

International Gateway Hub Construction and Air Logistics Industry Development Based on Multivariate Strategy Improvement Grey Wolf Algorithm

Yu Zhang ^{1,*} and Xue Mei¹

¹ New Epoch School of Tourism and Civil Aviation Management, Haikou University of Economics, Haikou Hainan, 571127, China

Abstract

INTRODUCTION: The global economic development pattern is changing, international economic and trade rules are being questioned, the global economy is not optimistic in the post-epidemic era, and it is more difficult to find growth points.

OBJECTIVES: How to achieve economic growth has become a more complex global issue. China, as the world's second largest economy and the world's second largest consumer market, is also a key issue to be addressed: how to promote a strong economic recovery and maintain a high level of public confidence in the state of our economy. The aviation industry chain plays a relatively good role in achieving supply stability as well as industry chain stability, and has a strong positive effect on the domestic and foreign double-cycle strategy. Shenzhen, as a window of China's opening up, has policies, resources and places to promote the development of aviation logistics industry.

METHODS: Information is obtained through literature review and fieldwork. Through the history of the development of aviation industry, the history of aviation logistics development and the current situation of the construction of China's aviation logistics are deeply reviewed and sorted out.

RESULTS: The specific path to be taken for the development of aviation industry, aviation logistics development and air express and related industries is explained. It also makes a long-term plan for the subsequent development of aviation industry, aviation logistics and air express development of Shenzhen airport, and analyzes the related objectives, and finally uses the relevant theoretical knowledge to make a relevant outlook on aviation industry, aviation logistics and aviation industry development, and summarizes the experience of aviation logistics company development. Combined with the construction of Shenzhen domestic airport, the relevant design concept is proposed.

CONCLUSION: Through the analysis of different routes, we finally found that the air logistics business of Shenzhen airport should take the road of synergistic development. In this way, the air logistics of Shenzhen airport should be built around five implementation points and six guarantee points in order to achieve a high-quality development in line with the new era.

Keywords: grey wolf algorithm, air logistics, multiple strategy improvement, international gateway hub construction.

Received on 22 April 2022, accepted on 17 January 2023, published on 24 January 2023

Copyright © 2023 Zhang *et al.*, licensed to EAI. This is an open access article distributed under the terms of the [CC BY-NC-SA 4.0](https://creativecommons.org/licenses/by-nc-sa/4.0/), which permits copying, redistributing, remixing, transformation, and building upon the material in any medium so long as the original work is properly cited.

doi: 10.4108/ew.3714

*Corresponding author. Email: HKU-sdlhgxy@hkc.edu.cn

1. Introduction

Under the background of global integration, the aerospace material industry is gradually recognized by various countries for using its own advantages to improve the economy. The rapid development of air cargo enterprises

and air express enterprises has played a vital role in the development of China's stable food supply chain, product supply chain and industrial chain, and played a very vital role in China's domestic, foreign double cycle. With the new era of Shenzhen in politics, resources, regional positioning and other aspects beyond the reform and opening up, Shenzhen as a more complete socialist construction area, leading the development of socialism, as a priority demonstration area of socialist construction, can take the lead in accelerating the pace of social development and actively respond to various challenges brought by marketization. In the logistics industry, its development can actively promote the rapid innovation as well as the iterative change of the national logistics industry. And the associated cost reduction, profit increase, etc. This paper reviews the research related to Shenzhen airports.

With the already counter-globalization trend in the United States and others, and the consequences of the COVID-19 epidemic, the course and structure of the world economy remains uncertain, and the restoration of sustainable economic growth has become one of the most important issues in the world today. As the world's second largest economy and the world's second largest consumer market, it is incumbent upon China to contribute to a strong economic recovery.

In September 2020, the 8th Central Finance Conference made it clear that a high-quality and efficient logistics network should be built and international airline shipping should be strengthened. Aviation, as the fastest way of action, highlights its position in the process of economic and social development in China, improves the competitiveness of the respective enterprises and contributes to the rapid development of the air logistics business in China. By 2020, the year of national reform and the overall development of China's civil aviation management "on the development of advanced airline logistics infrastructure, rapid increase in a number of people" Ministry of Transport issued "Shenzhen advanced science and technology innovation high-level international construction system power circuit international pending road test drive ride various policies Differences favorable government documents to help the rapid development of Shenzhen air logistics.

As of 2019, Shenzhen airport has flown 3.7 million times, carrying 12.83 million tons, more than 60 international routes, with assets of 5.189 billion yuan, an annual growth of 6.6%. The "golden content" of the shipping network and the quality of cargo services are improving, with more than 25 workstations for navigation of all cargo aircraft. In 2020, aimed at preventing and responding to epidemics and complications and changing the external environment to normalize and overcome the lack of bandwidth, over the annual tariff cargo and towns equipped with electronic counters at 13.99 million tons, ranking third in the country and for the first time in the top 20 in the world, with an average growth rate 13.7 percentage points higher than the tenth highest domestic transport airport (- 4.7%). As one of the driving forces of

the Shenzhen Special Economic Zone, Shenzhen Airport should be committed to a sustainable, high-quality development path around the "bulk commodity" development strategy. Therefore whether as an advanced demonstration zone of socialism or in a position of rapid development in the air logistics industry, Shenzhen should be in a more favorable position to combine its potential, unite its strengths, and take advantage of its unique political conditions, product resources, and geographical advantages to increase its integration into the global high-tech industry chain and stimulate the economic development of the Pearl River Delta region as well as Guangdong-Hong Kong and Macao-Macau Bay regions.

