

## **Research on Aviation Logistics Development Strategy of Chengdu Tianfu International Airport**

Yuyang Liu

Haaga-Helia Bachelor Program in Aviation Business



<b>Author(s)</b> Yuyang Liu	
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<p>This paper is a study on the development strategy of Chengdu Tianfu International Airport's aviation logistics, firstly, the background and significance of the study, and then from reading and collating the writings on aviation logistics development, we analyse three aspects of aviation logistics safety, timeliness and efficiency, the development trend of aviation logistics, and the construction of an international hub for aviation logistics. Then, based on the results of the internal factors of Tianfu International Airport, the SWOT analysis is applied to analyse the strengths and weaknesses, the advantages and weaknesses of the development of aviation logistics in Tianfu International Airport. Then, based on the results of the internal factors of Tianfu International Airport, an in-depth study of the advantages and disadvantages, opportunities and threats of the development of logistics at Tianfu International Airport is carried out, which leads to the formulation of a strategic positioning (SO) strategy and development ideas. The article explains how the strategy is implemented and how it is guaranteed. The article concludes with a summary of the text and an outlook on the future of Tianfu Airport.</p>	
<b>Keywords</b> Domestic and international cargo hub airports、PEST analysis, SWOT analysis, Development strategy, Strategic choice、Strategy implementation	

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# 1 Introduction

With the development of the economy and the progress of science and technology, as well as the acceleration of the process of world economic integration, the logistics industry, as a new industrial sector in the national economy, has become an important industry and a new growth point of the national economy in this century. As an important part of modern logistics, air logistics is increasingly prominent in its strategic position due to its unparalleled advantages in terms of speed and depth. In recent years, the accelerated development of the modern industrial system in the western region has laid a solid foundation for the development of Chengdu Tianfu International Airport's aviation logistics business. Chengdu Tianfu International Airport.

This paper is a study on the development strategy of Chengdu Tianfu International Airport's aviation logistics. Firstly, it starts from reading and compiling the writings and other materials on the development of aviation logistics, studying the current situation and trends of aviation logistics development, comparing the development history and successful experiences of typical cargo hub airports at home and abroad, and gaining inspiration for the development of aviation logistics at Tianfu International Airport. Then, based on the results of the internal elements of Tianfu International Airport, the SWOT analysis is applied to conduct an in-depth study on the advantages and disadvantages, opportunities and threats of the development of aviation logistics at Tianfu International Airport, and then to formulate strategic positioning and development ideas; finally, the three major objectives are to build a core customer base, improve the route network layout and Finally, a total of nine practical countermeasures for the development of the airport will be formulated, such as building a core customer base, improving the layout of the route network and creating a high-quality logistics ecological environment.

## 1.1 Background of the research

The civil aviation industry is an important strategic component of China's national economy and is already an important basic industry in China. Based on the civil aviation industry, the air logistics industry has been developing in great strides in the past decade or so, and has formed a strong impetus to the economy. Its characteristics are becoming more and more significant: it is a strategic industry that takes civil aviation airports as the main body, relies on the airport route network, integrates various modes of transport and resources, and realises the flow of goods from the place of departure to the place of receipt and expands its services. High timeliness, safety, convenience, added value and long distance transport are the distinctive features that distinguish it from other modes of transport. In contrast to air freight, air logistics is distinguished by a high degree of

information technology for process design and management of the whole process of the industry, highlighting the integration and optimisation of functionality, the smooth coordination of supply chain links, the improvement of transport punctuality and efficiency, the reduction of comprehensive costs and the powerful promotion of efficient connectivity between domestic and international markets.

With the continuous optimisation and adjustment of China's industrial structure and the continuous opening up to the outside world, China's air logistics continues to be in a stage of rapid development and its strategic position is becoming increasingly important.

Especially in recent years, the e-commerce and express logistics markets have maintained growth, and China's air logistics has made further breakthroughs. First, the business volume has maintained continuous growth, in 2008 China's air cargo and mail throughput was 4.08 million tons, to 2019 grew to 7.53 million tons, jumping to second in the world; even in 2020 by the impact of the new crown epidemic, due to the effective prevention and control of the epidemic in China, the impact on the air logistics industry was relatively small, reaching 6.77 million tons, only 10% less than in 2019. Second, the rapid development of market players, international airlines, Southern Airlines, China Eastern Airlines as the representative of the traditional airline companies to actively complete the independent operation of the cargo segment reform, focusing on professional, integrated, open air logistics service providers transformation; a number of private airline companies are also actively planning independent full freight companies, open up the domestic and international logistics market; Shunfeng, Yuantong and a number of courier companies are actively involved in the air Freight company formation, the size of the freight fleet, the rapid growth of air logistics freight; Ali, Tencent, Xiaomi and other IT companies, relying on their strong supply chain, warehousing and distribution, international markets and big data, cloud computing technology and other advantages, is a deep impact on the domestic and international air logistics market. Third, the steady and orderly transformation of the industry, China's aviation logistics hub airport construction gradually increased, international freight routes continue to open up, and government support continues to increase, giving the relevant enterprises a certain operating license priority; China's active introduction of policies to promote international air transport and the international development of air logistics to promote, match, the expansion of the international aviation market to widen and deepen, the route network to cover a wider range; at the same time at the same time, we are also actively developing towards electronic and digitalisation.

Although China's air logistics development has made more significant achievements, the quality of development is still not high, and some countries have a large gap in the strength of the industry, some deep-seated problems of the constraints of the impact are becoming more and more obvious. First, the airport infrastructure is backward, airports in

the planning often do not focus on the high design of air logistics, limited development space, service facilities saturation, ground synergy operation is limited; Second, the professionalism of air cargo enterprises, comprehensive strength is still not strong, the business thinking is more conservative and traditional, the international layout is narrower, international routes are not dense enough, limited capacity; Third, the management system and operation system there are still more intertwined The process is long, management is many, efficiency is low, can not take the initiative to promote the whole process of air logistics services and coordination, at the same time the airport home field and the base company in the relevant interests overlap, there are compromises and concessions when cooperating with each other; Fourth, information technology construction, intelligent construction, cargo hub construction, etc. is relatively slow, the standard is not uniform, the market demand response is too slow, the service level is low, etc., all lead to China's air logistics development Still in a more primary level of air cargo transport. Based on the above-mentioned background, this paper presents a detailed analysis of the international and domestic environment and the competitive situation of the civil aviation industry, as well as an in-depth study of the current situation of air logistics at Chengdu Tianfu International Airport, to complete the planning and design of the high-quality development of air logistics at Chengdu Tianfu International Airport, and also to explore the construction direction of the regional air logistics hub airport.

## **1.2 Significance of research**

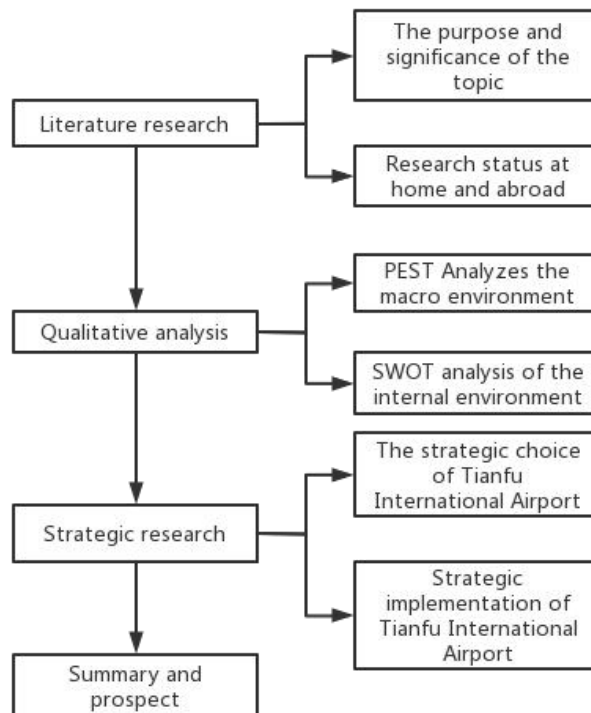
Theoretical significance: The country is now committed to building the Chengdu-Chongqing economic circle in the southwest, to better radiate the west and the Belt and Road area, and even the Eurasian continent, the construction of Chengdu Tianfu International Airport is also to better build the southwest aviation logistics hub, freight distribution centre and express processing centre, to accelerate the "Chengdu-Chongqing" economic circle faster development It will also drive the rapid development of the southwest region. This is why it is important to study the development of air logistics at Chengdu Tianfu International Airport.

Practical significance: This paper selects a representative airport in the southwest region, Tianfu International Airport, and conducts an in-depth study on the development of air logistics at the airport through SWOT, PEST, strategy selection and implementation, in order to fully understand the development path of air logistics at the airport and to make a preliminary forecast on the development strategy of air logistics in the coming years. This is because Chengdu Tianfu International Airport is in a promising strategic opportunity period for China's air logistics during the 14th Five-Year Plan period, so the planning and layout of Chengdu Tianfu International Airport in the coming years is crucial.

### 1.3 Research content

The study focuses on this topic - the development strategy of aviation logistics in Tianfu International Airport. The literature begins with a background introduction and literature study to clarify the importance of aviation logistics in the current era, before analysing three aspects of aviation logistics safety, timeliness and efficiency, aviation logistics development trends and aviation logistics international hub construction research respectively, laying the foundation for the Chengdu Tianfu International Airport aviation logistics development study. Finally, the research methods of SWOT, PEST, strategy selection and implementation are used to analyse the development strategy of Chengdu Tianfu International Airport's aviation logistics and make relevant recommendations. This thesis uses qualitative analysis methods such as SWOT and PEST to analyse the current situation of Chengdu Tianfu International Airport's aviation logistics development by finding relevant literature, focusing on the policy advantages of Chengdu Tianfu International Airport in the general environment, the strong assistance provided by relevant laws and regulations, and the opportunities and challenges faced by the entire airport's aviation logistics industry in the future; and then through strategy selection and This is followed by a detailed study of the development strategy of the Chengdu Tianfu International Airport through strategic choices and implementation.

The research idea of this thesis is shown in Figure 1



## 1.4 Thesis structure

This thesis analyses the opportunities and problems facing the development of air logistics at Chengdu Tianfu International Airport from both macro and micro perspectives, and examines the development of air logistics at Chengdu Tianfu International Airport through the experience of typical airports at home and abroad and the actual socio-economic characteristics of Sichuan and Chengdu. It consists of seven main parts.

chapter 1 is the introduction, which explains the background that China's air logistics industry is in a stage of continuous and rapid development and has become an important part of modern logistics, and introduces the purpose and significance of this thesis, and specifies two research methods and contents.

chapter 2 is the current situation of domestic and foreign research, in this part of the analysis of domestic and foreign aviation logistics industry research status and development trend.

chapter 3 is a typical case study of domestic and international airports, with Shanghai Pu Dong Airport and Hong Kong Airport in China, Incheon Airport in Korea and Dubai Airport in the United Arab Emirates as examples, to provide theoretical basis and practical experience for the development of air logistics at Chengdu Tianfu International Airport.

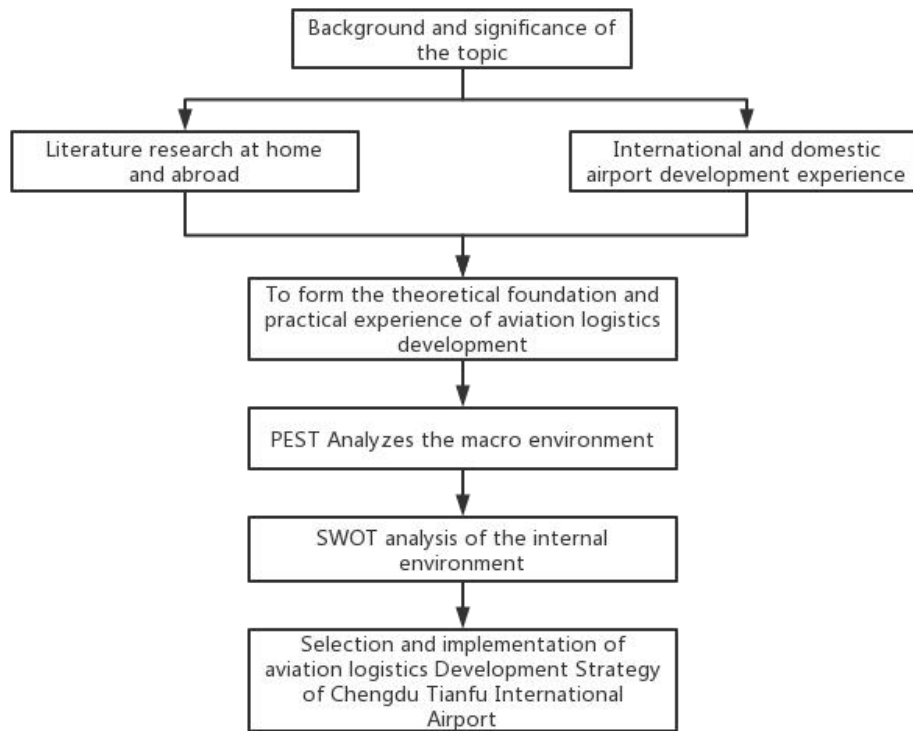
Chapter 4 presents an analysis of the macro environment of Chengdu Tianfu International Airport's air logistics development, using the PEST analysis to assess the main conditions for the development of air logistics at Chengdu Tianfu International Airport.

