

Research on the Organization of the Innovation Consortium in the Aviation Industry: Taking the Development of Aviation Industry in Zhenjiang as an Example

Xia Huang*, Yongsheng Hu, Liping Zhou

Jiangsu Aviation Technical College, Zhenjiang 212134, Jiangsu Province, China

*Corresponding author: Xia Huang, xiahuang1996@163.com

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Abstract: As a new type of organizational model, the aviation industry innovation consortium conforms to the inevitable trend of industrial upgrading and scientific and technological innovation. Its core goal is to promote technological innovation and upgrading of the aviation industry. This paper presents a comprehensive analysis of the development status of the aviation industry in Zhenjiang and points out the problems and challenges it is currently facing. To solve these problems, we tackled the organizational model and implementation path of the aviation industry innovation consortium and proposed targeted implementation measures aimed at promoting the development of Zhejiang's aviation industry.

Keywords: Aviation industry; Innovation consortium; Technological innovation; Industrial upgrading

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1. Introduction

With the increasingly fierce competition among enterprises, China is faced with the challenge of potential limitations in core technologies. China highlighted the importance of stepping up research in these key areas, making ongoing progress, and putting more effort into independently developing and advancing these technologies. The goal is to speed up the process of achieving greater self-reliance and autonomy in scientific and technological advancements. However, the existing innovation capacity is insufficient, and there is an urgent need to deeply integrate the innovation resources of the industry, academia, and research sectors. In response to this issue, China has proposed accelerating the establishment of innovation consortiums led by top enterprises, supported by universities and institutes, and coordinated by experts. This approach is seen as a novel national innovation system and a significant organizational structure for conducting crucial technology research^[1].

Guided by government directives, the innovation consortium brings together diverse innovation

components from different stakeholders, fostering unity and collaboration. This collaborative approach allows parties to complement each other's strengths and collectively address technological challenges. This model serves as a robust assurance to propel the innovation capabilities of science and technology enterprises, ultimately fostering high-quality economic development. The aviation industry is an emerging industry important symbol of the comprehensive national strength of a country. The current phase represents a crucial opportunity for China's aviation sector to bolster its global competitiveness, achieve strategic advancements, and overcome development hurdles. Investigating the organizational structure and practical approach of an innovation consortium within the aviation industry will offer robust support for the sustainable progress of China's aviation sector ^[2].

2. The basic status of aviation industry development in Zhenjiang

Over the last decade, Zhenjiang has consistently followed the principles of socialism with Chinese characteristics in the new era. The city has diligently put into practice the essence of the 20th CPC National Congress and General Secretary Xi Jinping's significant address during the deliberation of the Jiangsu delegation at the 14th National People's Congress. As a result, Zhenjiang has successfully established an aerospace industry cluster with global competitiveness, swiftly evolving into the sole pilot region for provincial and municipal collaborative development in the aerospace industry within the province ^[3].

2.1. Main achievements of Zhenjiang's innovation consortium

Being one of the key sectors emphasized in Zhenjiang's "14th Five-Year Plan" under the umbrella of the "Four Clusters and Eight Chains" initiative, the aviation industry aligns with the specific objectives outlined in the "14th Five-Year Plan for the Development of Aerospace Industry in Zhenjiang." It has evolved to encompass a development strategy characterized by "two cores, six fields, and double features," along with a spatial arrangement defined by "one center, three areas, and multiple points." The system is built upon the foundation of "one school, one field, one town, and four parks," demonstrating a robust industrial concentration effect. Zhenjiang's aviation industry has realized a major breakthrough from scratch and built a strong foundation for further development. This progress is primarily evident in its close alignment with national major special projects, facilitation of collaboration and support across the industry chain, and the successful establishment of industry clusters. Furthermore, Zhenjiang has actively set up a talent research consortium to break through the limitations of technological development. In Zhenjiang, industry-leading enterprises take the lead in integrating with advantageous entities throughout the industry chain, including universities, research institutes, and other innovative resources. Collaboratively, they precisely pinpoint bottlenecks, compiling a "technical list" along with a "talent map." This facilitates the formation of teams based on merit, reinforcing the roles of "Commander-in-Chief" and "Chief Technician," thereby effectively energizing and supporting innovation. The joint mechanism incorporates "Task Guidelines," "Service Guidelines," and "Service Support" to further enhance coordination and innovation efforts ^[4].