2. Research Background

Compared with other modes of transportation, although aviation industry transportation began after the realization of aircraft cargo, it has developed rapidly. With the manufacturing of large aircraft and the lower and lower cost of aircraft, the aviation logistics industry has developed rapidly and has unprecedented advantages in other aspects of transportation. In this paper, various factors such as politics, reform and opening up, relevant economy and geography are taken into account. Taking Shenzhen as the research object, Shenzhen airport as the key research object.

Although Deter external investigations have begun, less attention has been paid to the rapid growth trend of freight operations in China, and less research has been done on ground services, extensive information management, and cargo and mail security at the airport as a major institution. First, based on previous research, this article provides theoretical reference thinking for future business research by classifying relevant aviation logistics policies. Second, it analyzes the development direction of aviation logistics business of Shenzhen Airport under the new conditions, which has standard significance for improving the development of domestic and domestic aviation logistics business.

First of all, the transportation industry is the foundation to support the rapid economic development of socialist countries, and it is a leading industry in strategic position. The rapid growth, development and construction of large modern transportation and logistics companies with global market competitiveness may increase the sustained momentum of the development of China's aviation logistics companies. Second, the company should play a more active role in maintaining the "double zone" construction, improving the environment of Shenzhen's aviation logistics department and promoting regional economic development. Third, it is a guideline for governments, scientists and even similar airports for proper architectural research.

3. Materials and methods

3.1. Basic Theory

3.1.1. Aviation logistics

From a smart city perspective, the researchers analyzed key nodes of different types of technological innovations in logistics and strategic management. Qualitative and quantitative analysis, according to the characteristics of regional economic and industrial planning, management, different regions of aviation logistics management technology tendency, in aviation logistics management logistics is logistics strategy and a union, and for this they suggest logistics enterprises through competition and cooperation across the line of development; In their view, if air logistics flows are to be maximised, they should be based on America's strengths in this area; And put forward constructive suggestions. The operation process of aviation logistics is shown in Figure 1.

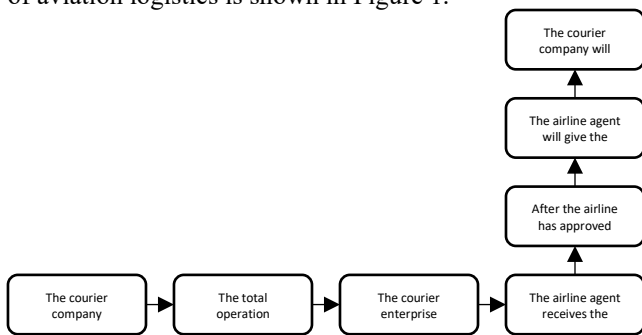


Figure 1. Operation flow of aviation logistics

Chinese logistics researchers have analyzed the development status of cross-border electronic commerce logistics. To improve the business model, we offer five remedies; In the field of aviation logistics, some authors systematically analyzed the development of aviation logistics, compared the situation of domestic aviation logistics market before and after COVID-19 epidemic, constructed an evaluation index system that takes into account strength, sustainable development and system strength, and put forward development strategies of countries, regions, industries and enterprises. Researchers at Peking University are analyzing and building freight flow models, building smart logistics platforms, and demonstrating green ideas in the post-pandemic context; Shanghai researcher, said China's need to unify the actual supply chain, pay attention to "please come in" and "exit" logistics companies, the national development and reform stable COVID - early 19th outbreak epidemic situation has revealed the freight logistics system and the development of our country, the largest air transport in order to speed up to complete the disadvantage of air cargo transportation technology and industry in China provides the means, contribute to the establishment of China's air cargo infrastructure, To provide political

guidelines for industrial development; Lanzhou University adopted SWOT analysis method and proposed the strategy of SO selection, completely relying on the practice and experience of FEDEX and other airlines. The system structure is based on the basic strategy of "building aviation logistics park, promoting e-commerce logistics automation and cultivating logistics system". Tibetan scientists briefly introduce the current reference point of the development of logistics and air freight hub, analyze the situation of the Huai air logistics hub using SWOT, and put forward the strategy to improve the quality and synergy effect of the Huai air logistics hub. Dalian researchers in this field use Gray and AHP correlation analysis methods. For example, the expansion of aviation networks; By studying the spatial structure of global aviation logistics development, researchers from Jiangxi University of Finance began to study the location differences of air passenger and cargo hubs in seven aspects. Combined with the current situation of domestic logistics development, this paper proposed the deployment principles of logistics centers at the present stage. Researchers from Henan Academy of Finance and Financial Sciences investigated the development chain of China's aviation logistics industry from the perspective of strategic planning and conducted a logical study on the development trend of China's aviation logistics. The key factors for the success of aviation logistics enterprises are shown in Figure 2.

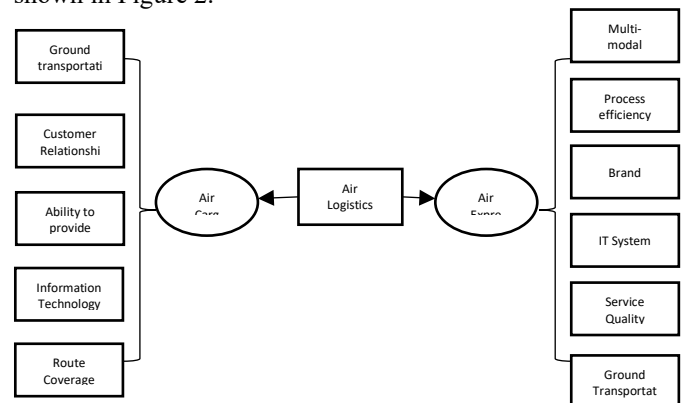


Figure 2. Key success factors of an aviation logistics enterprise

3.1.1. Construction of international gateway hub

We need to set up several relevant international portals in the country and build logistics today. Some local scientists argue that geography is particularly important to the development of logistics hubs; Mine has researchers who analyze the airports in the United States. They analyze and propose methods to improve the situation of aviation logistics. First, ensure the sustainability of the

planned transportation network plan. Secondly, land resources should be used rationally. Research conducted by Harbin Engineering University shows that in the context of air transport being an economic engine, empirical studies show that there is a close relationship between logistics and international trade, which proves this. Some foreign researchers have conducted a study at international airports, arguing that regional economies are largely determined by airport availability, especially at major airports.