Chapter 5 presents an analysis of the internal environment for the development of aviation logistics at Chengdu Tianfu International Airport, using SWOT analysis and more in-depth strategic analysis to identify the best strategy for the development of aviation logistics at Chengdu Tianfu International Airport.

Chapter 6 presents the design and implementation of an aviation logistics development strategy for Chengdu Tianfu International Airport. Through a series of in-depth analyses in the previous sections, a detailed aviation logistics development strategy for Chengdu Tianfu International Airport is designed, specifying a complete set of strategic objectives, options, implementation and safeguards.

Chapter 7 concludes with a summary of what has been researched and the conclusions drawn, an objective evaluation of the shortcomings of this paper, and an introduction to the directions that need further work in the future.

The thesis research route is shown in Figure 2



## **2 Research status at home and abroad**

This section is a research article on the development strategy of airport air logistics at home and abroad found by searching for information, and to identify the main research directions in the article to better provide research ideas for this paper.

### **2.1 Research on the construction of international hub of aviation Logistics**

Some scholars have conducted research on domestic air logistics hub airports, with (Lin Si, 2018) detailing the characteristics and trends of Hong Kong's air logistics and analysing the main competitive and industry competition factors in the regional and global markets, as a way of exploring the role of international air logistics hubs. (Ma Tongguang and Qi Lan, 2018) conducted an in-depth study of China's major hub airports, where passenger traffic, production technology and innovation, infrastructure conditions, personnel conditions, etc. and the airside economy promote each other's development, but air logistics shows an inverse influence with them, which has implications for the development measures of China's airside economy.

Some scholars have conducted studies on foreign air logistics hub airports. (Tang Ronzhu, 2015) selected 13 major airports in the Asia-Pacific region and studied their competition, airport class and competitive potential in the air logistics market from the perspective of demand and supply chain, arguing that economic globalisation and changing supply chain networks have intensified competition among airports. (Liu Chunling, 2014) summarised the characteristics of the respective industrial structures of the successful models of aviation economic development - Schiphol, Memphis and Incheon - and comparatively studied the general rules of industrial development in aviation economic zones, so as to provide suggestions for the development of the aviation industry in the Zhengzhou Aerodrome Comprehensive Pilot Zone. (Li Mu Yuan, 2017) conducted an in-depth study of international aviation logistics hubs such as Fed Ex's Memphis, DHL's Leipzig and UPS's Louisville, and concluded that there are three commonalities: firstly, cargo and passenger flows are separated in different aviation centres, secondly, they are able to meet the demand for huge volumes of cargo aircraft entering and leaving the port, and thirdly, they do not compete with passenger aircraft for flight resources.

Some scholars carried out research on air logistics hub airports by using a specific analysis method. (Chen Jun and Huang Guangqiu, 2019) used a fuzzy Petri net to build a blockchain-based model to explore the main impacts of blockchain technology in practical use and design a way in which the technology can be quickly landed in the industry. (Li Guoliang, 2018) studied some problems of Zhengzhou aviation port by using data envelopment analysis, and gave some countermeasures in terms of transformation

and development, infrastructure construction, industrial system construction and industrial zone construction. (Cao Yunchun and Luo Yu , 2020) used the gravitational force model and social network analysis method to carry out a proxy analysis of the development data of 23 cities where the airport-type national logistics hubs are located, and found that the cities related to aviation logistics and urban economic development present similar characteristics, such as strong in the east and less developed in the west, dense cities in the east and more scattered in the west, "core-semi-fringe- The analysis reveals that the cities related to aviation logistics have similar characteristics to urban economic development, such as strong eastern cities and underdeveloped western cities, dense eastern cities and fragmented western cities, "core-semi-fringe-fringe" and "multi-centre-driven", as well as a series of shortcomings that need to be improved.

## **2.2 Research on the development trend of aviation logistics**

Based on the current situation of aviation logistics to analyze the sustainable development countermeasures, (Shen Danyang, 2016) studied the sustainable development of airport logistics from the perspective of logistics network, analyzed the factors influencing the sustainable development of airport logistics, and found that quality, quantity and duration are the three main aspects of airport logistics development, while the structure of aviation logistics enterprises, airport conditions, information technology, air and ground networks are four key factors in the growth of airport logistics volumes. (Li Hejun ,2021) pointed out that due to the unbalanced development of China's aviation logistics industry at this stage, the obvious gap between the east and west, the changing market environment, the diversification of customer needs and the rapid development of high-speed rail have restricted the development of aviation logistics, and through the analysis of the current situation and problems of aviation logistics, corresponding countermeasures are proposed to improve the aviation logistics system. (Cao Xueming and Wang Xifu ,2009) comprehensively expressed the development of China's aviation logistics, especially analyzed the impact brought by the promulgation of the Civil Airport Management Regulations, and proposed a reform of the management and operation mode in line with the policy from the perspective of sustainable development. (Zhang Qinglei , 2014) argued that the evaluation system of sustainable development of airport logistics is not perfect, summarised the indicator system of seven major areas of airport aviation logistics, and used hierarchical analysis, first value method and deviation method to calculate the comprehensive evaluation value, verified with five international airports in China, and argued that airport aviation logistics should focus on four aspects: economic, operational, environmental and social.

From the perspective of air logistics transformation and development countermeasures, (Wei Ran and Li Yaling , 2018) explored the transformation direction of "Internet +

logistics", and summarized the platform model of Cainiao Logistics and the O2O model of Tiandihui "Highway Port" on the basis of the analysis of this model. Based on the analysis of this model, the platform model of Cainiao Logistics and the O2O model of Tiandihui Highway Port are summarized, and three new development models of "Internet+" are proposed around the characteristics and development status of the value chain of aviation logistics enterprises. (Wang Xinyu , 2020) studied the transformation of aviation logistics into modern logistics, and analysed that modern logistics is characterised by interconnected links and the integration of different modes of transport, which requires China's aviation logistics to reconstruct its route network, build aviation hubs and strengthen the connection with other modes of transport.

### **2.3 Study on safety, timeliness and efficiency in air logistics**

Air logistics covers a wide range of areas, but safety, timeliness and efficiency are the fundamental requirements of this industry. From the perspective of air transport safety risks, (Gao Jianguo , 2021) constructed an aviation safety risk evaluation index system based on the "human-machine-environment" system safety theory, and determined the safety risk value and confidence structure of each evaluation index through triangular fuzzy numbers and their operation rules. (He Peng and Sun Ruishan ,2021) analyzed the air transport safety situation under the global epidemic crisis and discussed the research trends of cross-indicator fatigue rapid measurement technology, data analysis technology based on the fusion of safety I and multi-source multidimensional data, and the reliability and validation of SPO systems. (Mao Ning ,2019) adopted the CCP critical control point control method and constructed an implied dangerous goods indicator system and risk assessment model to accurately identify safety risk links and risk sources in passenger and cargo transportation.

(Sun ,2019) proposed a faster and more accurate calculation model, and the results showed that airlines need to continuously improve the construction of distribution hardware and design optimal distribution routes through multiple experiments. ( Zhou Hong ,2008) modelled the international cargo operations of an airline company and accurately found the shortcomings in resource allocation and transportation operations with the help of eM-PlantTM, and evaluated different scenarios in simulation and finally made suggestions for improvement.

(Prokop ,2002) analyses current initiatives to further deregulate international air logistics and outlines the US Department of Transportation's mandated approach to combining combined transport, joint terminalisation and coastal transport operations, arguing that this hybrid transport reform sets a precedent and that the results show that it has been effective in improving air logistics efficiency in the US. (Yuan , 2009) used the ACSCOR model of air logistics supply chain operations to examine the impact of airport operational

strategies and industry potential on the overall efficiency of airports and to quantify the economic benefits of service operations.( Hu Xichang ,2021) argues that the implementation of neutral electronic waybills to optimise the process of air logistics is an inevitable trend, which can effectively improve customs clearance efficiency and promote trade facilitation. (Ge Chunjing ,2018) focuses on the relevant key issues, and believes that time constraints, compartmentalised management systems, inefficient ground services, and low international competitiveness of enterprises are the key areas where China's air logistics needs to break through. (Bai Yang and Zhu Jinfu ,2009) sorted out and summarised the whole process in terms of quality and quantity, space and time, respectively, and proposed measures to improve efficiency, enhance stability, reduce costs and increase profits, and enhance convenience.

## **2.4 summary**

This section takes a closer look at three aspects of aviation logistics through the study of aviation logistics development trends and the study of the construction of an international hub for aviation logistics, the study of aviation logistics safety, timeliness and efficiency, and identifies this paper as the main research direction for the development strategy of aviation logistics at Tianfu International Airport.

### 3 Experience in aviation logistics development at domestic and international airports

This chapter focuses on the development of air logistics at domestic and international airports. By analysing the cargo and mail volumes of Shanghai Pu Dong Airport, Hong Kong Airport, Incheon Airport in Korea and Dubai Twin Airports from 2010 to 2020, and providing an overview of the air logistics development of the four airports based on the results produced by the charts, and finally briefly analysing the current development of Tianfu International Airport with the help of the results of the analysis of these four airports.

#### 3.1 Overview of aviation logistics development in domestic airports

##### 3.1.1 Development of aviation logistics at Pu Dong Airport

Shanghai Pu Dong International Airport, located in Pu Dong New Area, covers an area of nearly 60 square kilometres and is only 32 kilometres away from the city centre, and was opened on 16 September 1999. It has two terminals and four runways, and is a 4F class civil airport. The third runway provides landing and take-off for all-cargo aircraft and has 52 parking spaces for all-cargo aircraft. The cargo area covers 2.04 million square metres and has a full range of services for general cargo, express cargo, cross-border e-commerce, cold chain, express distribution, special cargo and freight forwarding. The cargo and mail throughput, as shown in Figure 2.1, has grown rapidly to 3,686,600 tonnes by 2020, ranking third in the world for 12 consecutive years. (Chen Zhiyong. 2021). 29 September 2013 saw the establishment of the Shanghai Free Trade Zone, and by 2015 the State Council further added Lu Jiazui, Jin Qiao and Zhang Jiang to the Shanghai Free Trade Zone, with more than 300 institutional innovations replicated and extended to the whole country, with significant growth in all major economic indicators.