2.2. The main problems of Zhenjiang's innovation consortium

Zhenjiang's innovation consortium has achieved great results, but there are still some problems. Firstly, the technological innovation capacity, the independent research and development of core technologies and key components, and the added value of products need to be improved. Secondly, the degree of industrial agglomeration is not sufficient, the scale of enterprises is generally small, and there is a lack of large-scale enterprises with international competitiveness. Zhenjiang still has a lot of room for development in the

aviation industry based on the “Three-year Action Plan for the Development of the Aerospace Industry of Jiangsu Province (2023–2025)” released in 2023. In addition, there is a shortage of talent, insufficient policy support, and other problems. Hence, it is essential to build an innovation consortium led by top enterprises. To achieve this, the construction of the aviation industry innovation consortium, following the “Zhenjiang mode,” aims to integrate innovation resources along the industry chain. This involves strengthening foundational research, developing groundbreaking technologies, and addressing critical challenges to overcome obstacles in innovation. The goal is to eliminate the innovation bottleneck, bridge the gap between research and industrial transformation, and dismantle barriers hindering industrialization. By fostering deep collaboration among the government, industry, academia, research, and other stakeholders, a synergistic innovation environment can be created, promoting sustained innovation and development in Zhenjiang’s aviation industry ^[5].

3. Practices and inspiration of innovation consortiums in neighboring regions

In today’s innovation-oriented era, innovation consortiums have become the driving force in promoting economic development. Through effective resource and technology integration, these consortiums have built a new cooperation platform for various types of innovation bodies such as enterprises and universities ^[6].

3.1. Typical practices

3.1.1. Suzhou: Innovation consortiums make photons shine

Suzhou has achieved remarkable results in the field of photonics technology, thanks to the joint efforts of the government, industry, academia, and research centers, which resulted in the establishment of a photonics-focused innovation ecosystem. This ecosystem effectively harnesses the strengths of all parties, forming a complete chain from basic research, and application development to industrialization. Concurrently, Suzhou actively expands its presence in both domestic and international markets, enhancing its global influence. Suzhou’s successful model offers valuable insights for other regions in constructing innovation consortiums. First, industrial fields with specific characteristics and advantages are selected. Second, the constraints of traditional institutions and mechanisms are broken and in-depth cooperation among various types of innovation bodies is encouraged. In this way, innovation-driven development and sustainable economic and social progress can be achieved ^[7].

3.1.2. Changzhou’s China Petroleum Changzhou University Innovation Consortium stimulates the vitality of high-capacity innovation bodies

Changzhou’s China Petroleum Changzhou University Innovation Consortium is a great example of government-university-enterprise cooperation. In this collaborative framework, enterprises collaborate with universities to share research and talent advantages, fostering technological innovation. The government plays a crucial role by providing policy support for the consortium’s innovation activities, incentivizing participation from all parties, and driving industrial development. Universities contribute by transforming research outcomes into tangible products and services, thereby promoting technological progress and providing valuable talent support. In short, the cooperation between the government, universities, and enterprises is an important way to promote scientific and technological innovation and industrial development. Therefore, this form of cooperation should be promoted to accelerate China’s scientific and technological innovation and industrial development ^[8].

3.1.3. Nanchang's Aviation Industry Science and Technology Innovation Consortium adheres to the project traction and platform driven to create innovative industry clusters

Nanchang's Aviation Industry Science and Technology Innovation Consortium has garnered significant attention in recent years as a distinctive form of industrial organization. The consortium, centered around projects and platforms, aims to foster innovative industrial clusters, injecting new vitality into Nanchang's aviation industry and even to the nation as a whole. The consortium adopts a forward-looking approach. Recognizing the challenges posed by the global aviation market, the consortium acknowledges the limitations of individual enterprises in adapting to these changes. Therefore, it strategically integrates resources across the industry's upstream and downstream sectors, creating a novel industrial model that aligns with market and technological developments, thereby enhancing overall competitiveness. Moreover, the consortium assumes an indispensable role in the realm of industrial upgrading and transformation. With innovation at its core, it actively addresses technical bottlenecks, expedites the transformation and application of scientific and technological achievements, and propels the technological progress of the aviation industry. In doing so, the consortium serves as a catalyst for positive change and advancement within the sector.

3.2. Useful insights

3.2.1. Aggregating innovation power and realizing complementary advantages

An innovation consortium is a new type of organization that aims to aggregate innovation entities of different fields and achieve resource-sharing and complementary advantages. However, to realize its potential, it is necessary to pay attention to three core elements: stability, flexibility, and a clear operating body. Stability is crucial for ensuring long-term cooperation and sustainable development, emphasizing common interests and cooperation mechanisms. Flexibility is key for responding to market changes and opportunities, requiring all parties to maintain an open mind and adjust cooperation strategies and methods as needed. A clearly defined operating body is essential because a professional and independent entity ensures the efficiency of the daily management and decision-making of the consortium.