Logistics Park Development Bureau in eight areas, such as the design of a comprehensive and integrated investment environment; Shi inter-university teaching national two-way logistics flights to the airport - the model has developed a corresponding imperfect infrastructure, impractical management, information construction to speed up the management of air cargo market countermeasures to regulate; Fawn-Hannan (Jiangzhou, Henan Province City Shenzhang Airport) is a cross-dimensional analysis of the relationship between the physical and technical aviation sector and the regional economy in Henan Province, one of the main reasons, according to a researcher from the Institute of Agricultural Economics of Henan Province, the world economic portal is an aviation hub where aviation resources become a national and even global transport base, and the basis for development. Express companies are very large; Henan Province is a regular case for the study of rural farms, so inferentially developed from the international air logistics center, marking the center should dominate international logistics, in terms of efficient reception as well as information management level, to get the remainder of the world's leading, capable airport map in Huoyou 2 million tons of cattle per year; once upon a time, the airport program studied the various centers. The infrastructure studied, the classification of aircraft cargo banned from storage, related international travel, domestic travel, domestic and international travel; Dalian learned that Guangzhou's new cloud things managed by the precise international airport planning, for example, Nexus Gate Logistics Park has an average density of vacant on behalf of the construction site of logistics up to 50% to 80% of the range; Guangzhou has been trained in air cargo compared to large passenger capacity, the market and competition has been affected by the development of logistics aviation issues, air cargo market integration is high enough; Southern University of Science and Technology aviation logistics park research technician planning and design; Southwest University of Finance researchers provide accurate detection performance required for airport hub construction to improve the level of transport and improve the transport tray initiatives, where a major international aviation hub has a basic flight hush.

Some meteorological researchers recommend accelerating the digital transformation to the air logistics industry in order to play the largest role in expanding the availability of new industrial infrastructure and accelerating the establishment of a supply-demand

balance system and global value chains and domestic supply chains; and provide Gene Fu Chao Xinzheng Airport five streams sub flawed infrastructure currency, high lack of professional logistics personnel, mixed transport mechanisms remain healthy, innovative mixed self-consciousness, not Export, improve the Council infrastructure, strengthen the hub function, the establishment of professional teams, efficient, industrial mixed industrial transport, work facilitation, level of innovation, the creation of the town state national security and other initiatives; the use of operators strategists with the local developed developed economies, effectively enhance the division of labor industry more precise location and integration of resources benefits, the local industrial structure of efficient service updates and specialization, large-scale manufacturing - manufacturing, effectively promoting the social inclusion of the local economy, as an important supporting role for the underlying theory; some researchers have developed a management framework based on epidemic explosion, which contributes to the sustainability of civil aviation in China, while paving the way for improvements at the institutional, industrial and technological levels; air traffic flow structure, increasing the level of air transport, specifying nine priority tasks aimed at improving the transport development environment and improve the efficiency of services; the industry is dominated by air logistics, which is at the heart of the global landscape; understanding that the implementation of the genetic dedicated international city planning, continue to strengthen the aviation industry large fleet city planning system to attract international star stations of large air fleets will be carried out, the major cities service aviation information joint use of resource platforms, engine hybrid air transport reports and collection of quotes for advanced services and Various technical methods for large new customers; expectations of complex propensity analysis and quantitative cross analysis, combined with different analytical methods, began to wait for air logistics companies to provide functional guarantees, including tools, management systems, government policies.

3.2. Research methods

3.2.1. Grey Wolf algorithm

The algorithm (GWO) is a giant punch axis algorithm developed by external and other researchers, which simulates the process of guiding and hunting gray wolves. The Gray Wolf algorithm has been used in recent years for planning paths with good results. Like other clever sets of optimization algorithms, the Gray Wolf algorithm has disadvantages. For example, the "fault" algorithm used when a victim is attacked stalls and slows down during the search process. Scientists from home and abroad have proposed a number of improvements. In the literature, there is an optimization algorithm called "Gray Wolf" (Grey Wolf) that uses chaotic sequences to

improve search functions around the world, thus counteracting the ability of these search and development algorithms. Another literature suggests that the "gray wolf" algorithm implies a combination of dynamic evolutionary mechanisms that enhance the work of local search algorithms. But the global search function does not improve the algorithm. Second, the literature also contains a well-developed gray matter algorithm combined with the idea of hybrid film evolution, which in turn solves the problem of optimizing mechanical design functions. However, these algorithms do not take into account the impact of one wolf's information on the whole population in the study of gray wolf baiting gray wolf algorithm flowchart, as shown in Figure 3.