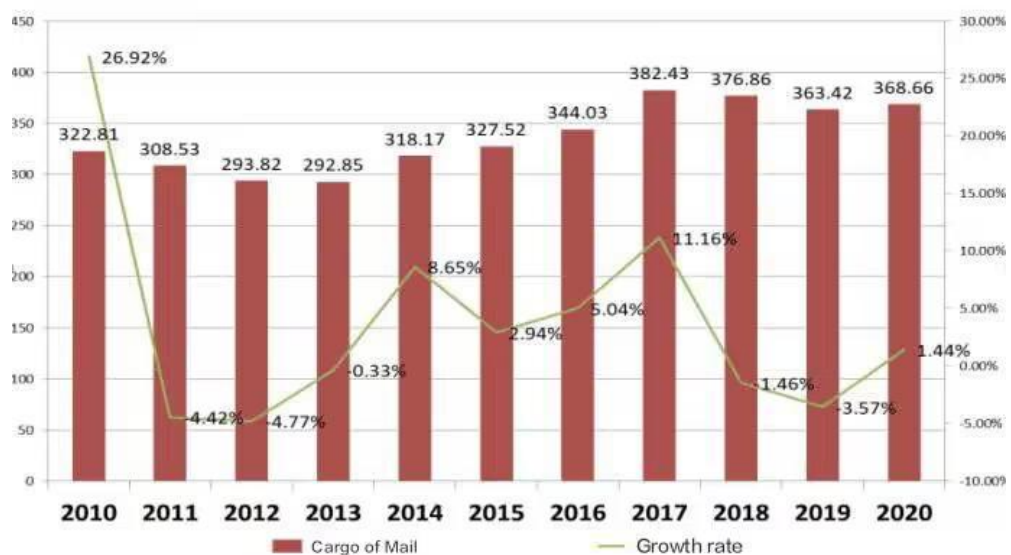


Figure 3. Cargo throughput trend chart of Pu Dong Airport from 2010 to 2020

The units used for shipment volume are all (10,000 tons)

(Data source: Huajing Industry Research Institute)

Digging deeper into the development history of Shanghai Pu Dong Airport's air logistics, the main factors for the development and growth of its logistics business are:

1) Giving full play to its transportation location advantages. Shanghai is an important part of the Yangtze River Delta and the national urban development strategy, and the vast cargo hinterland is a strong support for Shanghai's aviation logistics market and provides sufficient cargo sources for Shanghai Pu Dong International Airport. The construction of basic transportation and logistics facilities such as Pu Dong Railway, Wai Gaoqiao Free Trade Zone and Yang Shan Deep Water Port has provided Shanghai with a convenient ground transportation network for the development of air logistics and laid the foundation for multimodal transportation in Shanghai. The airport industrial park, aviation logistics zone, aviation manufacturing zone and other aviation industries are centrally located. Pu Dong Airport is the core part of Shanghai's Free Trade Zone, laying a solid foundation for the rapid development of aviation logistics, while combining with the Free Trade Zone and other functional entities to drive the development of international trade.

2) The government's industrial support policies have helped its development. During a period of rapid growth in the global and domestic air cargo industry, Pu Dong Airport quickly sought opportunities for development and rose to prominence by laying out the airside economy industry. Coordination with the Civil Aviation Administration (CAA) has led to the opening of the fifth air traffic rights on a priority basis, the establishment of a shipping centre and the introduction of the Free Trade Zone (FTZ), which has facilitated the leapfrog development of air logistics at Pu Dong Airport from the top level. The "Improving the efficiency of customs clearance at ports" programme, which provides policy protection for the development of Shanghai's aviation logistics industry. Supporting the construction of transshipment centres for international logistics integrators is not only beneficial for the improvement of cargo volume and service quality, but also a cornerstone for the consolidation of Pu Dong Airport as a hub.

3) Construction of the Comprehensive Free Trade Zone. Since its establishment in 2009 with the approval of the State Council, Pu Dong Airport Comprehensive Free Trade Zone has brought into play its advantages as a composite hub port for Asia-Pacific aviation, gradually forming an industry chain of air cargo Asia Pacific distribution centre, financial leasing, express transshipment centre, bonded exhibition and sale of high-end consumer goods and other airside functional services. It has facilitated the transformation of Pu Dong Airport into a modern logistics and transportation model, and promoted high-end international trade transportation in the Yangtze River Delta region to a new level.

### 3.1.2 Development of aviation logistics at Hong Kong Airport

The Hong Kong International Airport at Chek Lap Kok, 34 km from the city centre, covers an area of 12.55 square kilometres and is a 4F airport with two terminals, T1 and T2, and two parallel runways of 3,800 metres, forming an aviation network with 220 cities. The third runway is already under construction and its completion will increase the annual passenger throughput to 102 million, cargo and mail throughput to 8.9 million tonnes and 600,000 landings and take-offs. At present, HKIA has two main types of air logistics: cargo centres and logistics centres, and four cargo terminals adjacent to cargo aprons, with 43 cargo parking spaces. (Li Jiao, 2020) As shown in Figure 2.2, the volume of cargo and mail in 2020 will reach 4.46 million tonnes and HK\$3.5 trillion, accounting for 43% of Hong Kong's total foreign trade. Hong Kong itself is one of the world's most open and freest free trade ports, with a total area of 1045 square kilometres, and has gone through three major stages: re-export trade, processing trade and now integrated trade, with a comprehensive international legal, financial, banking and insurance system. The airport's air logistics volume accounts for a significant proportion of Hong Kong's total foreign trade and has become a major economic engine for the region.

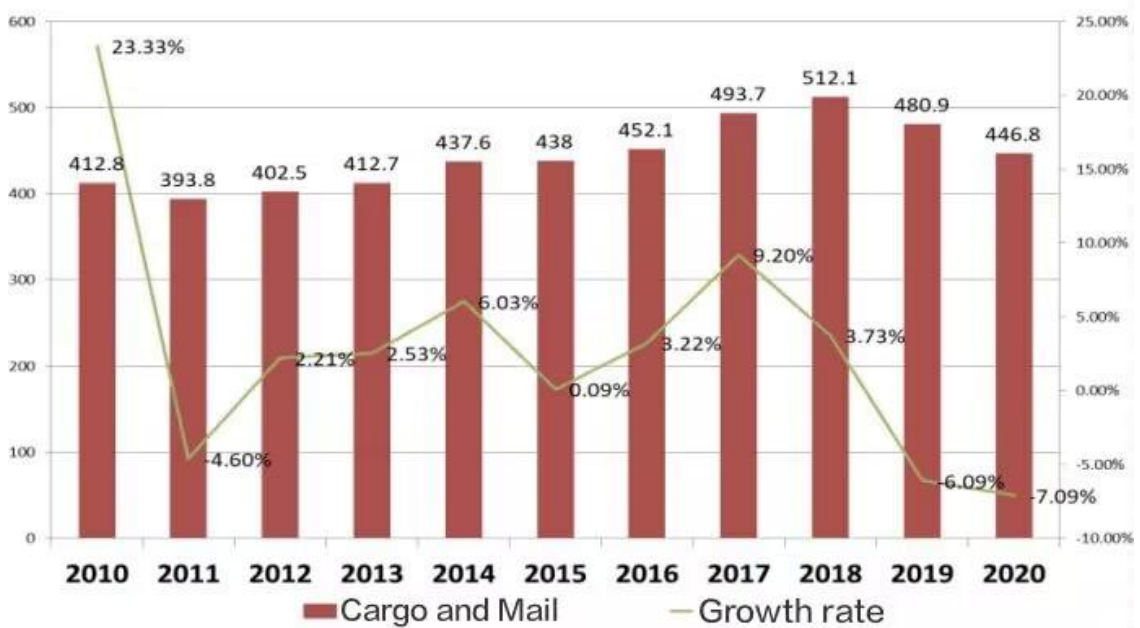


Figure 4 Trend chart of cargo throughput of Hong Kong Airport from 2010 to 2020

The units used for shipment volume are all (10,000 tons)

(Data source: Hong Kong Airport Authority)

Digging deeper into the history of Hong Kong Airport's air logistics, the main factors for the development and growth of its logistics business are:

1) Freight priority. Hong Kong Airport is not only strategically located, with a convenient transportation network and a high level of information technology, but also has a high

degree of connection between the airport's cargo information system and the customs supervision system. 3 hours before the arrival of goods in Hong Kong, the airport's customs supervision system and air cargo information system achieve real-time information exchange, cargo information, customs clearance, etc. can be visually checked, which can significantly improve operational efficiency and reduce waiting time. In the case of cargoes with strict timeliness requirements, special channels are adopted to guarantee and personalised protection plans are made according to the needs, which significantly enhances customer satisfaction and the reputation of the airport.

2) Active guidance from the government. The Hong Kong Government's concept of air logistics development at the airport is to carry out regulatory functions only and will not interfere too much with the operation and healthy competition among enterprises. The Government strongly supports and encourages healthy competition and strives to create a fair and healthy market competition environment. The Government will provide support in the form of appropriate tax concessions and financial subsidies, and continue to strengthen the infrastructure and supporting facilities at the airport to enhance the overall business environment of the airport, so as to attract well-known domestic and international airlines and air freight forwarders to the Hong Kong airport and gradually establish an airport-based logistics ecology to promote the development of air logistics in Hong Kong.

### **3.2 Overview of aviation logistics development in foreign airports**

#### **3.2.1 Development of aviation logistics at Incheon Airport in South Korea**

Incheon International Airport is an island reclamation airport with an area of about 21 square kilometres, 15 kilometres from the coast, and a 4F class civil airport. It is under construction with 4 runways and the expansion of Terminal 2. It is designed to handle 130 million passengers and 6.3 million tons of cargo and mail respectively, with 790,000 take-offs and landings, and is accessible to 173 cities in 55 countries. Three cargo terminals will be built in Phase 4, with a total area of 658,000 square metres and 62 cargo slots. (Dong, Xianxiang, 2020)As shown in Figure 2.2, the cargo and mail throughput will be 3.03 million tons in 2020, accounting for 33.6% of Korea's total imports and exports, and the cumulative total of Incheon Airport has exceeded 50 million tons since its commissioning in 2001, with a total value of approximately US\$15 trillion. The Incheon Free Economic Zone, a national special economic zone established in 2003, consists of Songdo New Town, Cheongra New Town and Yeongjong New Town, covering an area of 209.5 square kilometres and encompassing Incheon Airport and Incheon New Port, and is the gateway to the Seoul Economic Circle. The Incheon Free Economic Zone promotes trade facilitation and freedom of trade by providing fairly liberal policy support in terms of

immigration, tax exemptions, rent reductions, financial support and foreign exchange control. At the same time, the Korean government has continued to strengthen Incheon Airport and Incheon New Port to develop into a logistics hub in Northeast Asia, driving the development of other regional linkages and jointly building a top Northeast Asian business centre city.

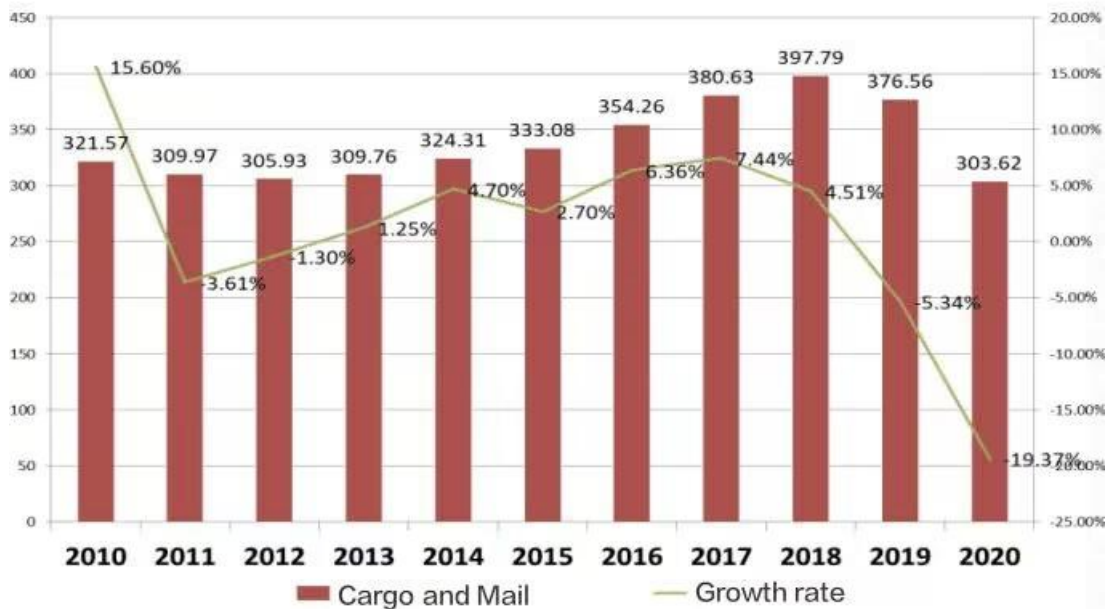


Figure 5 Trend of cargo throughput of Incheon International Airport from 2010 to 2020

The units used for shipment volume are all (10,000 tons)

(Data source: China Civil Aviation Resource Network)

Digging deeper into the history of air logistics at Incheon Airport in Korea, the main factors for the development and growth of its logistics business are:

- 1) Strong government management. The Korean government has set the strategic goal of Incheon Airport as a hub airport in Northeast Asia. The government, through the Ministry of Land, Infrastructure and Transport, almost directly manages Incheon Airport and has stepped in to negotiate air rights and air routes, which has helped Incheon Airport to acquire more aviation resources relatively quickly.
- 2) Mutual support with the Free Economic Zone The Incheon Free Economic Zone is planned and laid out in a diversified manner around Incheon Airport and its surroundings, incorporating Korean culture, tourism and resort, business and finance, and leisure, focusing on the coordinated development of the city and bringing a variety of cargo sources to Incheon Airport.
- 3) The comprehensive three-dimensional transportation system is well developed. Incheon Airport is closely connected to the Incheon New Port, the Gyeongin Expressway, the West Coast Expressway, and the Seoul Outer Ring Road, greatly enhancing the

Incheon Free Economic Zone's links with China, Japan, and even North America and Europe, bringing together highly influential companies and international affairs organizations from around the world.