3.2.2. Deepening the “list of commanders” and improving scientific and technological evaluation

Advancing the innovation consortium's development relies significantly on the transparency of the system and the scientific and technological evaluation system. The traditional science and technology evaluation system emphasizes too much on papers and patents and ignores practical and industrial aspects, resulting in many achievements remaining in the laboratory stage. Therefore, reforming the evaluation system and emphasizing the transformation and application of scientific and technological achievements can stimulate the enthusiasm of researchers and promote industrialization. Innovation consortiums should strive to overcome technical problems and achieve rapid transformation and application. A transparent system overcomes the problem of resource integration, facilitates the development of excellent teams, and provides a strong guarantee for the innovation consortium.

3.2.3. Improving the management and enhancing the innovation efficiency of innovation consortiums

The establishment of a sound management mechanism is essential to ensure the effectiveness of an innovation consortium. In the era of rapid development of science and technology, innovation is the key to promoting social progress and economic development. Given that the establishment of an innovation consortium involves diverse fields, enterprises, and organizations with scattered and complex resources, effective management is crucial. This is essential for integrating related resources and enhancing innovation efficiency within the consortium. Furthermore, the management mechanism serves to coordinate the interests of all involved parties,

striking a balance in demands and ensuring the stability and sustainable development of the consortium.

4. Zhenjiang's aviation industry innovation consortium "1+N+X" synergy model construction

After analyzing the typical practices of innovation consortiums in neighboring regions, it becomes clear that the construction of innovation consortiums is crucial for promoting the development of the aviation industry. To further promote the innovative development of Zhenjiang's aviation industry, we propose the "1+N+X" synergy model. The main objective of this model is to realize resource sharing, complementary advantages, and collaborative innovation to promote the overall progress of Zhenjiang's aviation industry.

4.1. "1" network

"1" means establishing a platform as the foundational infrastructure for the innovation consortium, facilitating information sharing, communication, cooperation, and innovation support. Internet technology will be utilized to build an authoritative information resource-sharing platform to break down information barriers and promote exchanges and cooperation. A data and information-sharing system that safeguards data security and privacy while promoting data openness and circulation will be created. In addition, a docking mechanism for public information and public data will be established to improve the utilization of scientific research infrastructure. All in all, "1" will provide an efficient, secure, and convenient platform for sharing, communication, and innovation, playing a vital role in advancing the construction of Zhenjiang's aviation industry innovation consortium.

4.2. "N" sharing

"N" stands for "government, industry, academia, research, and application," including government, industrial enterprises, universities, research institutes, and users. This collaborative system centers around projects and employs sharing as its fundamental mechanism, forming a strategic layout of "one body, two levels, and multiple points." The government serves as a bridge, facilitating the integration of industry, academia, research, and application. In line with the aviation industry's long-term development, the government has established an expert steering group and a steering body for integrated development, responsible for organizing, coordinating, and acting as a bridge between various sectors. This strategic layout aims to leverage the strengths of each party to collectively drive innovative development in the aviation industry. To ensure the high-quality development of the aviation industry, it is imperative to engage multiple stakeholders in building a core pole of innovation sources, establishing a chain for results transformation, nurturing the aviation industry's ecological chain, and creating a model of regional cooperation.

4.3. The "X" format

"X" signifies the various forms of "government-industry-university-research-application" cooperation. It is crucial to recognize that the effective integration and utilization of intellectual and human resources from all parties are pivotal for promoting innovative development in Zhenjiang's aviation industry. To achieve this goal, there is a need to enhance the depth and scope of collaboration by establishing joint innovation platforms and employing various forms of cooperative initiatives. These forms include, but are not limited to: joint technical research, entrusting scientific research institutions to carry out special research, promoting the transfer and transformation of scientific and technological achievements, as well as entity co-construction. These measures will strongly promote the sharing of intellectual resources, promote the rapid transformation and application of scientific research results, and propel the innovative development of Zhenjiang's aviation industry.

5. Conclusion

The “1+N+X” synergy model is a model of aviation industry innovation consortium aiming to realize resource sharing, complementary advantages, and collaborative innovation. Building an information-sharing platform, establishing a cooperation system, and expanding the forms of cooperation among industries, universities, and research institutes fosters communication and cooperation among all parties. This helps drive the innovative development of the aviation industry. The popularization of this model is expected to inject new impetus for the sustainable development of Zhenjiang’s aviation industry.

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