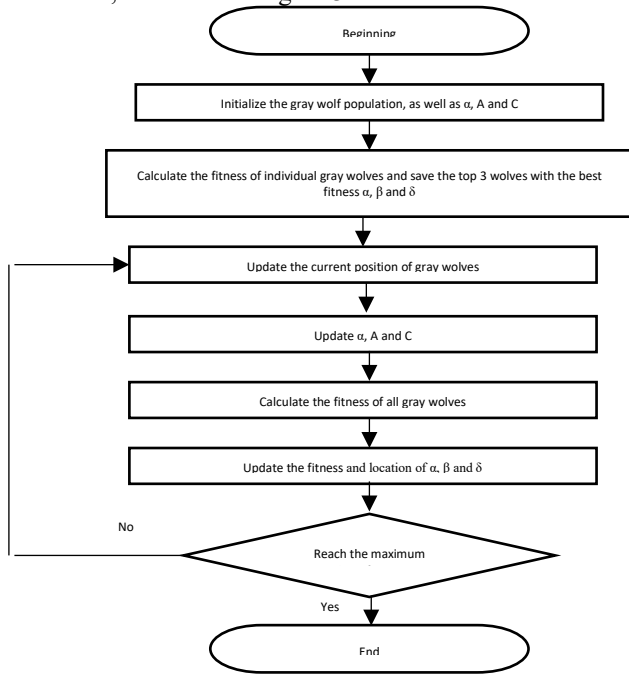


Figure 3. Flowchart of gray wolf optimization algorithm

Therefore, based on these problems, an improved multivariate pad algorithm is proposed to optimize the gray wolf. The first step is a possible travel strategy to improve the role of lead wolves in the algorithm. At the same time, a reverse study mechanism based on the optical bending principle should encourage the weakest to learn backwards, thus increasing the diversity and the algorithm is no longer shy to be locally optimized. Finally, they slip through the curve and add to it. The Grizzly Wolf algorithm is an idea inspired by external researchers and other grizzly behavior. The GWO algorithm focuses on the natural hunting behavior and social leadership of grizzly wolves. Grey wolf packs have an average of 5 to 12 wolves. They then follow a social hierarchy, a social hierarchy. In the hierarchy, the senior alpha (beta) and the second wolf are called betas; Greg

Sabri is a leader who takes full responsibility for issues such as hunting, sleeping or awakening. The chief is also referred to as the wolf because the wolf obeys him. In addition, the lead wolf is not the strongest member of the pack, but he is the best at handling attacks on other animals. As shown in Figure 4.

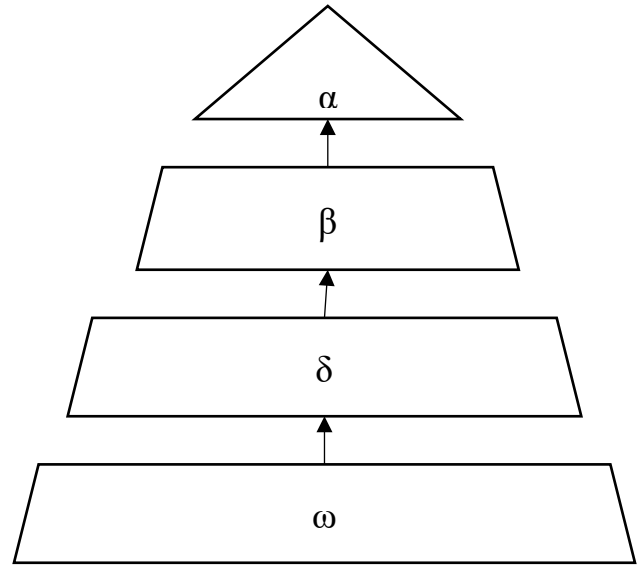


Figure 4. Basic gray wolf algorithm

3.2.2. Main evaluation method

Set (Ω, ζ, P) is a conceptual space, X the set of all wandering variables on the space involved. The risk metric ρ is a mapping X from a X_ρ subset of R to the real numbers, denoted as. $\rho: X \in X_\rho \leftrightarrow \rho(X) \in R$

First define the \mathcal{G} function called distortion function (distortionfunction) $g: [0,1] \rightarrow [0,1]$, if it is a monotonically nondecreasing function and satisfies $g(0) = 0, g(1) = 1$

Next, define the $\rho_g: x \rightarrow R$ risk measure: often called distortionriskmesure if $\rho_g(X)$ it satisfies

$$\rho_g(X) := \int_{-\infty}^0 \lg(S_X(x)) dx + \int_0^{\infty} g(S_X(x)) dx, X \in x \quad (1)$$

Here is \mathcal{G} the distortion function, which $S_X(x) = P(X > x)$ is X the tail distribution.

The X assumption is that the total risk faced $f: [0, \infty) \rightarrow [0, \infty)$ by the insurer $f(X)$ is the partition function, representing the insurer transferring part of the risk faced by itself to the reinsurer. The reinsurer charges the insurer for the insurance premium to supplement the risk they bear because they assume a portion of the insurer's risk. In this paper, we assume that the reinsurance cost criterion has the following form.

$$\mu_r(f(X)) = \int_0^{\infty} r(S_{f(x)}(x)) dx \quad (2)$$

where $S_{f(x)}$ is $f(X)$ the tail distribution $r: [0, \infty) \rightarrow [0, \infty)$ about, is a monotonic nondecreasing $r(0) = 0$ function with. Without loss of generality, we assume r that it is not a function that is zero almost everywhere, and that the total risk an insurer has to face is the residual risk it will face plus the cost required to transfer the risk. Expressed in terms of the formula can be expressed as

$$T_f(X) = X - f(X) + \mu_r(f(X)) \quad (3)$$

4. Results and Discussion

4.1. Current status of the study

4.1.1. The current situation of the research airport in this paper

Shenzhen Airport is located in Shenzhen Special Economic Zone, Guangdong Province, and is the only airport in China that serves a group consisting of group, sea, air and rail. Airport waiting room covers an area of 77,000 m², "dungeon" "main surface structure", the development of the technical area of 45,100 m², storage airport area of 166 million m², Shenzhen Airport it is relatively late construction completion time, its age is not yet ten years old. Of course the younger airport, he has a higher improvement in both management planning as well

as costs, profits, etc. It is one of the more advanced airports built in China, it has a longer run prop, there is a large amount of, large passenger aircraft, cargo aircraft. The airport is built on two runways of 3.600 meters long, capable of taking off and landing Airbus A380 aircraft.