### **3.2.2 Development of aviation logistics in Dubai International Airport and Dubai World Center**

Dubai is a dual airport, Dubai International Airport and Dubai World Central. Dubai International Airport, which was expanded in 1959, has a total area of 2.12 million square metres, with three terminals, four satellite halls and two 4,000-metre runways, making it a 4F civil airport with 240 cities. Dubai World Central, located approximately 60 kilometres south of Dubai International Airport, covers an area of 140 square kilometres and is planned to be an aviation metropolis centred on Al Maktoum International Airport, which has six runways and is designed to handle up to 160 million passengers and 12 million tonnes of cargo and mail annually. Dubai International Airport handles the bulk of the belly cargo, with a 35,000 sqm cargo terminal and a dedicated cargo centre for FedEx and DHL to the north, as shown in Figure 2.4, with a cargo and mail throughput of 1.93 million tonnes in 2020. Dubai World Central is responsible for pure cargo logistics, with the first phase of cargo operations starting in June 2010 on a priority basis, with 17 cargo carriers in operation and access to 45 cities worldwide. (Zhang Pei, 2019) The airport is surrounded by a cluster of seven project areas of over 130 square kilometres, with a full range of functions, as shown in Figure 2.5. There are currently 24 FTAs in place or planned in Dubai, the most influential being the Dubai Airport Free Trade Zone and the Jebel Ali Free Trade Zone, which correspond to the twin-airport configuration. The two zones have similar liberal policies, with full ownership by foreign companies, exemption from major taxes such as personal income tax and re-export tax, and no foreign exchange controls, which has attracted a large number of foreign investors. The two districts are also the engines of economic growth in the UAE and Dubai, accounting for over 30% of the total.

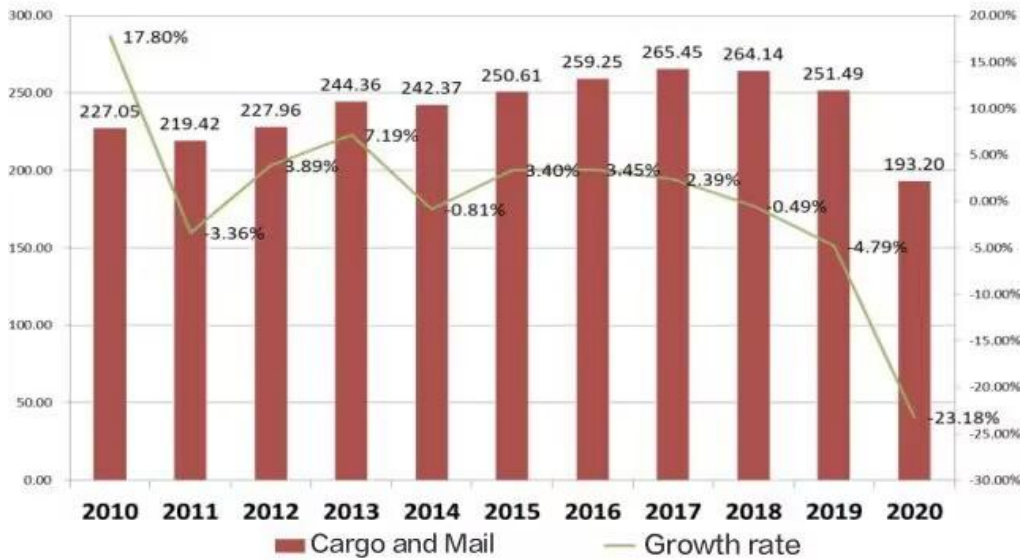


Figure 6 Trend chart of cargo throughput of Dubai International Airport from 2010 to 2020  
The units used for shipment volume are all (10,000 tons)

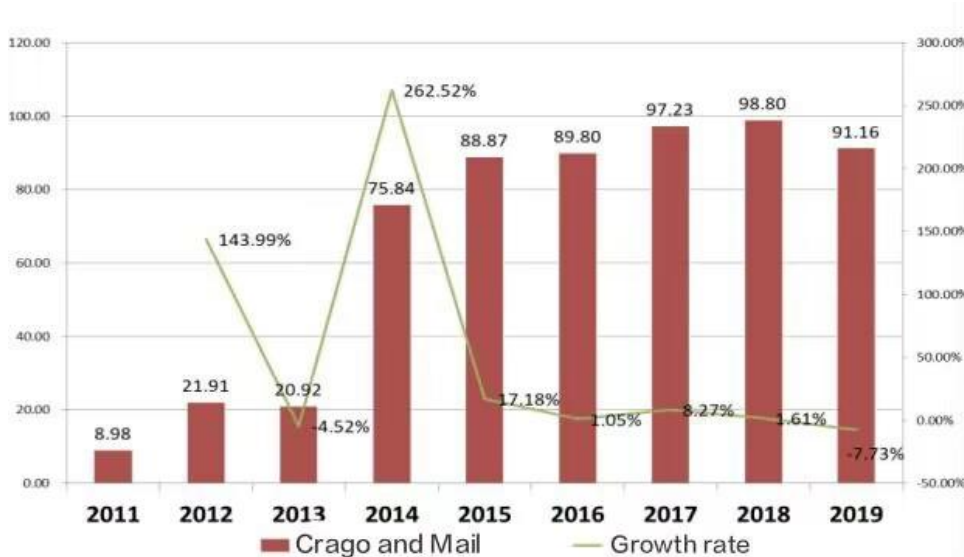


Figure 7. Cargo Throughput Trend chart of Dubai World Center from 2010 to 2019  
The units used for shipment volume are all (10,000 tons)

(Data source:Zhang Pei, 2019)

Digging deeper into the history of air logistics at Dubai Airports, the main factors that have contributed to the growth of its logistics business are:

- 1) A strong integrated transport system. The "two airports + two seaports + two free trade zones" pattern enables a high degree of multimodal transport integration, with the two airports as the core, a dedicated bonded road and railway and also connected to the sea, allowing a seamless connection between multiple ports within 6 hours and under full customs supervision, saving costs by approximately 40%.

2) Reasonable planning layout, Dubai World Centre has distributed seven functional areas around the core area of the airport according to demand to form a combination, improving the logistics infrastructure, strengthening the attraction to capital, complete residential, office, commercial and leisure support to ensure a stable number of high-end talent to move in.

3) Dubai's "open skies" policy has given airlines from all over the world equal access to air rights, routes and airtime, making it an international hub with a dense network of international routes.

### **3.3 Aviation logistics development of Chengdu Tianfu International Airport**

Chengdu Tianfu International Airport has three runways and 710,000 square metres of terminal space, with 210 aircraft slots, including 113 Class C, 7 Class D, 82 Class E and 8 Class F slots, and three runways with specifications of 4,000 metres long and 60 metres wide, 3,800 metres long and 45 metres wide and 3,200 metres long and 45 metres wide respectively. The runways are 3,000 meters long and 45 meters wide, 3,200 meters long and 45 meters wide, and can meet the annual passenger throughput of 60 million passengers and cargo and mail throughput of 1.3 million tons. By June 27, 2022, Tianfu International Airport will have been in operation for exactly one year. The number of flights and landings exceeded 90,000 and the passenger throughput exceeded 10 million.

#### **3.3.1 Key factors in the growth of air logistics business at Tianfu International Airport at this stage**

1) Make good use of the policy advantages of the newly built airport. 2021 October State Council triggered the "Outline of the Construction Plan of the Twin Cities Economic Circle in Chengdu-Chongqing Region", which clearly proposes to build an integrated comprehensive transportation system and create an international aviation gateway hub; together with building a world-class airport cluster in Chongqing. Accelerating the establishment of a world-class airport cluster in Chongqing has become one of the important tasks in the construction of the twin-city economic circle in the Chengdu-Chongqing region. As the largest civil transport airport planned to be built during China's 13th Five-Year Plan, Tianfu International Airport is positioned as the main hub airport of Chengdu's international aviation hub, and is the core airport to serve the construction of the Chengdu-Chongqing twin-city economic circle and build the Chengdu-Chongqing world-class airport cluster. The introduction of this policy marks Tianfu International Airport as a leader in the western region and its development potential is enormous.

2) Passenger traffic drives cargo. In order to better promote the construction of "One Belt, One Road" and further develop Chengdu into an international metropolis, Chengdu Shuangliu Airport will transfer all international passenger trains to Tianfu International Airport. The increase in international routes will drive more passengers into China through Chengdu Tianfu International Airport, which will inevitably lead to the rapid development of its air logistics.

3) Mutual support with the airside economic zone. By relying on Chengdu Tianfu International Airport to build out a three-dimensional comprehensive transportation network of air, rail and public transport, the future Jinyang will make full use of its airside advantages to actively participate in the construction of the Sichuan-Chongqing Free Trade Pilot Zone and other open platforms, and promote the accelerated development of cross-border e-commerce and open economy, thus gathering more goods to be exported to "One Belt, One Road" through Tianfu International Airport " to countries along the "Belt and Road" and even to Europe.

### **3.4 Summary**

In this chapter, through the analysis of the current situation of domestic and foreign literature on aviation logistics, we can find that foreign theories on aviation logistics have been carried out in a deep and micro direction, with richer research on model design and effect verification of supply chain, airport planning, operation system and collaborative division of labour. China's aviation logistics theory is mainly focused on the introduction of research and ideas to deal with the transformation of domestic airports, process improvement and competitive situation, etc. The compartmentalisation is more obvious, and logistics theory needs to be worked on from qualitative research to quantitative research. It also provides a brief analysis of the development of air logistics in Tianfu International Airport with the help of research on the air logistics situation in four airports at home and abroad, and paves the way for the analysis of the internal and external environment of Tianfu International Airport later on.

## **4 Macro environment analysis**

The external environment is a general term for the political, economic, social and technological environment outside the industry, also known as the general environment, which together have varying degrees of influence on the industry. The PEST model is generally used to analyse the impact of these external factors on a company's strategic objectives and the progress of strategy implementation. This section uses PEST to analyse four aspects of Chengdu Tianfu International in detail: political, economic, social and technological.

### **4.1 Political factors**

The Party Central Committee and the State Council have supported Sichuan's comprehensive development of modern aviation logistics. In Sichuan Province issued the "14th Five-Year Plan" for the development of modern logistics: bigger aviation logistics, the development of high-speed rail logistics "planning": through the construction of intelligent logistics facilities, improve the level of logistics specialization, sound emergency logistics, the development of trade logistics, cultivate the development of new dynamic energy, and other five aspects to further develop aviation logistics, to promote its modernisation and development. Sichuan is planning to build an international air cargo corridor, promote the operation of Tianfu International Airport and Shuangliu International Airport as one, expand the intercontinental 10-hour and Asian 5-hour flight circles with efficient connection to major global passenger and cargo hubs, support the opening of all-cargo routes, and build a "Y" route with Chengdu as the core, west to Europe, east to North America, south to South Asia and Southeast Asia, keeping pace with or moderately ahead of the development of foreign economic trade. The "Y" shaped global air cargo network with Chengdu as the core, west to Europe, east to North America, and south to South Asia and Southeast Asia. By 2025, an air logistics service network with global access and national service will be formed, and the capacity of multimodal transportation will be significantly strengthened.

#### **4.1.1 "One Belt, One Road" Strategy**

(Yan Xing, 2022). In 2013, economic globalisation has become the new global economic development situation, in this context, China has proposed the "One Belt, One Road" economic development strategy, to open up a model of economic collaboration across geographical regions. Chengdu has become the core city of the Belt and Road, and the implementation of this policy has become a major opportunity for the city's development. How can Chengdu seize the opportunity to optimise its development strategy, parallel its

own development with the national strategy, actively build international exchange platforms such as airports and international dry ports, make full use of the "metre" traffic corridor to link up with the major countries along the "Belt and Road" and the "It has become a window for China's inland opening up.

