



## **Air Logistics Analysis of NF Airlines Based on SWOT and AHP**

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## Abstract

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<p>With the development of the global economy, the improvement of people's consumption ability, the transformation of consumption methods, the continuous growth of demand for aviation logistics, and the continuous expansion of market size, it has become an important growth point and driving engine for regional economic development. This article aims to analyze the aviation logistics of China Southern Airlines based on the theoretical frameworks of SWOT analysis and AHP analytic hierarchy process. Analyze the current aviation logistics situation of NF Airlines by analyzing the company's strengths, weaknesses, opportunities, and threats. In this article, it will be analyzed that NF Airlines has good advantages in air transportation experience, modern logistics facilities, close cooperation relationships, and strong brand influence. However, NF Airlines still needs to address factors such as insufficient brand awareness, and the company needs to strengthen communication with the government and institutions, as well as face fierce market competition, international trade policies, and other disadvantages and threats. Then, this article will evaluate the company's performance on key factors through the Analytic Hierarchy Process (AHP), helping NF Airlines to more intuitively analyze and compare the impact of key factors on aviation logistics. The research purpose of this article is to first clearly analyze the current situation of aviation logistics of NF Airlines, and then infer and analyze ways and methods that can improve the operation of NF Airlines based on these current situations.</p>
<b>Key words</b> SWOT, AHP, Aviation logistics

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# 1 Introduction

With the integration of the global economy and the continuous development and acceleration of global trade, the position of aviation logistics is also increasingly elevated. Air logistics mainly refers to the service of using air transportation tools to quickly and safely transport goods, mail, and other items to their destination. Secondly, air logistics not only provides services with air freight as the theme, but also integrates a series of related aspects to provide integrated services. At present, aviation logistics services have become an indispensable component of many enterprises' daily business. In the global logistics market, aviation logistics occupies an important position.

## 1.1 Research questions

Air logistics is a process that takes airports as the main body, relies on the airport route network and air transportation advantages, utilizes modern information technology, integrates multiple transportation methods and related resources, connects supply and demand entities, and enables the effective flow of raw materials, finished products, and related information from the starting point to the destination. And it organically integrates transportation, warehousing, loading and unloading, processing, sorting, distribution, information, and fund exchange to form a complete service supply chain, providing users with an integrated logistics solution characterized by "one-stop" and "door-to-door" services. Compared with traditional air freight, air logistics not only needs to complete the air transportation of goods, but also needs to participate in the umbrella process of logistics operations, and carry out overall design and management of logistics operations. Therefore, air logistics places more emphasis on the integration of logistics functions and coordination of cooperative relationships.

This article will analyze the aviation logistics of NF Airlines. Analyze its current aviation logistics operation situation, analyze its advantages and disadvantages through SWOT analysis method, as well as some external threats or opportunities for further development that this aviation logistics operation structure may encounter in the aviation industry market environment. And evaluate the company's performance on key factors through the Analytic Hierarchy Process (AHP), and study and analyze which key factor has the greatest impact on NF Airlines.

Air logistics is an important standard for determining the degree of market openness, economic development, and material exchange convenience of a country or region. It can effectively reduce the comprehensive costs of enterprises, help accelerate the adjustment and upgrading of the aviation industry structure, and effectively promote the development of domestic and foreign trade. With the rapid development of the economy and technological progress, the logistics industry, as an emerging service industry in the modern economy, As a 'third source of profit' The role it plays

is becoming increasingly significant. Currently, China's aviation logistics industry is in the process of transitioning from traditional air freight to modern logistics. Efforts to explore China's aviation logistics management and operation models, as well as sustainable development strategies, will have important theoretical and practical significance. The freight business of competitive vortex airlines focuses on the transportation of air cargo between cities and airports, and air transportation has gained competition due to its speed and safety. Compete for advantages. The steady growth of the national economy, the gradual advancement of economic globalization, and the adjustment of regional industrial structure have all brought infinite opportunities to the air cargo industry. On the other hand, the rapid increase in the input of transport capacity among airlines, the high degree of specialization of freight forwarder, and the expansion of business scale, as well as the increasingly stringent requirements of customers for air cargo services have all led to the worsening of the party struggle situation in the air cargo industry.

This article is based on SWOT and AHP analysis of aviation logistics for NF Airlines, studying and analyzing the advantages, disadvantages, and potential threats or opportunities that NF Airlines may face in terms of logistics operations. The research results can be used as a reference and comparison for the logistics situation of other airlines. The research in this article can to some extent enrich the research theories on the operation of aviation logistics both domestically and internationally.

Through this study, the specific situation of logistics operation of NF Airlines is analyzed, and the advantages and disadvantages are summarized. The advantages and disadvantages are analyzed, and a set of aviation logistics operation mode with NF Airlines' unique culture is developed to improve transportation efficiency, enhance the competitiveness of NF Airlines' air cargo in the domestic and foreign aviation industry markets, enhance the business level of NF Airlines' aviation logistics, and provide certain assistance for its market expansion.