Shenzhen airport adhere to the "a nuclear collective" strategy, and then return to "guests, cargo, city, people, information" as the "future development of the five strategic coordination" of the clear plan, focusing on the base camp business. Internally, an organizational structure has been established for "strategic control of the line of business, three main business development committees, 11 business support blocks", which can be an important aviation hub for international cargo transportation from the main route route. Shenzhen Airport's total capital increased from 163 million yuan in 2011 to 524 million yuan, net assets rose from 11.6 billion yuan to 4.4 billion yuan in 2011, with an average annual profit of 1.4 billion yuan in the past five years, making it possible to increase the value of state-owned assets. Shenzhen Airport is both a powerful engine of development for the District of Columbia and a barometer of Shenzhen's economic performance. As another indicator, passengers have the opportunity to provide security at civilian airports, as well as their capacity, which is twice as large as they are in transport situations, totaling up to 560 million passengers and about 15 million tons of cargo. The basic elements of human transportation, logistics, capital flow and information flow increase the speed of circulation through the windway, accelerating the urban development and construction of Guangdong, Hong Kong and Macao Bay.

4.1.2. Airport air logistics business overview

Shenzhen airport has seen rapid development of cargo in Shenzhen airport in the past 15 years. The cargo capacity in 2019 reached 123,000 tons, with an annual growth rate of 6.2%, ranking 23rd in the world. Of this, international cargo capacity doubles annually to 352,000 tons, with an annual growth rate of 13.2%. In 2020, the main aviation activity at Mountain Town Airport will be Counter. The number of passport mailboxes reaches 139,999,000 tons, entering the world's top 20 for the first time, and the national airport's rate is less than 1 million tons. When it opens in 2021, five ", 14 cargo transport capacity increased by more than 1,568 million tons, accounting for 12.1% compared to the same period in the international and regional transport of goods has reached 650,000 tons, an increase of 26.8%, the same year. Shenzhen airport is building a third high-level runway. These three runways will be put into operation in the future, which will help ensure a cargo capacity of 2.2 million tons.

The establishment of a sea mining since 2020 global liveSingapore Air air one of the longest and largest airlines, but also the world's two five-star airlines, with a new found difference or Chicago encryption Shenzhen 8th international air service of Europe Luxembourg cargo,

accounting for 36.7% of the international and regional 4.7 percentage points of the increase over the previous year. Shenzhen airport's international logistics market is expanding. In 2021, Shenzhen airport has 17 airlines operating all cargo flights and 12 international flights open and encrypted. One of them is Shenzhen Kuala Lumpur, Shenzhen-Bangkok, with cargo flights to Shanzhen Osaka operated by Sanzenhiro, Shenzhen Bangkok, Shenzhen Bangkok and UPS. In addition, Shenzhen airports continue to expand in Europe and the United States. Shenzhen has established links with major international logistics centers in Europe and the United States, and has opened international cargo routes to Los Angeles and Cologne, contributing to the economic prosperity of the Gulf region. Shenzhen Airport's cargo throughput is growing even faster, but there is an imbalance between domestic, international and regional capacity. Take the cargo and mail throughput of Shenzhen Airport in the 13th Five-Year Plan period as an example, the total cargo and mail throughput (10,000 tons) is shown in Figure 5.

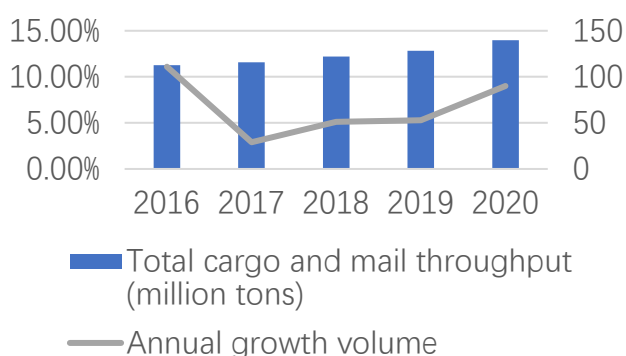


Figure 5. Cargo and mail throughput of Shenzhen Airport during the 13th Five-Year Plan period(1)

The cargo and mail throughput of Shenzhen Airport during the 13th Five-Year Plan period is shown in Figure 6.

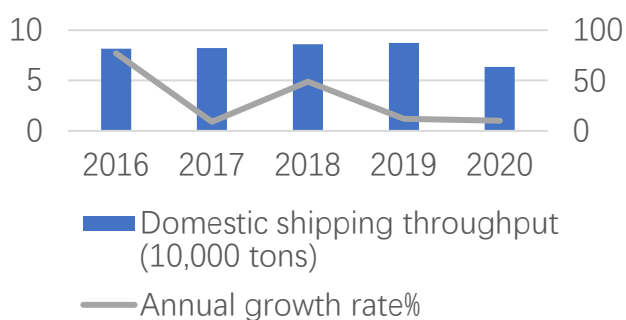


Figure 6. Cargo and mail throughput of Shenzhen Airport during the 13th Five-Year Plan period (2)

The cargo and mail throughput of Shenzhen Airport during the 13th Five-Year Plan period, international cargo and mail throughput (10,000 tons), is shown in Figure 7.