#### 4.1.2 Strong government support

Policies and regulations are an important driving force for the evolution and development of the aviation logistics industry. For a long time, China's air transport enterprises have been "emphasising passengers over cargo and cargo following passengers". Under the guidance of national policy support, the development speed of China's aviation logistics has been greatly enhanced within a short period of time. (Zhi Chun, 2019) In March 2019, the Director of the Civil Aviation Administration (CAA) and the Sichuan Provincial Party Committee signed the Deepening Cooperation Agreement on Promoting the High-Quality Development of Sichuan's Civil Aviation Industry in Beijing. It was proposed in the meeting that the CAA will actively promote the implementation of the Chengdu International Aviation Hub Strategic Plan, increase support for the construction of Tianfu Airport, and further promote the construction of Chengdu International Aviation Hub to create an international aviation hub comparable to those in the north. Table is the relevant policies on the development of aviation logistics industry in recent years, through these policies can further understand the future development trend of aviation logistics.

Table 1 Policies related to the development of aviation logistics industry

Time	Issuing unit	Related policy	Main content
January 2018	Office of the State Council	Opinions on Promoting the Synergistic Development of E-Commerce and Express Logistics	<ol style="list-style-type: none"> <li>1、 Strengthen system innovation, optimize the policy and regulatory environment for collaborative development.</li> <li>2、 Strengthen planning and leading, improve the infrastructure of e-commerce express logistics.</li> <li>3, strengthen the standardization of operation, optimize the management of e-commerce delivery.</li> <li>2、 Strengthen service innovation and enhance the service capacity of express terminal.</li> <li>4, strengthen standardization and intelligence, improve the efficiency of collaborative operation.</li> <li>5, strengthen the green concept, the development of green ecological chain</li> </ol>
May 2018	Civil Aviation Authority	Guidance on Promoting the Development of the Air Logistics Industry	<ol style="list-style-type: none"> <li>1、 Innovate the institutional mechanism as the driving force, and focus on improving the service quality and competitiveness of the industry.</li> <li>2、 Promote the development of air logistics informatization, specialization, networking and</li> </ol>

			socialization, build an efficient, green, safe and reliable air logistics service system, and better play the role of air logistics as an engine to promote the development of the airside economy.
December 2018	National Development and Reform Commission, Ministry of Transport	National Logistics Hub Layout and Construction Plan	By 2020, through optimization and integration, function enhancement, layout and construction of about 30 national logistics hubs with strong radiation drive, high level of modern operation and close interconnection, promote intra-regional and cross-regional logistics activities to organize and scale operation, cultivate a number of hub operation enterprises with strong resource integration ability and advanced operation mode to initially establish a hub construction and operation mode in line with China's national conditions, and form the basic framework of national logistics hub network.
January 2020	Civil Aviation Authority	Outline of Action to Promote the Construction of Type 4 Airports (2020-2035)	This is the leading document to guide the construction of Type 4 airports in the current and future period. According to the Outline, by 2035 the benchmark airports will lead the development of the world's airports, and the four types of airports will be fully built to be safe and efficient, green, intelligent and convenient, and harmonious and beautiful, providing important support for the all-round construction of a strong civil aviation country.
July 2022	Chengdu East New District	Several Policies on Pointing out the Development of Tianfu Aviation Economy	Through comprehensive and multi-dimensional policy support, we will accelerate the cultivation of market players, the transit and distribution of passengers and freight, the formation of a comprehensive security zone, and the rapid gathering of new businesses, so as to promote the high-quality development of Chengdu East New Area's airside economy.
December 2022	State Council	The 14th Five-Year Plan for the Development of Modern Logistics	According to the principle of "market-led, government-led, system concept, integrated promotion, innovation-driven, linkage and integration, green, low-carbon, safe and resilient", by 2025, a modern logistics system with appropriate supply and demand, internal and external connectivity, safety and efficiency, wisdom and green will be basically built, the capacity of logistics innovation and development and the competitiveness of enterprises will be significantly enhanced, the quality and efficiency of logistics services will be significantly improved, the operation system of "channel + hub + network" will be basically formed, the level of safe and green development will be significantly improved, and the institutional environment for modern logistics development will be more perfect.
Source: Documents issued by CAAC, 14th Five-Year Plan documents			

## **4.2 Economic factor**

### **4.2.1 Trends of global economic development**

(Yu, Weiwen , 2022)Global and Chinese economies maintain growth and continue to face complex changes. In August 2021, the International Monetary Fund forecasted global economic trends and concluded that the world economy would continue to grow by 6% in 2021 and 4.4% in 2022; the PMI index for the global manufacturing sector remained high in the first half of 2021, and the world's major countries and economies continued to recover. In recent years, our economy has generally maintained a positive and steady momentum of development, with GDP exceeding \$100 trillion in the 13th Five-Year Plan period; while the world is still experiencing the severe situation of the new epidemic, China has been strong in prevention and control, and economic growth is steady to good. However, the global economic recovery has been uneven and the situation has changed, with more and more dynamic factors affecting the economy. Overall, the general environment in China is still in a period of strategic opportunity. The global civil aviation industry, despite the fact that the global new crown epidemic has not yet been effectively controlled, bringing continued pain to the development of civil aviation, still seems to be in a developmental situation in the long term.

### **4.2.2 Economic development of Sichuan province**

Specific fees and requirements for booking and checking in can be found on the HN Airlines website. HN Airlines can simplify the pet shipping procedures and combine the three certificates required for pet shipping, namely "Animal Quarantine Certificate", "Pet Certificate" and "Pet Container Disinfection Certificate", into one "Animal Quarantine Certificate". In addition,HN Airlines can improve customer satisfaction by establishing a pet information database to collect pet inspection information, thus simplifying the procedures for the next shipment. In terms of air transport costs for pets, airlines should make detailed classification of transport costs, formulate corresponding price lists according to the size, body type, habits and other information of pets, and make relevant information public.(Data source: Sichuan Economic Daily)

Table 2 Changes of GDP of Sichuan Province and Chengdu from 2016 to 2022

Time	Gross product of Sichuan Province (100 million yuan)	Growth rate	Gross domestic product of Chengdu (100 million yuan)	Growth rate
2022	56749.8	2.9%	20817.5	2.8%
2021	53850.8	3.2%	19916.9	8.6%
2020	48598.8	3.8%	17716.7	4.0%
2019	46368.8	7.4%	17012.6	7.8%
2018	42902.1	8.0%	15342.7	8.0%
2017	37905.1	8.1%	13889.4	8.1%
2016	33138.5	7.8%	12170.2	7.7%

Data source: Sichuan Provincial Bureau of Statistics, China Business Industry Research Institute

#### 4.2.3 The influence of Chengdu-Chongqing economic circle construction

As an inland growth pole, the Chengdu-Chongqing twin-city economic circle is mainly a major growth pole and new driving force for the development of the western part of the country. The Chengdu-Chongqing region is located in the middle of the golden route between Europe and the Pan-Asian region, and is a high potential hub for intercontinental transit, and is the link between the "Belt and Road" and the Yangtze River Economic Belt. According to relevant statistics, the strong strength and rapid recovery of the aviation market in Chengdu and Chongqing under the impact of the new epidemic is directly related to the economic development of Chengdu and Chongqing. As the main aviation hub in the western region, Tianfu International Airport will play an increasingly important role and become more influential as the economy is built up.

### 4.3 Social factor

#### 4.3.1 The location and cultural environment of Sichuan

Sichuan Province and Chengdu City are famous tourist and consumer destinations at home and abroad. Since the reform and opening up, China's economy has made tremendous achievements, the nation's income level and income structure have been continuously improved and optimised, and the concept of tourism, leisure and consumption has also undergone great changes. In the current vigorous development of the domestic and international double cycle pattern, cultivating high-end consumption has become an important grasp to build a complete domestic demand system and stimulate the endogenous power of the economy, and high-end tourism in the territory will usher in significant benefits. Sichuan Province and Chengdu City have the nation's tourism resources with deep cultural heritage, diverse natural landscape and rich food culture. As

the development environment continues to be optimised, the tourism consumption sector has been further opened up. Residents of China have been attracted to come to Chengdu to spend money and continue to cultivate a stable consumer base. The number of people travelling on holidays has gradually increased in recent years and Chengdu has become one of the top five travel destinations in the country. Looking ahead, tourism and high-end consumer demand will bring a strong demand for air logistics in Sichuan, which will remain in a medium to high growth phase in the long term.

#### **4.3.2 Consumption trend**

(Zhang, S.Y., Li, D.S. & Zeng, Y, 2020)According to statistics 2022, the total retail sales of consumer goods in Sichuan Province amounted to RMB 2,410.46 billion, a decrease of 0.1% compared with the previous year, mainly due to a significant decline in food and beverage consumption and a steady growth in commodity consumption. This shows that with the economic development, people are paying more attention to the consumption of immediate needs, relying on the existing developed e-commerce platform and logistics network, people's consumption demand for this area will gradually increase, which also has a positive effect on the development of aviation logistics in Tianfu International Airport. This will also have a positive effect on the development of air logistics at Tianfu International Airport.

#### **4.4 Technical factor**

##### **4.4.1 The use of information technology**

The widespread use of information technology has become a trend. The continuous growth of cargo has forced air logistics enterprises to embark on production reforms of information technology, and the comprehensive improvement of air logistics information technology construction is a sure way to significantly improve logistics efficiency. To some extent, as China's aviation logistics development is still in its infancy, the industry still relies heavily on traditional manual statistics and transportation, just like a labour-intensive enterprises. In recent years, with reference to international standards, the neutral electronic waybill project, integrated information management system construction is to ensure that the industry to carry out information technology construction and service basis, vigorously guide the main participants in aviation logistics to use unified bar code, radio frequency identification and other Internet of Things technology, guide the research and development of big data, intelligent logistics and other emerging technology applications, will accelerate aviation logistics to update production equipment, improve logistics

efficiency and save costs This will enable the aviation logistics industry to transform from a labour-intensive industry to a technology-intensive industry.

#### **4.4.2 The development of manufacturing technology for transportation means**

With the continuous improvement of aviation manufacturing level, the aviation manufacturing products have made great progress, and the strength in product development and processing has been strengthened. With the application of various new technologies, new materials and the upgrading of processing methods, the performance of air transport vehicles has been greatly enhanced. Aircraft manufacturing technology at home and abroad has advanced by leaps and bounds, resulting in better aircraft performance and greater cargo capacity, providing a guarantee for the development of the air transport industry.

The application of new technologies, the accelerated development of new materials, new structures and other key manufacturing technologies, the improvement of the level of intelligent manufacturing technology, and the close integration of "Internet+" technology with the aviation manufacturing industry have made the reliability of aircraft more powerful, the air control capability more reasonable, the flight system and monitoring functions more standardised, the maintenance and It is clear that the development of the air transport industry will be effectively promoted.

#### **4.5 summary**

This section focuses on the external macro environment of Tianfu International Airport. Firstly, a PEST analysis is used to focus on the political, economic, social and technological factors in the external macro environment, with national and local government policies, social demand and scientific and technological developments all releasing strong positive signals in favour of development.

## **5 SWOT analysis of aviation logistics development of Chengdu Tianfu International Airport**

This section is an analysis of Chengdu Tianfu International Airport's air logistics development using the SWOT analysis method. The so-called SWOT analysis is based on the analysis of the internal and external competitive environment and the competitive conditions, the main internal strengths, weaknesses and external opportunities and threats that are closely related to the enterprise are listed through the survey and arranged in the form of a matrix, then using the idea of system analysis, the various factors are matched with each other and analysed to find out the enterprise's own strengths and weaknesses and development potential, core competitiveness The SWOT analysis is a qualitative method that allows for a more objective and accurate analysis and study of a company's reality.

### **5.1 Chengdu Tianfu International Airport Air Logistics Development Advantages (S)**

#### **5.1.1 The Chengdu Municipal Government's support for the new airport**

After the new Chengdu Airport Tianfu Airport is opened to traffic, the corresponding Tianfu Airport cargo terminal is expected to be put into use at the same time, as the flights of Southern Airlines, Juneyao Airlines, Spring Airlines and other airlines will all be transferred to the new airport, the outbound delivery and inbound pick-up of the corresponding airline flights will be operated at the new airport cargo terminal. Chengdu also released the "accelerate the construction of Chengdu air cargo hub support policy", through policy support and encourage subsidies and other ways to attract more air cargo market players to open the core of Chengdu to the world of all-cargo routes, to encourage air freight forwarding enterprises in Chengdu to establish international freight forwarding (distribution) centre. Bee Logistics FM Air believes that the opening of the new airport in Chengdu, for the Chengdu air cargo market, opportunities and challenges coexist, but the opportunities will outweigh the challenges. With the opening of the new airport, it is expected that Chengdu will usher in a new wave of domestic and international routes peak, Chengdu air cargo capacity will increase significantly, and the market competition will become more intense.