## **1.2 Research method**

### **1.2.1 SWOT analysis method**

The so-called SWOT analysis, which is based on the situation analysis of internal and external competitive environments and conditions, is to investigate and list various main internal strengths, weaknesses, and external opportunities and threats closely related to the research object, and arrange them in a matrix form. Then, using the idea of system analysis, various factors are matched and analyzed to draw a series of corresponding conclusions, And the conclusion usually carries a certain degree of decision-making. By using this method, comprehensive, systematic, and accurate research can be conducted on the scenarios in which the research object is located, and

corresponding development strategies, plans, and countermeasures can be formulated based on the research results. S (strengths) is an advantage, W (weaknesses) is a disadvantage, O (opportunities) is an opportunity, and T (threats) is a threat. According to the complete concept of enterprise competitive strategy, strategy should be an organic combination of what an enterprise can do (i.e. organizational strengths and weaknesses) and what it can do (i.e. environmental opportunities and threats).

The analysis characteristic of SWOT analysis method is based on structure and systematicity, organically combining the internal conditions of the institution with the external environment, and finally forming a regular structural matrix. Each part of the matrix is given different analytical meanings, enabling the institution to conduct more comprehensive and systematic analysis and research according to its specific situation, and then formulate development plans and strategies, More scientifically allocate one's own resources and actions to their strengths and areas with greater opportunities. However, the SWOT analysis method is mainly based on qualitative indicators, which results in subjectivity of the results and the analysis of the situation is not comprehensive enough. So, when using the SWOT analysis method, it is important to focus on an objective and comprehensive judgment basis, and combine it with some quantitative data for analysis. This article takes NF Airlines as the research object, comprehensively applies SWOT and AHP, considers internal strengths and weaknesses as well as external opportunities and threats, assigns weights to each factor, makes the results more scientific and reasonable, and obtains relevant development strategies and paths. (Yang 2022, 109-112.)

### **1.2.2 AHP analysis method**

Analytic Hierarchy Process (AHP), also known as Analytic Hierarchy Process (AHP), refers to a decision-making method that decomposes elements that are always related to decision-making into levels such as goals, criteria, and plans, and conducts qualitative and quantitative analysis on this basis. This method is a hierarchical weight decision analysis method proposed by Professor Sati of the University of Pittsburgh, an American operations research scientist, in the early 1970s, when studying the subject of "power distribution based on the contribution of various industrial sectors to national welfare" for the US Department of Defense, applying network system theory and multi-objective comprehensive evaluation method.

Analytic Hierarchy Process (AHP) refers to the systematic method of decomposing a complex multi-objective decision-making problem into multiple objectives or criteria as a system, and then decomposing them into several levels of multiple indicators (or criteria, constraints). By using qualitative indicator fuzzy quantification method, the single ranking and total ranking of the levels are calculated, which serve as the objective and multi scheme optimization decision-making

system. The Analytic Hierarchy Process (AHP) decomposes decision-making problems into different hierarchical structures in the order of overall objectives, sub objectives at each level, evaluation criteria, and specific alternative investment plans. Then, by solving the eigenvectors of the judgment matrix, the priority weights of each element at each level to a certain element at the previous level are obtained. Finally, the weighted sum method is used to gradually merge the final weights of each alternative plan to the overall objective. The one with the highest final weight is the optimal plan. (Xu 2022, 53-55.)

The principles and advantages and disadvantages of AHP Analytic Hierarchy Process. The Analytic Hierarchy Process (AHP) decomposes the problem into different constituent factors based on its nature and overall goal to be achieved, and aggregates and combines factors at different levels according to their interrelationships, influences, and membership relationships, forming a multi-level analytical structure model. Thus, the problem ultimately boils down to the determination of the relative important weights of the lowest level (solutions, measures, etc. for decision-making) relative to the highest level (overall goal) or the arrangement of the relative order of advantages and disadvantages.

The Analytic Hierarchy Process (AHP) has three advantages, namely a systematic analysis method, a concise and practical decision-making method, and less quantitative data information required. The systematic analysis method is reflected in the Analytic Hierarchy Process, which treats the research object as a system and makes decisions based on decomposition, comparative judgment, and comprehensive thinking. It has become an important tool for system analysis developed after mechanism analysis and statistical analysis. The idea of the system is to not cut off the influence of various factors on the results, while the weight setting of each layer in the Analytic Hierarchy Process will ultimately directly or indirectly affect the results, and the degree of influence of each factor in each layer on the results is quantified, very clear and clear. This method is particularly suitable for evaluating systems with unstructured characteristics and for evaluating systems with multiple objectives, criteria, and periods. The concise and practical decision-making method is reflected in AHP, which not only pursues advanced mathematics, but also does not one-sided focus on behavior, logic, and reasoning. Instead, it organically combines qualitative and quantitative methods to decompose complex systems, mathematically and systemize people's thinking processes, making it easy for people to accept. It can also transform multi-objective, multi-criteria, and difficult to fully quantify decision-making problems into multi-level single objective problems. After determining the quantity relationship between elements at the same level and those at the previous level through pairwise comparison, simple mathematical operations are performed. The calculation is simple and the results obtained are simple and clear, making it easy for decision-makers to understand and master. The lack of quantitative data information required is