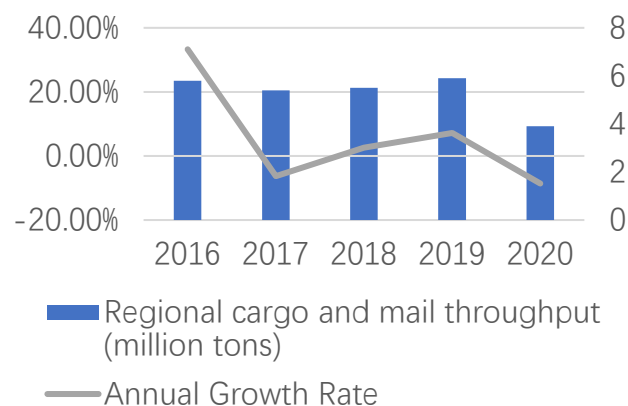


Figure7. Cargo and mail throughput of Shenzhen Airport during the 13th Five-Year Plan period(3)

The logistics policy environment is good. The first is the introduction of protection strategies. During the last five-year plan of China, Shenzhen Airport has been recognized by all walks of life through its development and has become an important international transportation hub. Before the convening of the 19th National Congress of China, the country carried out planning to develop at the same time, Shenzhen Airport as an important driving force for national economic development; to promote the development of the aviation logistics industry, the Civil Aviation Administration of China (CAAC) Shenzhen Airport base identified as a comprehensive test city airport for aviation logistics services. In 2019, the planning for the development of the Guangdong-Hong Kong-Macao Greater Bay Area Outline once again clarifies the requirements for improving the competitiveness of Shenzhen Airport's aviation hub. On March 24, 2020, China's National Aviation Administration "Shenzhen Baoan International Airport Master Plan" clearly states that "Shenzhen Airport, as an international aviation hub based in the Greater Guangdong Bay area, facing the Asia-Pacific international aviation hub, the world's radiation and aviation logistics center, is an important international transportation hub for the Guangdong Gulf Region International Airport Group, the cooperation between the Greater Bay Area and Hong Kong. The center of Hong Kong and Macao is the core of the Greater Bay Area and the region."

Second, the comprehensive test of aviation logistics is steadily advancing. Shenzhen Airport conducted security

checks on high-quality products containing lithium batteries, helped SF Logistics implement the well-known shipbuilder pilot, conducted express security checks on all cargo planes, and delivered over 2,000 tons as well as over 4,000 tons of cargo weight respectively, which is a relatively large transport volume in the history of air transportation, while transporting over 15,000t of lithium battery cargo by improving the level of security checks on different batteries. We have completed a relatively large order from Huawei in China. In addition, DJI drones, Huawei technology and Xiaomi and other high-tech industries in Shenzhen, including the medical industry, have been affected by the development of logistics and air logistics dividends, greatly improving the efficiency of logistics and reducing the cost of air logistics. In Shenzhen airport transportation air logistics enterprises up to 7000.

Third, the level of information technology in the aviation logistics security business is gradually improving. In the case of China's already high national security as well as the relatively high level of regional security, Shenzhen Airport has once again improved its own security level and improved its own security efficiency. In the rapid development of high-speed rail at the same time, the airline waiting time is also a continuous reduction, but the effect is not very obvious, and Shenzhen Airport through the security check to improve the facilities, so that all kinds of security check time is significantly reduced.

4.2. Shenzhen airport air logistics business path outlook

(1) Research and development stage. Combined with the actual status of the development of air logistics business in Shenzhen Airport, summarize the experience of Hong Kong International Airport and Guangzhou Bayern Airport air logistics development as a reference basis, and consider the qualitative and quantitative factors together with foreign environment and development forces for a comprehensive analysis. Many infrastructures that are not modern are being phased out.

After the restoration, the self-sustaining land is decreasing year by year, and the growth of land for construction in the transition zone is limited. The number of routes opened by Shenzhen Airport has increased in recent years, improving its ability to reach all five continents. Transportation facilities and equipment cover the whole process of machines from packaging and loading to inspection and installation, and there is still much room for improvement in quantity and quality compared with the construction status of transportation hubs. The local airlines represented by Shenzhen Airport are mostly the first domestic and foreign cargo airlines, in the Guangdong-Hong Kong-Macao Greater Bay Area, only individual domestic express industry logistics companies, he established the relevant central base, but other express enterprises as well as logistics enterprises are not the construction of the central base. In the

information level and transportation mode: Shenzhen digital airport design, so that the use of passenger and transportation technology has been greatly improved, Shenzhen airport is the only one in the country to integrate air, rail, land and sea transport in one airport. The government has also provided policy and tax assistance to related industries, such as further simplification and efficiency in customs clearance inspection and customs supervision, preferential interest rates and preferential interest rates on loans from banks such as the National Import and Export Development Bank, etc. Especially in recent years, more aviation supervisory departments and institutions have proposed simplified logistics procedures. Various beneficial policies and related documents have played a significant role in the development of air logistics in Shenzhen. In terms of cargo inspection technology it will take until the end of 2022, or even longer, to see the results. The Ombudsman department has established a set of educational systems and systems to support the use and availability of new technologies. In terms of industrial modernization: Shenzhen's economic development is steadily at the forefront of the country and relies heavily on high technology, innovative industries and services.