#### **5.1.2 Jinyang City government to build the western logistics industry functional park**

Jinyang City also laid out the Southwest Tourism Distribution Centre project in 2017, which is located in the functional area of the airport economy industry. At present, the

project is initially completed and 21 industrial projects have been signed and introduced, including Tianfu International Aviation Education and Technology Industrial Park, Feng Shu (Jinyang) Integrated Platform for Airside E-Commerce and Logistics, and Wanwei (Jinyang) Intelligent Industrial Park for Airside Logistics, etc. Meanwhile, Jinyang is also negotiating with a number of high-powered enterprises, such as HNA Group, Tai Mei Aviation and Bright Group, for aviation security, aviation food headquarters, aviation data and other high airside pointing industrial projects. In addition to the airside economic industry functional area, Jinyang City has also planned the Chengdu Air and Space Industry Functional Area and the Western E-Commerce and Logistics Industry Functional Area to undertake different development forms of industries to move in. "The western e-commerce logistics industry functional area is the only e-commerce industry functional area in the eastward region of Chengdu, and its primary goal is to build a multimodal transportation centre and a Tianfu e-commerce logistics port by relying on the gathering of logistics enterprises. At present, more than 20 e-commerce enterprises, led by Vipshop (China) Western Headquarters Base, have been stationed in the functional zone, as well as incubation platforms such as Netease (Jinyang) Joint Innovation Centre, and the characteristics of in-depth integrated development of e-commerce logistics have become more distinct." The person in charge of the Western Electric Logistics Industry Functional Area Management Committee said that the functional area will rely on the airport, the construction of a zone of three bases, that is, to build a hundred billion industrial functional area with international competitiveness and regional impetus, a national e-commerce demonstration base, a national demonstration base for dual innovation, and a demonstration base for e-commerce cooperation in the twin-city economic circle of Chengdu and Chongqing. We will build an e-commerce supply chain logistics centre, innovate the ecosystem, promote the integration of the "five chains" and continuously enhance the development capacity.

## **5.2 Disadvantages of Aviation Logistics Development of Chengdu Tianfu International Airport (W)**

### **5.2.1 Single type of transport service**

Multimodal transport is an important manifestation of the competitiveness of hub airports, of which transshipment services are one of the important criteria for measuring hub airports. According to the air cargo development experience of leading airports in China, the interpenetration of multiple air transport services is a good medicine to break through the bottleneck of air cargo volume development and solve the slowdown of air cargo

development in airports. The international routes in the Chengdu region are basically point-to-point, with a single type of transport service and a negligible percentage of transit routes, and trucking flights are still in the primary network building stage. The reason for the single type of transport service is mainly because the infrastructure function is not yet perfect to support the full development of the transit business, and the high cost of domestic air freight, which cannot provide low-cost solutions for the front-end customers in the domestic and international air intermodal transport.

### **5.2.2 The Europe-Pan-Asian intercontinental air corridor network is incomplete**

As Tianfu International Airport has just been built, the air cargo system is not perfect, so the most important thing is to improve the air cargo system as soon as possible and to find out the most suitable system for the current airport in a short period of time so that it can play the biggest role in air cargo.

### **5.2.3 The impact of rail freight on air freight**

Air transport mostly transports small, high-value items such as pharmaceuticals and luxury goods. This is because of the relatively small cabin size and load capacity of aircraft and the fact that the cost of air logistics is higher than that of ground transport. As flights are limited by weather conditions, this can affect their regularity and punctuality. In addition, it is difficult to make full use of the advantages of fast air transport over short distances. In particular, Chengdu railway is particularly developed, and most of the goods can be transported by railway to the province or several surrounding provinces and cities, except for places like Tibet where railway transport is slow, otherwise various logistics companies will choose railway transport more often when transporting goods.

## **5.3 Development Opportunities of Aviation Logistics at Chengdu Tianfu International Airport (O)**

### **5.3.1 Air cargo lines are gradually expanding**

Behind the rise of aviation is the further expansion of the open field, the further improvement of the open level and the further upgrade of the open way. With the commencement of direct international trains between China and Vietnam, the Chengdu Air-Trail International Intermodal Transport Port has formally built an international multimodal transport channel network to ASEAN and Eurasia in multiple directions, marking Chengdu's commitment to building a "new aviation + western land and sea channel" that can reach all railway outbound ports to ASEAN.

### **5.3.2 E-commerce platforms are rising.**

Recent years have been a golden period for e-commerce logistics expansion and model upgrades, with most e-commerce logistics fighting for speed advantages, and therefore more and more platforms choosing to shorten cargo arrival times through air logistics. The "One Belt, One Road" strategy has led to year-on-year growth in cross-border e-commerce transactions in China, with air transport accounting for 90% of international and regional express business. At the same time, the Belt and Road Initiative has pushed the western region to the forefront of opening up to the outside world, with Chengdu, as the "inland open highland", being featured in the document "Vision and Action for Promoting the Construction of the Silk Road Economic Belt and the 21st Century Maritime Silk Road" jointly issued by the National Development and Reform Commission, the Ministry of Foreign Affairs and the Ministry of Commerce. The document "Vision and Action to Promote the Construction of Silk Road Economic Belt and 21st Century Maritime Silk Road" was mentioned in particular. All these provide a good opportunity for the development of air logistics in Chengdu.

## **5.4 Challenges of Aviation Logistics Development at Chengdu Tianfu International Airport (T)**

### **5.4.1 The impact of Shuangliu International Airport**

According to the latest report by Airports Council International (ACI), Chengdu Shuangliu International Airport is one of the top 10 busiest airports in the world in 2021, and Sinotrans - DHL International Air Express Co Ltd (DHL) has signed a cooperation agreement with Shuangliu District to expand Sinotrans DHL's port facilities at the Shuangliu Airport International Express Centre and upgrade them to a regional transshipment centre. A number of other logistics giants have also established a "circle of friends" with Shuangliu's aviation economy. Two months ago, it was announced that the western China headquarters of SF Airlines would be located in Shuangliu. SF Airlines will continue to lay out its route network in Chengdu (Shuangliu), increase capacity investment, build cargo routes connected to major air cargo hub node cities around the world, and build a cargo route network that connects Ezhou, radiates nationwide, covers Asia Pacific, Europe and the United States, and reaches the whole world.(Data source: Sichuan People's Network)

### **5.4.2 The impact of rail freight on air freight.**

Air transport mostly transports small, high-value items such as pharmaceuticals and luxury goods. This is because of the relatively small cabin size and load capacity of aircraft and the fact that the cost of air logistics is higher than that of ground transport. As flights are limited by weather conditions, this can affect their regularity and punctuality. In addition, it is difficult to make full use of the advantages of fast air transport over short distances. In particular, Chengdu railway is particularly developed, and most of the goods can be transported by railway to the province or several surrounding provinces and cities, except for places like Tibet where railway transport is slow, otherwise various logistics companies will choose railway transport more often when transporting goods.

#### 5.4.3 The impact of the "Internet Plus" new business model on general aviation cargo

The Internet has transformed the traditional industry, the traditional B2B e-commerce model to B2C, C2C, C2B and other ways to change, e-commerce self-built warehouses, regional distribution centres become the trend, ground transportation network improvement, efficiency, cost reduction and other factors make e-commerce preparation mode changes, land transport, local advance preparation become a common mode of large e-commerce, leading to a decline in demand for domestic general air cargo transportation.

#### 5.5 SWOT Matrix of aviation logistics development of Tianfu International Airport

Through the previous analysis of the internal and external key factors of Tianfu International Airport's air logistics, a SWOT matrix analysis diagram of Tianfu International Airport's air logistics development was constructed, which eventually led to the following Ace-China strategy portfolio, laying the foundation for the strategy formulation that follows.

Table 3 SWOT matrix analysis of aviation logistics development of Tianfu International Airport

	<b>Advantage (S)</b>	<b>Disadvantage (W)</b>
	1. policy support from the Chengdu Municipal Government; 2. the creation of a functional park for the western logistics industry by the Jinyang city government; 3. possession of all international passenger routes in Chengdu;	1. a single type of transport service; 2. an inadequate network of Euro-Pan-Asian intercontinental air links Inadequate access to the cargo route network, especially the national and route network;

<p><b>Opportunity (O)</b></p> <ol style="list-style-type: none"> <li>1. gradual expansion of air cargo routes;</li> <li>2. the gradual rise of e-commerce platforms in Chengdu;</li> <li>3. the obvious trend of logistics express words;</li> </ol>	<p><b>SO strategy (Rely on advantages and take advantage of opportunities)</b></p> <ol style="list-style-type: none"> <li>1. Relying on the construction of "One Belt, One Road" and "Chengdu-Chongqing Economic Circle", implement the internationalization strategy and improve the layout of the international cargo route network.</li> <li>2. Further expand the aviation logistics supply chain at Tianfu International Airport; innovate other business models and diversify revenue generation;</li> </ol>	<p><b>WO strategy (Make use of opportunities to make up for weaknesses)</b></p> <ol style="list-style-type: none"> <li>1. creating a good environment for the development of air logistics, mainly by optimizing the operating environment and the regulatory service environment, improving revenue and reducing comprehensive costs;</li> <li>2. airport information construction, increase the use of new technologies to improve logistics efficiency, accuracy, safety and cost savings;</li> <li>3. accelerating the landing of the airside economic zone to make up for the shortcomings of the industry, the new e-commerce park will sleep the product of the airside economic zone, and absorb talents to join;</li> </ol>
<p><b>Threat (T)</b></p> <ol style="list-style-type: none"> <li>1. the impact of the Shuangliu International Airport, with its highly competitive air cargo market;</li> <li>2. the impact of the developed railway freight in Chengdu on air cargo;</li> <li>3. the impact of the new business model of "Internet+" on general aviation cargo;</li> </ol>	<p><b>ST strategy (Rely on advantages to avoid threats)</b></p> <ol style="list-style-type: none"> <li>1. seizing opportunities to enhance capacity, attracting more domestic and foreign airlines to set up bases at the airport, continuously expanding the scale, and improving efficiency and logistics and transport capacity;</li> <li>2. facilitating customs clearance, implementing an open, pragmatic and convenient customs clearance policy, and developing a targeted mode of operation for rapid customs clearance;</li> </ol>	<p><b>WT strategy (Make up for weaknesses and eliminate threats)</b></p> <ol style="list-style-type: none"> <li>1. Create a new aviation logistics hub airport, strengthen the connection with major domestic hub airports and strengthen the connection with domestic regional airports;</li> <li>2. "Multimodal transport" to build logistics transport "arteries", systematize, multi-level and integrate the preparation of multimodal transport networks;</li> </ol>

The four strategic combinations of SO, WO, ST and WT formed by the study were selected to formulate a development strategy under the new situation. The SWOT matrix of Tianfu International Airport shows that the airport has the advantages of rapid development of airport logistics business driven by the positive economic development of the region in which it is located, obvious location advantages, the initial formation of an airside economic zone, and the initial emergence of a gathering platform for aviation logistics business, while it has the advantages of lagging supply of logistics facilities, the impact of developed railway freight, slow development of international logistics business, insufficient access to the international freight route network, especially insufficient access

to the all-cargo route network, and low subsidies from industrial policies. The city has disadvantages in terms of inadequate access to the international cargo route network, especially to the all-cargo route network, and low industrial policy subsidies.

## **5.6 Summary**

Through the SWOT analysis, it is concluded that the opportunities in the external environment of Tianfu International Airport outweigh the threats, and the internal environment mainly reflects the advantages. Therefore, the future development of aviation logistics in Tianfu International Airport will be based on SO strategy, and in the formulation and implementation of the strategy, we should seize the external opportunities, further develop our advantages, and accurately grasp the position of Tianfu International Airport in the fierce market competition under the existing development foundation conditions. Make full use of the location and regional economic advantages, seize the opportunities of aviation logistics and the great development of the region, make up for shortcomings and actively respond to internal and external environmental threats. Adopt a differentiated competitive strategy, strive to adapt to new business development needs, strengthen the introduction of core customers and strategic customer synergies, further improve logistics infrastructure, enhance the quality of public services, promote the development of logistics intelligence and information technology, while seeking the support of the government, industry authorities and relevant parties, and fully promote the optimisation of logistics resources and business development to achieve leapfrog development of Tianfu International Airport's aviation logistics business. We will also seek support from the government, industry authorities and relevant parties to optimise logistics resources and develop our business, so as to achieve leapfrog development in the aviation logistics business at Tianfu International Airport.