reflected in the Analytic Hierarchy Process, which mainly starts from the evaluator's understanding of the essence and elements of the evaluation problem, and emphasizes more qualitative analysis and judgment than general quantitative methods. Due to the fact that Analytic Hierarchy Process (AHP) is a way of simulating people's decision-making process, it leaves the step of determining the relative importance of each element to the brain, retaining only the impression of the human brain on the element and transforming it into a simple weight calculation. This idea can handle many practical problems that cannot be solved using traditional optimization techniques.

However, the Analytic Hierarchy Process (AHP) also has several drawbacks, the first being that it cannot provide new solutions for decision-making. The role of Analytic Hierarchy Process is to select the better one from alternative solutions. When applying Analytic Hierarchy Process (AHP), there may be a situation where scholars' own creative ability is insufficient, resulting in scholars choosing the best solution among the many solutions that scholars have come up with, but the effectiveness is still not as good as what enterprises can achieve. For most decision-makers, if an analysis tool can help scholars analyze the optimal solution among the known solutions, then point out the shortcomings of the known solutions, or even propose improvement plans, then this analysis tool is more perfect. But obviously, the Analytic Hierarchy Process has not been able to achieve this yet. The second reason is that there is less quantitative data and more qualitative components, which are not easily convincing. In today's evaluation of scientific methods, it is generally believed that a science requires strict mathematical reasoning and comprehensive quantitative methods. But many times, the problems in the real world and the process of thinking about problems in the human brain cannot be simply explained by numbers. Analytic Hierarchy Process (AHP) is a decision-making method that simulates the human brain, therefore it inevitably has more qualitative colors. The third issue is that when there are too many indicators, the data statistics are large and the weights are difficult to determine. When scholars hope to solve more common problems, the number of indicators selected is likely to increase accordingly. The increase in indicators means that scholars need to construct deeper, more numerous, and larger judgment matrices. So scholars need to compare many indicators in pairs. Due to the fact that scholars usually use 1 to 9 to illustrate the relative importance of Analytic Hierarchy Process in pairwise comparisons, if there are more and more indicators, it may become difficult for scholars to judge the importance of each two indicators, and even affect the consistency of single ranking and total ranking in the hierarchy, making consistency testing impossible. If it cannot pass, it needs to be adjusted, which is difficult to adjust when there are many indicators. The final point is that the precise calculation of eigenvalues and eigenvectors is quite complex. When calculating the eigenvalues and eigenvectors of the judgment matrix, the method used is the same as that used by scholars in multivariate statistics. In the second and third order, it is relatively easy for scholars

to handle, but as the indicators increase, the number of orders also increases, making it increasingly difficult to calculate. Fortunately, this drawback is relatively easy to solve, and scholars have three commonly used approximate calculation methods. The first method is the sum method, the second method is the power method, and another commonly used method is the root method.

**Application of AHP Analytic Hierarchy Process.** When people systematically analyze problems in the fields of society, economy, and management, they often face a complex system composed of many interrelated and mutually constrained factors. The Analytic Hierarchy Process (AHP) provides a new, concise, and practical decision-making method for studying such complex systems.

The Analytic Hierarchy Process is mainly applied in the fields of safety science and environmental science. The main applications in safety production science and technology include coal mine safety research, hazardous chemical evaluation, oil depot safety evaluation, urban disaster emergency response capacity research, and traffic safety evaluation; The application in environmental protection research mainly includes: water safety evaluation, research on water quality indicators and environmental protection measures, research on ecological environment quality evaluation index system, and determination of pollution sources in aquatic wildlife protection areas. In addition, Analytic Hierarchy Process (AHP) can be more used to guide and solve problems encountered in personal life, such as choosing majors, jobs, and buying a house. By establishing a hierarchical structure and measuring indicators, work ideas and problem-solving levels can be clarified. (Huang 2022, 14-17.)