(2) Designated development path. Through a high analysis of the stage of development of air logistics business, there is an analysis that the air logistics of Shenzhen airport has entered the "four levels" of maturity, into a higher level of development, with rapid development speed and a broad outlook. According to the actual situation of Shenzhen airport, there are several development routes: "different development roads", "regional airport integrated development road" and "coordinated development road".

Integrated development of regional airport routes. The most important airports in the Pearl River Delta, measured by energy supply criteria, are Hong Kong, Guangzhou and Shenzhen. In the region, resources have been integrated and good institutional mechanisms have been established for the exchange of all aspects of the aviation sector and airport technology, which has had a significant impact on the environment, industry and development. While developing in a comprehensive manner, each airport must not only fulfill its own mission, but also make every effort to promote quality airports throughout the region. There are many uncertainties in the path of development of regional airports in mutually beneficial situations. First and foremost, governments and airports must come together to integrate civil aviation and cooperate in a spirit of trust. This plays a big role. Secondly, the development of airports is a matter of economic interest. Especially in normal epidemic times, the development of air transport logistics brings unlimited sales opportunities. But the sooner the market grows and the higher the revenues, the less likely the optimal merger will be.

Harmonized development model. "Harmonization" means combining two or more different resources or types to achieve high-quality development in the field of air

logistics in Shenzhen airports, cooperating on the basis of common development and mutual benefit to achieve the ultimate goal. "Multilateral war" and "mixed war" instead of "rope" and "boxing" is a realistic and sustainable development path. A coordinated development path includes pros and cons and "synergy" between the airport and its stakeholders. Briefly, the "advantage" is to develop the benefits of logistics development in order to measure the obstacles given now and in the future, and by refining and understanding the "c", the investigator takes advantage of timely changes to facilitate procurement. Coordination for "airport" brings airport and logistics development, such as transportation, logistics center network, etc., the role of logistics development and all parties, overall development and industry. The two components of the road to harmony are interdependent and inseparable. However, apart from the airport itself, the drawback of development is this connection. Harmonious development will not be successful if all parties work together to assess the pros and cons of the development of Shenzhen air logistics led to a qualitative and quantitative analysis, that is, Shenzhen aviation industry engineering must follow a "" coordination paves the way.

4.3. Shenzhen airport air logistics business development path implementation points

Determined the high development of the road, Shenzhen found a new era in line with the real development of the enterprise. In terms of improving efficiency, the benefits should be transformed into a comprehensive development. Develop and implement the national logistics plan of Shenzhen airport to build a professional and efficient aviation logistics system. Strengthen the cooperation with DHL, ups, lufsa and other airlines to support the expansion of Shenzhen Airport's main product base. Contact municipalities and civil aviation authorities to develop a protection policy to support airlines to improve their capacity in terms of rent, taxes, cleaning efficiency, flight time, cargo ownership, etc. Encourage border headquarters to enter the airport and establish a global border express center by improving the efficiency of transit services. Shenzhen airport logistics activities are carried out in the following four main areas.

(1) Adhere to the market-oriented, the use of government and industrial policies to create a logistics developed enterprise group, in the airport "source" Shenzhen strategist prot role management, many people feel car and responsible, fully free dynamic, the formation of a healthy management environment. Chinese freight enterprises in the process of transformation to the management, in order to change the aviation logistics chain weak logistics chain deficiencies, Huasheng Airlines, waa airlines, national airlines and other large freight enterprises are involved in the transformation of traditional transport enterprises, the logistics chain systematization, throughout the freight

logistics chain, each link is extended to the distant end of the first and final transport chain. In the context of the normal epidemic, it is necessary to cooperate with major shipping companies, such as Puroforma, pad, post office, cross and other major transport companies, fully cooperate with the interests of the market, to enhance the air capacity, and jointly expand and strengthen the air logistics.

(2) Develop a comprehensive information platform for logistics airports. We are committed to developing a "one-stop" aviation logistics management, creating the "strongest brain in the airport" and a comprehensive logistics information platform, and improving management skills with new technologies to become a market leader in digital airport reform.

(3) Expanding the import and export business of raw materials. The import and export of international transportation business in the integrated zone is actually "direct" freight, which can solve all the customs clearance problems in the integrated zone. After the goods arrive at the Shenzhen airport warehouse, logistics can arrive at the warehouse without customs approval, which greatly improves the efficiency of aviation logistics.

(4) The implementation of aviation logistics innovation. Air logistics services are different from public rail, road and waterway transportation. Safety is its main feature, but safety is always a constant issue in aviation. How to create a solid safety foundation in high-quality air logistics services. At present, there is an urgent need to further improve the service level and safety of air cargo.

5. Conclusion

This paper presents the information obtained through literature research and field surveys. This paper clarifies in detail what is air procurement and air logistics development. Secondly, the current situation and development of air logistics business in Shenzhen airport is analyzed theoretically, and the strengths, weaknesses and shortcomings of the method are understood on the basis of comprehensive evaluation and analysis, as well as how to develop a detailed, complete and systematic analysis and scientific research on it. Again, based on the analysis and results of the previous chapters, the development goals of Shenzhen airport air logistics were determined. We have evaluated the development situation of "eight directions" in detail, and proposed "multiple development paths", "airport regional integration development path" and "coordinated development path". Coordinated development path". Through the analysis of different routes, we finally found that the air logistics business of Shenzhen airport should take the road of synergistic development. In this way, the air logistics of Shenzhen airport should be built around five implementation points and six guarantee points in order to achieve a high-quality development in line with the new era.

