations for the return on investment, which is not conducive to the continuous operation and development of the airport. Therefore, relevant

departments can refer to the experience of the United States and establish a general airport subsidy mechanism to Increase local and social speed and motivation to build general aviation infrastructure. Furthermore, based on the construction of basic aviation services, flight service stations should be set up according to the actual conditions and needs of different regions to cater for the current and future high-speed development of general aviation.

(3) Strengthen the building of industrial integration capabilities and innovate the development model of general aviation tourism. To promote the deep integration of general aviation and tourism industries, we must first strengthen the independent innovation capabilities of relevant enterprises. The improvement of the autonomous innovation ability of enterprises requires both the increased financial input from the government and the creation of a good climate for innovation, as well as the intellectual support from professional research institutions. The government should encourage qualified places to build a number of general aviation research institutes to provide strong support for the development of the general aviation industry. In addition, we can expand product breadth and depth by "general aviation tourism +" based on regional reality and oriented by market demand, such as "short-distance transportation + sightseeing tourism", "general aviation tourism + leisure sports + popular science education". By developing personalized and diversified products that fit users' consumption level, we can improve the "cost performance" of products and extend the industrial chain of general aviation tourism consumption.

(4) Strengthen the role of cultural empowerment industries and consolidate the foundation of the low-altitude economy. The cultivation of aviation consumption culture is the key to develop the general aviation market, and it is necessary for the government, enterprises, institutes to stimulate the public's awareness of general aviation tourism consumption and enthusiasm for participation. With the increasing number of general aviation enterprises, it can give full play to the main role of general aviation enterprises and build general aviation culture based on general aviation enterprises. At the same time, the construction of culture and talent cultivation are inseparable from education. However, due to the strong professionalism of general aviation, although some universities have added aviation-related majors and courses, only a few people receive aviation education. Therefore, aviation cultural education should be extended to primary and secondary education, laying the foundation for the future supply of talents in the aviation field and the cultivation of consumer groups. In addition, for different groups such as aviation enthusiasts and families, we regularly carry out targeted activities related to general aviation tourism, and use aviation exhibitions and aviation events to cultivate

people's concept of general aviation tourism consumption.

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REFERENCES

- [1] H.Q. Liao, Z.G. Fang, C.H. Wang, et al., Economic Development Forecast of China's General Aviation Industry, Complexity, vol. 2020, 2020.
- [2] X.T. Meng, Research on System Coupling Coordination of General Aviation Industry and Tourism Destinations, Zhengzhou University, 2017.
- [3] Q.M. Gao, Challenges and Development Ideas Facing the Transformation of China's General Aviation Industry during the 13th Five-Year Plan period, Economic Review Journal, 2016, pp. 29-34.
- [4] Y.G. Jin, Preliminary Study of Low, Journal of Physics: Conference Series, vol. 1533, 2020.
- [5] V. K. Salesi, W.H.K. Tsui, X.W. Fu, et al., The Nexus of Aviation and Tourism Growth in the South Pacific Region, Asia Pacific Journal of Tourism Research, vol. 26, 2021, PP. 557-578.
- [6] S. Bojana, L. Gui, S. Noel, Air Transport and Tourism - A Systematic Literature Review (2000-2014), Current Issues in Tourism, vol. 21, 2018, pp. 975-997.
- [7] M.M. Wang, M.X. Wang, Research on Convergence of Rural Tourism and Related Industries Based on the Perspective of Holistic Tourism: Practice Analysis from China, Ekoloji, vol 28, 2019, pp. 4295-4302.
- [8] B.H. Zheng, J. Yang, Differences in the Needs of Social Groups in Tourist Cities and Their Planning Responses from the Perspective of Humanism, Seeker, 2019, pp. 112-119.
- [9] D.D. Boyd, A Review of General Aviation Safety (1984-2017), Aerospace Medicine And Human Performance, vol. 88, 2017, pp. 657-664.
- [10] R. Li, Policy Text Analysis of Strategic Emerging Industry System in China: Based on General Aviation Industry, Science and Technology Management Research, vol. 40, 2020, pp. 31-38.
- [11] J.C. Han, Study on Cultural Construction of China General Aviation, Northwestern Polytechnical University, 2016.