### **1.3 Thesis structure**

This paper first uses theoretical discussion to explain the development history and structural evolution of aviation logistics, and carries out SWOT analysis on the current situation of aviation logistics, and then uses practical cases to further analyze the operation of aviation logistics of NF Airlines under the environment. Use AHP analytic hierarchy process to compare and analyze the development status of aviation logistics, summarize the historical development law. The main research work and framework of this paper include:

Part 1 : Introduction. Starting from the current international and domestic aviation logistics environment, this paper briefly describes the research background and significance, explains and answers the research questions. Then the research method of this paper is explained in detail. This paper will use SWOT analysis method and AHP analysis method, and explain the concept, advantages and disadvantages of SWOT analysis method and AHP analysis method, as well as the application direction. Finally, the framework of this paper is defined and the research idea of this paper is determined.

Part 2 : This part will explain the theoretical framework of this paper. Firstly, the relevant concepts and business structure of aviation logistics are expounded, and then the definition of development path of aviation logistics is analyzed and explained. Then, by collecting and reading a large number of relevant materials at home and abroad, the research status of aviation logistics at home and abroad in recent years is summarized and analyzed. Finally, the theoretical basis of the research is analyzed and explained.

Part 3 : This part will introduce the aviation logistics of NF Airlines and explain the basic situation of NF Airlines.

Part 4 : This part is mainly to carry out research and analysis. SWOT analysis and AHP analysis are used to analyze aviation logistics of nf Airlines in detail. SWOT analysis is used to analyze the strengths, weaknesses, opportunities and threats that NF Airlines will face in aviation logistics. Then, the analytic hierarchy process (AHP) is used to evaluate the performance of NF Airlines on the four key factors, so that the key factors that have a greater impact on the aviation logistics of nf Airlines can be more intuitively analyzed.

Part 5 : Summarize and analyze the development path and future direction of aviation logistics of NF Airlines, and what aspects can be used to better improve its aviation logistics.

Part 6 : Discussion, reflection and summary of this paper's research on aviation logistics of NF Airlines. And a future-oriented outlook on aviation logistics of nf Airlines.

## **2 Theoretical framework**

### **2.1 Related concepts**

#### **2.1.1 Aviation Logistics**

Air logistics transportation refers to the process of logistics transportation of goods and mail using aircraft as carriers, and the circulation, transportation, and storage of goods from the shipper to the receiving location, which has economic and social benefits. The aviation logistics has systematically integrated various links such as cargo transportation, storage, dispatch, security inspection, handling, and delivery, forming a complete logistics supply chain, providing multi-functional and integrated aviation integrated logistics services for aviation freight forwarder and cargo owners.

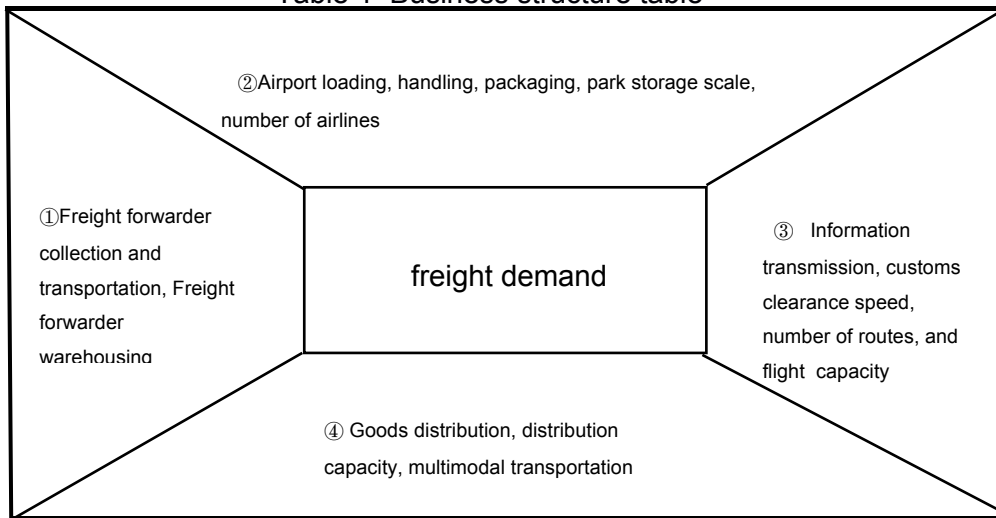
Usually, people equate air freight with air freight logistics. In fact, air freight logistics includes two major markets: air freight and air freight (express delivery). Air freight refers to the door-to-door, door-to-airport and airport to door transport between freight forwarder, cargo owner and carrier under a specific single contract. However, the scope of air mail (express delivery) must meet two conditions, and neither of them can be missing. First, the carrier should act as a comprehensive person. He should provide one-stop transportation services to the freight forwarder and the owner of the goods, and send mail (express) from the designated receiving place to the destination designated by the freight forwarder and the owner of the goods. The second is to have time constraints or to have accelerated products. This paper combines the actual situation of Shenzhen Airport and conducts extensive research on air freight logistics, including two categories: air freight and express delivery.