The global economic development pattern is changing, international economic and trade rules are being questioned, the post-epidemic era, the global economy is not optimistic, and growth points are more difficult to find. How to achieve economic growth has become a more complex global issue. China, as the world's second largest economy and the world's second largest consumer market, is also a key issue to be addressed: how to promote a strong economic recovery and maintain a high level of public confidence in the state of our economy. The aviation industry chain plays a relatively good role in achieving supply stability as well as industry chain stability, and has a strong positive effect on the domestic and foreign double-cycle strategy. Shenzhen, as a window of China's opening up, has policies, resources and places to promote the development of aviation logistics industry. Information is obtained through literature review and fieldwork. Through the history of the development of the air industry, the history of the development of aviation logistics and the current situation of the construction of China's aviation logistics are deeply reviewed and sorted out. The specific path to be taken for the development of aviation industry, aviation logistics development and air express and related industries is explained. It also makes a long-term plan for the subsequent development of aviation industry, aviation logistics and air express development of Shenzhen airport, and analyzes the related objectives, and finally uses the relevant theoretical knowledge to make a relevant outlook on aviation industry, aviation logistics and aviation industry development, and summarizes the experience of aviation logistics company development. The design concept is proposed in conjunction with the construction of Shenzhen domestic airport.

6. Acknowledgements

This paper is supported by Hainan Federation of Humanities and Social Sciences Circles, 2021. Title: Research on the Development Path of Aviation Logistics Industry in Hainan under the Background of Free Trade Port Construction. (Grant No. HNSK(YB)21-29)

References

- [1] Fortune Nicola, Madden Richard, Riley Therese, Short Stephanie. The International Classification of Health Interventions: an 'epistemic hub' for use in public health.. *Health promotion international*,2021,36(6).
- [2] Carroll Jenny. The International Alliance of Academies of Childhood Disability Knowledge Hub. *Developmental Medicine and Child Neurology*,2021,63(7).
- [3] Juan Gan, Chunxi Wang. A Synergy Analysis of Aviation Logistics and High Quality Development of Regional Economy[J]. *Theory and Practice of Science and Technology Science and Technology*,2021,2(1).
- [4] Martinez César Augusto Ferrari. Student mobility and the production of Chile as an international academic hub[J]. *Globalisation, Societies and Education*,2020,18(5).
- [5] Simons Terry, MacGlashan Andrew, Goldsmith Christopher, Wodeyar arsha, Abraham Kottarathil A.. Initial impact of COVID-19 on dialysis provision; review of international guidelines and adaptation of a hub unit's service. *Seminars in Dialysis*,2020,34(2).
- [6] Peng Wang. Application Research of Supply Chain Management in Civil Aviation Logistics Enterprises. *Textiles and Clothing Design*,2020,1(1).
- [7] Gong Yifei, Li Peiyue. Enlightenment of Rotterdam Port to the Construction of Inland International Logistics Hub under the Framework of Chongqing Free Trade Zone. *Technology and Investment*,2020,11(03).
- [8] Deema Faris Badokhon, Mohammed Fekry. JEDDAH'S INTERNATIONAL WRITERS HUB. *Journal of Critical Reviews*,2020,7(08).
- [9] Chan T. M. S., Chan C. H.. Centre for Youth Research and Practice: Social Impact Assessment Results.. *Journal of evidence-based social work* (2019),2020,17(3).
- [10] Yuhang Song. Research on the Development of Blockchain Technology in China's Aviation Logistics Industry. *International Journal of Social Sciences in Universities*,2020,3(1).
- [11] Domenico Gattuso, Margherita Malara, Gian Carla Cassone. Planning and Simulation of Intermodal Freight Transport on International Networks. Hub and Spoke System in Euro-Mediterranean Area. *Sustainability*,2020,12(3).
- [12] Soong Hannah. Singapore international education hub and its dilemmas: the challenges and makings for cosmopolitan learning. *Asia Pacific Journal of Education*,2020,40(1).
- [13] Herlihy Patricia A., Jacobson Frey Jodi, Lin Na, Kahn Alaina. International employee assistance digital archive: A new knowledge hub. *Journal of Workplace Behavioral Health*,2020,35(1).
- [14] Shengrun Zhang, Kurt Fuellhart, Yanjun Wang, Weiwei Wu, Jinfu Zhu, Frank Witlox. Congestion spillover effects of Chinese hub airports on international connecting traffic. *Transportmetrica A: Transport Science*,2019,15(2).
- [15] David Wortley. Hospitals of the future as economic development hubs Guiqian International General Hospital Launch. *Digital Medicine*,2019,5(4).
- [16] Wen Wen, Die Hu. The Emergence of a Regional Education Hub: Rationales of International Students' Choice of China as the Study Destination. *Journal of Studies in International Education*,2019,23(3).
- [17] Ryan Espersen. Fifty Shades of Trade: Privateering, Piracy, and Illegal Slave Trading in St. Thomas, Early Nineteenth Century. *New West Indian Guide / Nieuwe West-Indische Gids*,2019,93(1-2).
- [18] Pascal Falter-Braun, Siobhan Brady, Rodrigo A. Gutiérrez, Gloria Coruzzi, Gabriel Krouk. iPlant Systems Biology (iPSB): An International Network Hub in the Plant Community. *Molecular Plant*,2019,12(6).
- [19] Miao Feng, Dan Zhou, Yang Yang. SWOT Analysis and Countermeasure of Jilin Province Aviation Logistics Industry Development Strategy Based on Low Carbon and Environmental Protection. *IOP*

Conference Series: Earth and Environmental Science,2019,252(4).

- [20] K. A. G. Out of the frying pan and into the fire? Uncovering the impact of FSMA's sanitary food transportation rule on the food logistics industry[J]. Business Horizons,2023,66(2).