## **6 Aviation logistics development strategy of Chengdu Tianfu International Airport**

### **6.1 Strategic positioning**

Through the detailed analysis and elaboration in the previous chapters, with the core of serving the European-Pan-Asian air cargo demand, radiating the 4-5 hour aviation economic circle at home and abroad, relying on express airlines to expand the international and regional all-cargo route network, gradually enhancing the hub position of Tianfu International Airport in the global aviation network, forming a cross-border distribution network of express mail with Tianfu International Airport as the core, focusing on radiating the Asia-Pacific region, and The airport will be an international aviation hub with a focus on the Asia-Pacific region and intercontinental long-haul routes to Europe and other regional economic centres. Therefore, the development of air logistics at Tianfu International Airport is positioned to become a first-class international express mail cross-border distribution centre and a major international air logistics hub in the west, becoming the fourth largest aviation hub in China.

### **6.2 Basic principle of development**

#### **6.2.1 Pursue coordinated development**

Adhere to synergistic development. To actively adapt to the new situation and requirements of the development of the western world-class airport cluster, strengthen the strategic synergy between Tianfu International Airport and Chengdu Shuangliu and Chongqing Jiangbei aviation hubs, form a Tianfu International Airport cargo system with synergistic operation and differentiated development as the main features, promote the expansion of Tianfu International Airport to, and gradually transform to synergistic development, to better meet the aviation market demand in the western region.

#### **6.2.2 Adhere to open development**

The airport will implement the national "One Belt, One Road" initiative and the strategy of opening up to the outside world in all aspects, coordinate the two markets and the two major situations, give full play to the role of Tianfu International Airport in the construction of the "Chengdu-Chongqing Economic Circle" and the development of western China, promote the construction of a major domestic and international air transport corridor, accelerate the improvement of the layout of the international route network, and strive to enhance the international level and international competitiveness of Tianfu International Airport.

### **6.2.3 Pursue innovative development**

Based on the actual development of Tianfu International Airport, we will give full play to the unique policy advantages of Chengdu as a new first-tier city, stimulate the vitality of the aviation market, and continue to explore the construction mode and development path of aviation logistics business at Tianfu International Airport, comprehensively promote innovation in the areas of system and regulations, operation technology, management system, operation mechanism and product services, and provide sustainable momentum for the healthy development of aviation logistics business.

### **6.2.4 Pursue integrated development**

The local government will play a leading role in the development of aviation logistics at Tianfu International Airport, actively promote the integration of civil and military development, and promote the integration of the airport, airlines, air traffic control, joint inspection and other related units. Accelerate the construction of an integrated transportation hub system with Tianfu International Airport as the core and multiple modes of transportation effectively connected, giving full play to the comparative advantages of various modes of transportation and promoting the in-depth integration of land, air and rail.

## **6.3 Strategic objective**

### **6.3.1 Overall objectives**

The overall objective of Tianfu International Airport is to build a world-class airport cluster in Chongqing, forming a coordinated and linked development with the three major airport clusters in Beijing, Tianjin and Hebei, the Yangtze River Delta, and the Guangdong, Hong Kong and Macao Greater Bay Area, further improving the layout of China's airport network and optimising and enhancing the overall air transport network structure. It will become a strong strategic support for the airport network and route network in the western region.

### **6.3.2 Specific goal**

(1) Create an industrial park for airside economy.

With the development of the air transport industry as the main focus, the gathering effect of the airside industry cluster will be formed, and then a unique economic development model with the airside pointing industry as the main focus and a variety of industries organically linked will be built. We will also attract a number of projects to Sichuan, such as the SF Logistics Industrial Park and the GLP Intelligent Logistics Port, and strive to achieve a full-calibre business income of over RMB 100 billion by 2025 in Chengdu East New Area's airside economy.

(2) Enhance the function of international aviation hubs.

We will speed up air cargo in accordance with the idea of both passenger and cargo, speed up to make up for the shortcomings of air cargo, and promote air cargo to take off and take shape. In terms of building an air cargo capacity system, the Eastern New Area will cooperate deeply with air carriers and freight forwarders to build an international cargo corridor to Southeast Asia, North America and Europe, accelerate negotiations on domestic all-cargo routes, build a main cargo corridor from Tianfu to the Pearl River Delta and Yangtze River Delta, and build an "all-cargo plane + belly class" capacity system with the rich belly class capacity of international airlines. belly class" capacity system.

#### **6.4 Strategic choice**

Tianfu Airport should give full play to its western hub location, leverage on the policy support of the country's Western Development, Belt and Road, and the Chengdu-Chongqing twin-city economic circle, leverage on its core competitive advantages of good operational experience and hardware facilities, increase cargo and mail throughput, build an international and domestic aviation hub, and develop an aggressive growth-oriented development strategy (SO) suitable for Tianfu Airport. Under the premise of this strategy, a diversified development strategy for both airports will be applied. Tianfu Airport should differentiate itself from Shuangliu Airport and work together to complement and co-exist, thereby enhancing the specialisation of the entire Chengdu aviation hub and consolidating its position as the aviation hub of the West. The main focus of Tianfu Airport should be on increasing marketing efforts, strengthening the hub, improving the operational system and government support to achieve a healthy and coordinated development of both airports.

##### **6.4.1 The strategy of continuously enhancing international hub capacity**

As Tianfu International Airport will only be open to traffic in 2022, the problem of insufficient international all-cargo aircraft capacity is a serious constraint on the speed of development of international business at Tianfu International Airport, and continued efforts to introduce international all-cargo aircraft capacity and optimise the layout of the international cargo route network are key to breaking through the barrier. The first all-cargo flight at Tianfu International Airport will not take place until 20 April 2023, while Hong Kong International Airport, which is also an international hub, has 97 all-cargo flight points and Guangzhou Baiyun Airport has 28 all-cargo flight points. Therefore, Tianfu International Airport needs to make more efforts to expand its international business, attract more cargo airlines and large passenger airlines to Tianfu International Airport, expand the scale of international air logistics transportation, strengthen exchanges with the world's top-ranked large logistics integrators, actively support and nurture local large

and medium-sized freight forwarding enterprises to further strengthen and expand, and improve the ability of freight forwarders to serve the global supply chain. Leveraging on the strong cargo consolidation capabilities of large airlines and logistics integrators, we will further enhance our international logistics hub capabilities.

#### **6.4.2 Optimize the comprehensive capability strategy of logistics platform**

As the volume of aviation business at Tianfu International Airport continues to grow, the derivation and iteration of logistics supply chain processes are placing new demands on the scale and functionality of the logistics facilities. As a new airport, the aviation logistics facilities at Tianfu International Airport will need to be upgraded in practice. On the one hand, it should optimise the resource allocation of existing logistics facilities by adjusting the functions of the existing facilities and optimising the business process to increase the utilisation rate of the facilities and gain valuable time for the construction of new logistics facilities. On the other hand, we will vigorously promote the construction of new logistics facilities, co-ordinate the planning of domestic and international logistics guarantee sites and the construction of logistics facilities at cargo terminals, and reserve space for development in the design to meet future development needs. At the same time, we are actively improving the functions of the port, optimising the customs environment and enhancing the operation and security efficiency, building an efficient, green, safe and reliable platform for aviation logistics ground services, and striving to improve the quality and competitiveness of aviation logistics services at Tianfu International Airport.

### **6.5 Strategy implementation**

#### **6.5.1 Improve airline network layout and strengthen hub functions**

1) Increase the introduction of airlines and air routes.

SF Airlines is the leading domestic all-cargo air transport and express delivery company, occupying an important position in terms of fleet and business volume, and the SF Logistics Industrial Park is also located in Chengdu. Tianfu International Airport needs to keep an eye on SF Airlines' development trends and strategic synergies to strengthen its ties with SF Airlines and ensure that Tianfu International Airport is a hub in SF Airlines' route network.

2) In January 2023, the signing ceremony of the investment agreement for the Juneyao Airlines Tianfu International Airport Base Project was held in the East New District of Chengdu, where Shanghai Juneyao Airlines, a subsidiary of Shanghai Juneyao (Group) Co Ltd, one of China's top 500 service companies, owns 81 Airbus A320 series aircraft and six Boeing 787-9 Dreamliners. With 81 Airbus A320 series aircraft and 6 Boeing 787-9 Dreamliner aircraft, the airline operates over 200 scheduled flights to domestic, regional

and Asian and European destinations, with Shanghai and Nanjing as the hub of its route network. Tianfu International Airport can rely on Juneyao Airlines to build a western route network centre and open up international routes from Chengdu to Southeast Asia, Northeast Asia or Europe, further enhancing the hub level of Tianfu International Airport and improving the global layout of the route network with Juneyao Airlines, which will bring good economic development benefits.

3) Support the business development of airlines and logistics airport operators.

4) According to IATA's analysis of the development trend of global air cargo companies, the top 25 global airline companies gathered nearly 68% of the business volume in 2016, an increase of 2.3 percentage points compared to 2011. In light of the current development of Tianfu International Airport, actively strengthening cooperation with leading global customers is an inevitable way for Tianfu International Airport to respond to the rapid development of cargo in the future. Internationally, we will focus on strengthening strategic synergies with leading airlines such as Emirates (Dubai), Luxembourg Cargo (Luxembourg) and Lufthansa (Frankfurt) to secure their capacity at Tianfu International Airport and ensure further enhancement of the international hub function. On the domestic front, we will continue to strengthen cooperation with airlines such as Juneyao and SF. On the other hand, the airport will enhance its air logistics clustering capacity, while promoting the development of air-ground intermodal transport and building an integrated air-ground service network.

### **6.5.2 Create a high-quality logistics ecological environment and a platform for sustainable development**

A quality aviation logistics eco-environment is a prerequisite for attracting express carriers, large airlines and logistics integrators and ensuring the sustainable development of cargo business. In the logistics ecosystem, factors such as time resources, customs environment, security policies, security efficiency, operating costs, platform functions and information services are key concerns for airlines, logistics integrators, courier companies and other related enterprises

(1) Multiple measures to create a quality logistics operating environment

(Zuo Ji, 2022). Create a relaxed customs environment conducive to business operations by extending customs clearance operating hours, increasing the types of customs clearance functions, promoting the Greater Customs Clearance and improving customs clearance efficiency; strive for a breakthrough in security policies to narrow the policy gap with the other three international hub airports in China. Improve the efficiency of internal security and service quality, enhance customer satisfaction and continue to improve the level of information technology and professional services. At the same time, we will

strengthen the construction of the airport's economic zone to contribute to the development of Tianfu International Airport.

## 2) Increased supply of logistics facilities

The annual cargo throughput handled per square metre of cargo terminal floor space is related to the length of time the cargo stays in storage and the means of handling the cargo. The new cargo terminal, installed by Rodriguez Industries (a specialist logistics systems and equipment supplier), is equipped with two elevated transfer vehicles (ETVs) with a five-level, three-way automated ULD storage and handling system with 227x20ft storage positions. It has the capacity to handle 60 million passengers and 1.3 million tonnes of cargo and mail per year. In the second expansion phase, the airport will add three additional runways, increasing capacity to 120 million passengers and 2.8 million tonnes of cargo and mail per year. In addition to the international cargo terminal, Rodriguez Industries is supplying the airport operator, Sichuan Airport Group Company, with equipment for the airport's domestic cargo terminal, a dedicated dangerous goods warehouse and an express distribution centre. It also includes a supervised warehouse for international export cargo. In total, the contract provides ULD and pallet handling equipment for more than 83,000 square metres of cargo facilities. With a fully automated, highly modern and expandable cargo terminal, Chengdu Tianfu International Airport is believed to be well prepared for future growth.

## 3) Strive for better industrial support policies

Actively seek greater government support for funding subsidies for cargo routes, refer to the subsidy policies of other domestic airports, and increase the financial, tax and land policy support for airlines to establish transit centres or cargo bases at Tianfu International Airport and invest in large wide-body freighters. Companies that establish transshipment flights at Tianfu International Airport will be given priority in the scheduling of airline routes, and will be supported in the application of airline routes, the allocation of air traffic rights and the arrangement of airline seats. For cargo airlines with rapid growth in capacity investment and business volume at Tianfu International Airport, preferential landing and take-off fees and parking fees will be given, and incentives will be studied and formulated.