#### **2.1.2 Aviation logistics business structure**

Structure is a subsystem or component within a system or entity that exists in a certain form to ensure the normal functioning of the system or entity. For example, enterprises have their organizational structure, houses have their architectural structure, articles have their textual structure, and aviation logistics business also has its unique structure. From the origin of goods (mail) to their destination, they undergo different stages such as transportation, storage, loading and unloading, handling, distribution, and distribution. International air logistics places more emphasis on route coverage, customs clearance checks, and aircraft capacity, thus forming the entire business chain. Airlines, airlines, and others are all focused on meeting the needs of cargo transportation to the greatest extent possible, in order to achieve profits.

In the "Air Logistics Business Structure" diagram, from ① to ④, the purpose is to meet the demand for cargo transportation, that is, the demand for cargo transportation. Therefore, the purpose of air logistics business is to meet the demand for cargo transportation. After the emergence of cargo transportation requirements, the first step in the entire transportation chain is the collection and transportation of goods. If the goods to be transported cannot be transported immediately due to reasons such as excessive quantity or lack of aircraft, they must be stored; After the goods arrive at the airport park, they need to go through processes such as palletizing, packing, and handling before they can be successfully loaded onto the aircraft. At the same time, the size of the airport park and the number of airlines will directly reflect the freight volume of this station; The transmission of "on-site arrival" information, the exchange of information between loading and captain, the layout and density of routes, and aircraft capacity will have a direct impact on cargo carrying capacity, arrival speed, etc; After the goods arrive at the destination, it is the last link of the entire supply chain. After unloading, distribution, multimodal transportation, and finally reaching the hands of the shipper, this is the completion of freight demand. In short, to achieve freight demand, ① is the starting point, the foundation, ② ③ is the process, ④ is the endpoint, and is the result.

Table 1 Business structure table



**2.1.3 The Development Path of Air Logistics**

At present, there is no clear definition of the development path of aviation logistics. Through research on relevant literature, this article defines the development path of aviation logistics as the development direction selection or implementation measures taken by air cargo and mail in the entire circulation and transportation chain, with the main goal of obtaining economic or social benefits. The development path is not just determined by one or two factors, but requires comprehensive consideration of politics, economy, location, resources, information, and even

history in order to conduct a comprehensive, comprehensive, and systematic analysis and provide specific implementation plans. (Ye 2022)

The research on its development path is usually divided into two parts: one part is to choose a suitable development path for the subject according to their own needs, with a focus on how to choose; The second is to propose corresponding implementation methods based on the research objectives, with a focus on how to develop. The research object of this paper is the aviation logistics development model of NF airlines. This article is based on the study and research of literature and basic theories, and conducts a thorough analysis of the current development status, internal and external environment, and competitive situation of aviation logistics business. Combined with the experience of airport aviation logistics development at home and abroad, it evaluates the development stage of NF Airlines' aviation logistics. After clarifying the development goals, the final development path is determined, and implementation points and guarantee measures are proposed, Thus promoting the high-quality development of NF Airlines' aviation logistics business.

## **2.2 Academic support for the theory**

The development of aviation logistics abroad is rapid, accumulating a lot of experience in aviation logistics management and various possible risk response methods. Katayeva A believes that forecasting and inventory models for aviation logistics are essential in commercial aviation. Effective inventory management directly affects a company's financial savings, customer service levels, and product quality, playing a crucial role in the company's economic and strategic performance.

She-miao believes that international air logistics faces many risks due to the impact of uncertainty. How to identify and evaluate the risk level of each link has become a major issue in international aviation logistics management. On the basis of analyzing the causes of risks in international aviation logistics, a risk evaluation index system for international aviation logistics was constructed from the perspective of integrators, and the level of risk in each link was evaluated using Analytic Hierarchy Process. The effectiveness of this method was verified through typical cases. Research has shown that this method has certain application value for risk identification and assessment of international aviation logistics. (Cui 2023, 114-115.)

With the continuous development of China's air cargo industry, as a transportation carrier in the air cargo industry, NF Airlines is now facing significant development opportunities and challenges. As the latest development trend in the knowledge economy era, the Internet of Things has been applied to many fields. In this context, Zhao Shuping applied the Internet of Things technology to

the air cargo information management platform. Firstly, he introduced the theoretical basis of the Internet of Things technology, and then introduced the basic situation of the air cargo information system. Through a survey questionnaire, he analyzed the existing problems, Then, based on this, the demand for Internet of Things technology for air cargo information systems was analyzed, and the functional positioning, construction principles, and technical system architecture of an air cargo information management platform based on the Internet of Things were analyzed. Finally, starting from several key points involved in the air cargo information management platform, how to use Internet of Things technology to improve the operational efficiency of the air cargo information management platform was explored.

Cui Zhongfu believes that in order to adapt to the optimization and upgrading of residents' consumption, the adaptability of the aviation logistics service system to domestic demand should be improved in areas such as fresh cold chain and cross-border e-commerce, and the ability and quality of service supply should be improved. By better relying on the domestic market, global factors and market resources should be effectively utilized, and internal and external market connectivity should be more efficiently achieved. From the perspective of the market entities of aviation logistics, the participating entities are increasingly diverse, and aviation logistics products are entering markets with temperature, speed, and complexity characteristics. JD Airlines has officially put into operation, Huamao Logistics, a subsidiary of China Logistics Group, is preparing to build a cargo airline, while Xiamen Airlines is divesting its air cargo business and diversifying its equity. The mixed ownership reform in the civil aviation cargo sector is being deeply promoted. The aviation logistics products are becoming increasingly abundant. The origin of China Eastern Airlines Logistics has launched "sea air intermodal transportation" on the Chilean Chery sub project, making innovative breakthroughs in logistics solutions. China Southern Airlines Logistics has launched differentiated air freight products targeting major sources of cross-border e-commerce packages, flowers, aquatic products, electronic products, and general cargo. The allocation of aviation resources has been further optimized. Ezhou Huahu Airport has officially opened freight routes, and Cainiao has deployed six smart logistics hubs globally, operating over 3 million square meters of cross-border logistics warehouses. More than 240 charter flights are used for trunk transportation every month, establishing a high-quality global logistics network. Enterprises from different backgrounds such as freight forwarders, e-commerce, and express delivery have expressed their optimism about the huge market prospects of aviation logistics and increased their investment efforts, Layout key elements. The digitalization and intelligence level of aviation logistics is gradually improving. In order to provide convenient, multi-level, and personalized aviation logistics transportation services, aviation logistics enterprises have carried out intelligent upgrades in key logistics links and processes. Zhengzhou Airport has launched a

pilot program for electronic cargo transportation in aviation logistics, established a standardized system for aviation logistics, and built a cargo information service platform, thereby increasing the transit time of goods by 20%. Domestic aviation logistics digital service providers such as Yifei Ruite can provide customers with comprehensive solutions to achieve digital connectivity of personnel, equipment, goods, and venues in different operations such as tallying, outbound, and pickup. Unmanned handling technology and unmanned driving technology have begun to be applied in complex scenarios such as freight stations and airport logistics.

Zou Jianjun defined the system security of aviation logistics, which requires a clear understanding of the definitions of global value chain, industrial chain, and supply chain, as well as their relationships, especially the basic definition of supply chain stability. This article analyzes the system security of aviation logistics system from the perspective of supply chain security. Understanding Value Chain, Industrial Chain, and Supply Chain In 1985, Michael Porter proposed the concept of Value Chain while studying the competitive advantages of individual enterprises in vertically integrated group companies. (Zhan 2023, 52-54.)

Wei Xiayi believes that efforts should be made to build an aviation logistics hub center. The scarcity of airports at all times limits the development of the air cargo industry. The construction of cargo hubs can promote the division of labor and agglomeration of industries, and solve the plight of cargo airlines at all times. With the continuous construction of freight aviation hubs, China's air cargo supply side space is constantly being released, and the industry will also enter a period of rapid development.

### **2.3 Theoretical basis**

In 2003, James R. Stoke and Douglas M. Lambert put forward a related concept in their book *Strategic Logistics Management*, and put forward a concept of "logistics", that is, "logistics" refers to a supply chain process that is effectively planned, implemented and controlled to meet customer needs, and is an effective planning of goods, materials, material storage, services and related information "from the starting point to the consumption place" The process of implementation and control. In logistics management, there is a relationship of interdependence, cooperation, and mutual influence among customer satisfaction, company profits, and overall forces. Among them, customer satisfaction includes suppliers, intermediary customers, and end customers. For airport aviation logistics, these three aspects correspond to the cargo owner, airline company, freight forwarder and consignee. The company's profits include maximizing long-term profitability and the lowest total cost at an acceptable level of customer service. The former means maximizing profits and maintaining a long-term presence, while the latter aims to minimize cost expenditures as much as possible with customer recognition of the service. The overall force includes aspects such as

product, price, promotion, distribution, etc. It can be seen as the air logistics services provided, transportation and warehousing costs, measures taken to attract cargo owners, and distribution after the completion of air transportation. Logistics management plays a crucial role in the entire process of air logistics transportation. Therefore, the importance of logistics management cannot be ignored for both NF Airlines and other enterprises. It not only enables efficient matching and smooth integration of various logistics activities, but also relates to reducing costs and improving efficiency. (Wang 2021, 117-119.)