## (4) Further upgrade logistics information platform

With the advancement of science and technology, information technology is becoming more and more widely used in the field of logistics. The realisation of the strategic goal of an international aviation logistics hub requires Tianfu International Airport to become more international in its application of information technology. By upgrading the existing and building a new logistics information platform using international standards, the airport will be able to build a smarter, more convenient and efficient logistics information platform to achieve a fast and barrier-free interface with international logistics information flows,

laying the foundation for the introduction of large international companies and the development of international business at Tianfu Airport.

## **6.6 Strategic Support**

Taking into account the above favourable conditions, Tianfu Airport should give full play to its location as a western hub, build an international and domestic aviation hub by relying on the policy support of the country's western development, the Belt and Road and the Chengdu-Chongqing twin-city economic circle, as well as its core competitive advantages of good operational experience and hardware facilities to increase cargo and mail throughput.

### **1) Unified command of the provincial government**

The approval of airport projects goes directly to the State Council and the Central Military Commission at each level, with many coordinating bodies and difficult scientific research. Building Tianfu Airport into a regional hub cargo airport is an extremely complex and systematic project that requires command and coordination from many sides. Therefore, it is not only a matter for the Chengdu Municipal Government and the airport construction company, but also requires unified command and strong coordination at the provincial government level. The experience of logistics development in Hong Kong, Incheon and Dubai airports shows that the power of the government has played a leading role in the development and growth of airport air logistics. A provincial-level airport construction leading group has been set up, and a higher-level comprehensive coordination mechanism can be further established, with regular coordination meetings held to proactively study major issues and participate in high-level coordination. At this stage, it is necessary to seek support from the relevant national ministries and commissions, to design and plan the airport in a forward-looking manner, to reserve sufficient space for development, and to ensure that sufficient capacity is reserved for core civil aviation resources; to promote the approval of the Tianfu Airport project and to coordinate between the military and civil aviation. Under the unified leadership of the provincial government, Sichuan's functional units regularly hold special meetings to solve practical problems in the internal and external environment and adjust their strategies in real time to effectively play a role in promoting the development of aviation logistics at Tianfu Airport.

### **2) Multi-departmental linkage and coordination**

If Tianfu Airport is to achieve convenient customs clearance, intermodal transport and supply chain expansion and other planning to continuously improve the aviation logistics market environment and solve the problems exposed by the market, the relevant departments must strengthen communication and collaboration, change their working mindset and take the initiative to provide good services. Development and reform,

customs, transportation, tourism, finance, commerce, inspection and quarantine, airports, airlines, freight forwarders, industry associations and other linkage units should strengthen collaboration. Firstly, we should open up system interfaces to greatly improve automation, logistics turnover and customs clearance efficiency; secondly, we should complement supporting policies and working measures to promote mutual support between industries and make joint efforts to optimise the development environment; thirdly, we should strengthen our sense of service, form a mechanism to hold regular contact meetings and take the initiative to solve problems to serve the market.

### (3) Sound operation system and innovative management model

Tianfu Airport and Shuangliu Airport form a "one city, two airports" airport system in Chengdu, and the efficient operation of the "one city, two airports" cannot be achieved without scientific operation and management. The "one city, two airports" system has a number of airports and in order to keep the overall system in good working order, a professional organisation needs to be put in place to manage the system in an integrated manner. It is necessary to divide responsibilities according to a strict system, to complete the allocation of resources, to improve the degree of professionalism in management, and to actively use the capabilities of external entities. Secondly, it is necessary to take the market mechanism as the guide and the interest drive as the hand, actively innovate the management mode, guide the airlines to allocate the facilities and capacity resources reasonably in the new and old airports according to the functional positioning of "one city and two fields", open routes and flights, focus on supporting the backbone base airlines, and scientifically guide and allocate the passenger flow.

## **6.7 Summary**

Identify strategic choices for the development of aviation logistics at Tianfu International Airport, clarify strategic positioning and strategic objectives, and develop specific implementation strategies in six areas in two areas, including improving the layout of the route network and creating a quality logistics ecology, so as to provide reference recommendations for the healthy and sustainable development of aviation logistics at Tianfu International Airport.

## 7 Summary of this article

This paper starts from the analysis of the development stage and trend of aviation logistics, combining the research results on the development trend of aviation logistics, integration of supply chain and international hub construction at home and abroad, and selects four benchmark airports in Pudong, Hong Kong, Incheon and Dubai which are also in the free trade port/zone, summarising their development achievements and successful experiences mainly in three aspects: firstly, they are located in a superior geographical location; secondly, the local government or national The third is the high level of infrastructure development. These three factors are the main reasons why these airports have become international hubs, and provide reference for the choice of air logistics development strategy for Chengdu Tianfu International Airport. This is followed by an in-depth study of Chengdu Tianfu Airport's air logistics development, using SWOT and PEST to analyse the key strengths and weaknesses of Chengdu Tianfu International Airport's air logistics, the external macro environment, and to conclude that the strengths of Chengdu Tianfu International Airport lie in the opportunities brought by the "Belt and Road" strategy and the national policy to build the fourth aviation hub. Policy support. Through this series of analyses, it was concluded that the strategic goal of Chengdu Tianfu International Airport's air logistics development is to "build an international air logistics hub airport for the Eurasian region and Western countries. The next two development strategies were chosen: one is to continuously enhance the international hub capacity strategy; the second is to optimise the comprehensive capacity of the logistics platform strategy; the next two aspects of the strategy are carefully explained from the improvement of the route network layout, the enhancement of the hub function and the creation of a high-quality logistics ecological environment to create a sustainable development platform, and to make strategic guarantees.

The factors influencing the development of air logistics are numerous and complex, so this paper is only a cursory discussion at a theoretical level. Some mechanisms and systems, regional political and business environment and other deep-seated problems are not sufficiently analyzed; in the environment of China's socialist market economy, aviation logistics in its infancy will also face different problems and challenges, and further in-depth theoretical analysis and research is needed. It is hoped that with the continuous advancement of the airport's preliminary work, the aviation logistics development strategy of Chengdu Tianfu International Airport will be put into practice as soon as possible.

## References

- Bai Yang, Zhu Jinfu. 2009. Conceptual model and structural analysis of air logistics system[J]. Business Economics, (1). 147-150.
- Cao Xeming, Wang Xifu. (2009). Study on the sustainable development strategy of air logistics in China[J]. Logistics Technology, 28(11). 35-38.
- Chen Zhiyong. (2021). Study on the development strategy of aviation logistics in Sanya new airport (Master's thesis, Huazhong University of Science and Technology).  
[https://kns.cnki.net/kcms2/article/abstract?v=eK9vp3Kgfw5QyWflspZACt0gyZpiOOIPXe\\_yUu2neJ44BmjvPlajKNHDCJdLCe3G6YeEXPRhpZS3MArSJ2B0b4SfwEcYaCjvd89d7AfzDJhmZ\\_PyUSohCxCO8mwPP5VVnYsIA=&uniplatform=NZKPT&language=CHS](https://kns.cnki.net/kcms2/article/abstract?v=eK9vp3Kgfw5QyWflspZACt0gyZpiOOIPXe_yUu2neJ44BmjvPlajKNHDCJdLCe3G6YeEXPRhpZS3MArSJ2B0b4SfwEcYaCjvd89d7AfzDJhmZ_PyUSohCxCO8mwPP5VVnYsIA=&uniplatform=NZKPT&language=CHS)
- Chen Jun, Huang Guangqiu. (2019). Design of blockchain application path for aviation logistics based on fuzzy Petri nets [J]. Statistics and Decision Making, 35(15): 181-184.
- Darren Prokop. (2002). The logistics of air cargo co-mingling at Ted Stevens Anchorage International Airport[J]. Journal of Air Transport Management, 8(2): 109-114.
- Dong, Xianxiang. (2020). Demystifying the success of Incheon Airport. China Immigration Watch (06), 56-57.
- Gao Jianguo, Zhang Han, Min Guilong et al. (2021). A fuzzy evidence-based reasoning approach for aviation safety risk evaluation [J]. Electricity Light and Control, 14(11): 1-7.
- He P, Sun Rishan. (2021). Frontier issues and research trends of aviation safety under the global epidemic[J]. Transportation Information and Safety, 39(4): 1-8.
- Linsi. (2018). Detailed Analysis on the development situation of Guangdong-Hong Kong International Aviation Logistics [J]. Modern Economic Information, (12):334-335.
- Liu Chunling. (2014). International experience and reference of aviation economic zone industry development. World Geographical Research . (04):157-166.
- Li Muyuan. (2017). Air cargo hub drives logistics industry cluster, using Memphis' stone to attack Ezhou's jade[J]. Transportation Construction and Management, (12): 58-63.
- Li GL, Gao JH, Liu BZ. (2018). DEA analysis of industrial development efficiency in Zhengzhou Airport Economic Comprehensive Experimental Zone[J]. Geographical Research and Development, 37(2): 78-82+88.
- Li Hejun . (2021). Research on the Current Situation and Development of Air Cargo Logistics[J]. International Journal of Social Sciences in Universities, 4(3): 22-24.
- Li Jiao. (2020). Study on the development strategy of air logistics in Shenzhen Airport (Master's thesis, Nanjing University of Aeronautics and Astronautics).  
[https://kns.cnki.net/kcms2/article/abstract?v=eK9vp3KgfwutsyLqv6wSyYJGSgKUFWJB5-fRHnc-oyghNXfzBygAkF0Az1GRZW7UTTR0MDdreOHObn4D7X2Z\\_R7tGNODic1XzBAKkAr\\_q8CvMyIbsNu1stmEy6hv35tSZFhEX2Lm\\_Po=&uniplatform=NZKPT&language=CHS](https://kns.cnki.net/kcms2/article/abstract?v=eK9vp3KgfwutsyLqv6wSyYJGSgKUFWJB5-fRHnc-oyghNXfzBygAkF0Az1GRZW7UTTR0MDdreOHObn4D7X2Z_R7tGNODic1XzBAKkAr_q8CvMyIbsNu1stmEy6hv35tSZFhEX2Lm_Po=&uniplatform=NZKPT&language=CHS)
- Ma Tongguang and Qi Lan. (2018). Research on influencing factors of China's airport economic development -- Empirical analysis based on regional panel data.[J] Journal of Macroeconomic Research, (4): 97-109.

(2021). Research on Aviation Logistics Development Strategy of Sanya New Airport (Master's Thesis, Huazhong University of Science and Technology).

Shen Danyang . (2016). Research on Airport Logistics Sustainable Development in Perspectives of Logistics Network[J]. Journal of Residuals Science & Technology, 13(7): 235-243.

Tang Ronzhu. (2015). Experience and enlightenment of aviation logistics development in major large airports in Europe and Asia. [J] .Air Freight Business,(5):29-35.

Wei Ran, Li Yaling. (2018). Study on the innovation of aviation logistics enterprises' business model under the background of "Internet+"[J]. Business Economic Research, (2): 93-95.

Wang Xinyu. (2020). How to transform traditional air cargo to modern air logistics[J]. China Aviation Weekly, (47). 60-61.

Yan Xing. (2022). Strategies and countermeasures for Chengdu's participation in "One Belt, One Road" and Yangtze River Economic Belt construction.(Regional Financial Information).

Yu, Weiwen. (2022). Risks and opportunities for global economic development. International Finance (01), 24-25. doi:10.16474/j.cnki.1673-8489.2022.01.001.

Zhang Pei. (2019). The hub-and-spoke model (HSS) and the development of large hub airports - the case of Atlanta Airport, Dubai Airport and the Beijing Twin Hub. Civil Aviation Management (05), 37-40.

Zhi Chun.(2019). Deepening cooperation agreement on promoting high-quality development of Sichuan's civil aviation industry. (Published by Civil Aviation Administration of China)

Zhang, S.Y., Li, D.S. & Zeng, Y. (2020). A Study on the Trend of Energy Consumption Structure Changes and Adjustment Measures in Sichuan Province - Based on the Perspective of Building a Beautiful, Prosperous and Harmonious Sichuan. Natural Gas Technology and Economy (03), 89.

Zuo Ji. (2022). Study on the development strategy of Chengdu Shuangliu Airport under the "one city, two fields". Sichuan Normal University, MA thesis.

## **Appendices**

### **Appendix 1.**