### **3 A brief introduction to NF Airlines**

NF Airlines was founded on March 25, 1995, and since its establishment, its headquarters has been located in Guangzhou, southern China. Nowadays, NF Airlines has become the largest airline in China, with the highest level of route improvement, annual passenger numbers, and number of flights. It is also the largest airline in Asia and ranks third in the world. At the same time, NF Airline has the fourth largest number of transport aircraft in the world and the largest number in Asia. It is also the first company in the world to have Boeing 787 Dreamliner and Airbus A380, which also proves that NF Airline is powerful and is one of the largest, most comprehensive and most powerful airlines in China.

Currently, NF Airlines is committed to creating a "friendly and refined" service concept that aligns with international standards, integrates with national culture, and highlights its own characteristics, creating a comprehensive and standardized service image that satisfies passengers, internationally recognized, passengers, employees, brands, and the international community. 'Affinity and precision' is the core of NF Airlines' service system and an important indicator to highlight the characteristics of China Southern Airlines. To achieve this goal, firstly, to demonstrate humanization in the service and make passengers feel 'human touch'; The second is to do a good job in management, making it more standardized and refined, enhancing brand identity, cultivating customer loyalty, and bringing passengers a brand new and high-quality service experience. By the end of the 13th Five Year Plan, NF Airlines will establish a large networked airline with international scale, an annual passenger throughput of about 160 million people, and a cargo volume of over 2 million tons. (Huang 2021, 114-115.)

## 4 Carrying out the study

### 4.1 SWOT Analysis of Air Logistics for NF Airlines

Table 2 SWOT analysis table

Strengths	Weaknesses
<ol style="list-style-type: none"> <li>1. Adequate talent in aviation logistics</li> <li>2. Infrastructure improvement</li> <li>3. Close cooperation with major companies</li> <li>4. Strong brand effect</li> <li>5. Excellent core culture of corporate strategy</li> </ol>	<ol style="list-style-type: none"> <li>1. It is greatly influenced by objective factors such as weather and has strong uncontrollability</li> <li>2. Low visibility of shipping</li> <li>3. Weak contact with the government</li> <li>4. High transportation threshold</li> <li>5. Long talent cultivation cycle</li> </ol>
Opportunities	Threats
<ol style="list-style-type: none"> <li>1. The market demand for aviation logistics services is high</li> <li>2. National policy support</li> <li>3. Low level of competition in the domestic market</li> </ol>	<ol style="list-style-type: none"> <li>1. Poor macroeconomic environment</li> <li>2. Increased cost of raw materials such as fuel</li> <li>3. Fast speed of scientific and technological updates</li> </ol>

#### 4.1.1 Strengths

NF Airlines is the airline in China with the most transport aircraft, the most developed route network, and the largest annual passenger volume. NF Airlines has rich experience in air transportation and a professional air transportation team, capable of providing high-quality logistics services. And NF Airlines has modern logistics facilities and advanced information technology systems, including air freight centers, bonded logistics parks, automated freight hubs, etc. These facilities and technologies can improve the efficiency and quality of logistics services. Moreover, NF Airlines has established close cooperative relationships with domestic and foreign airlines and logistics companies, providing customers with diverse logistics solutions. These partners can provide a wider logistics network and higher quality logistics services. Finally, NF Airlines is one of the

largest airlines in China, with a strong brand influence and customer base. This can help the company attract more customers and business, and increase market share. And in the process of implementing strategic transformation at NF Airlines, the Party Group of NF Airlines believes that the corporate culture as a conceptual form has an important guiding, penetrating, and cohesive role, and the transformation process of the enterprise is also the process of forming and improving a new corporate culture. Corporate strategy reflects the company's purpose and core values, and is a reflection of corporate culture. Similarly, achieving strategic goals requires the guidance and support of excellent culture. These rich air transportation experiences, modern logistics facilities, close cooperative relationships with major companies, strong brand influence, and excellent corporate strategic core culture are all advantages of NF Airlines in air logistics transportation. (Yang 2022, 109-112.)

#### **4.1.2 Weaknesses**

The efficiency and quality of logistics services may be affected by weather, transportation, and other uncontrollable factors. Among them, weather has the greatest impact, such as low cloud weather, which greatly affects the safety of aircraft air transportation. In addition, the pressure state of the air during air transportation can also have an impact, and in severe cases, it can even lead to accidents, as well as ice accumulation, visibility, temperature, thunderstorm weather, and so on. In air transportation, meteorological factors are important factors that affect aviation flight safety. In addition to these objective disadvantages, NF Airlines also has some subjective disadvantages. For example, compared to some professional air logistics transportation companies, NF Airlines' shipping awareness is not high enough, affecting market share. Another issue is the weak communication and cooperation relationship between NF Airlines and the government and institutions, resulting in limited infrastructure and policy support for aviation logistics operations, making it difficult to obtain market information. (Xu 2022, 117-119.)

And currently, the threshold for air logistics transportation is very high, and NF airlines also have disadvantages in terms of qualification barriers, financial barriers, and talent barriers. In terms of qualification barriers: The aviation logistics industry belongs to the government's franchise management industry, and the government implements strict management systems for business licenses of public air transportation enterprises. The Civil Aviation Administration strictly controls the number of newly established airlines, making it extremely difficult to obtain operational qualifications. In terms of financial barriers: The aviation logistics industry is a capital intensive industry. The initial investment is relatively large, and the layout of logistics network, construction of warehousing facilities, transportation equipment, and personnel cultivation all require a large amount of investment. Daily business activities such as purchasing aviation fuel, aircraft

maintenance and repair, and logistics support have raised financial barriers in the later stage. In terms of talent barriers: The aviation logistics industry involves supply chain management, operational planning, cross-border logistics, cold chain logistics, and other fields, with a high demand for high-quality professional and versatile talents. The guarantee of flight safety relies on high-quality pilots and maintenance personnel, who require long-term training and practical operation. (Xi 2021, 98-101.)

#### **4.1.3 Opportunities**

With the current economic growth and the increase in foreign trade, the consumption level of residents is constantly improving, and the demand for logistics services will also increase accordingly. NF Airlines can meet this demand by providing high-quality logistics services, thereby gaining more business and market share. And in the future, multiple policies will be introduced to support the development of the aviation logistics industry. The Civil Aviation Administration proposes to expand the international and popular aviation market space, with a focus on expanding the international aviation market, promoting the popularization of aviation services, exploring the aviation logistics market, and expanding the modern comprehensive transportation service space. Comprehensively improve the quality of aviation services, build a large network airline with strong international competitiveness, with a focus on creating world-class super carriers, creating a global aviation logistics enterprise, and cultivating diversified aviation market entities. These policies will strongly support the development of the aviation logistics industry, and NF airlines can use these policies and measures to promote their own development. Moreover, the current level of competition in China's logistics market is relatively low, and NF Airlines can gain more market share by providing better logistics services. These are opportunities that NF Airlines can compete for. (Wang 2021, 117-119.)

#### **4.1.4 Threats**

The development of the aviation logistics industry is closely related to the development of the national economy. In recent years, due to the transformation of economic structure and the impact of trade frictions between China and the United States, there have been more uncertain factors in China's macroeconomic development, and the GDP growth rate has increased. The tightening macroeconomic situation has put pressure on the growth rate of social retail sales, which has had an impact on the overall development of the aviation logistics industry. The development of aviation logistics for NF Airlines will also be affected. Moreover, fuel accounts for a relatively high proportion of the operating costs of airlines. Once fuel prices fluctuate significantly, NF Airlines' air logistics transportation will be greatly affected. Moreover, the current speed of scientific and technological updates is fast, and the market is also fluctuating rapidly. In this fast-paced era, NF

Airlines still needs to strengthen its scientific and technological research and development in order to stand firm in the volatile market. (Wang 2021, 117-119.)

## 4.2 AHP Analysis of Air Logistics for NF Airlines

### 4.2.1 Establish a hierarchical model

Based on the results of the SWOT analysis above, the internal and external environment of the aviation logistics development of NF Airlines is analyzed, and the AHP analytic hierarchy process is used here. Taking the aviation logistics development strategy of NF Airlines as the target layer, the four influencing factors of external environment, brand awareness, strengthening cooperative relationships, and R&D science and technology as the criterion layer, and the degree of influence of factors as the bottom layer, a hierarchical structure model is constructed based on this.

Table 3 AHP evaluation model

Target layer(Objective)	NF Airlines' Aviation Logistics Development Strategy			
Criterion layer (Factors)	External environment	Brand awareness	Strengthen cooperative relationships	Research and development of science and technology
Bottom layer(Result)	Value of factors			

### 4.2.2 Construct a judgment matrix and assign values

Using the 1-9 scale method proposed by Sati, experts in the field of aviation logistics judge and score each constituent factor based on practical experience, and construct a pairwise judgment matrix.

Table 4 evaluation of AHP matrix

	External environment	Brand awareness	Strengthen cooperative relationships	Research and development of science and technology
External environment	1	1/3	0.5	0.5
Brand awareness	3	1	0.5	1
Strengthen	2	2	1	1

cooperative relationships				
Research and development of science and technology	2	1	1	1

Table 5 Expert in the field of aviation logistics

1	Director of General Aviation Industry Research Center, BJ Aerospace University
2	Vice President of General Aviation Industry Promotion Branch of China Communications and Transport Association
3	Senior expert of market center of Commercial Aircraft Corporation of China
4	Director of Aviation Logistics High Quality Development Research Institute of HN Airport Group
5	Director of Strategic Planning Office, Civil Aviation Science and Technology Academy of China

As shown in the above table, five experts in the field of aviation logistics were selected to assign scores to these four constituent factors, and then the highest and lowest scores were removed. The remaining assigned scores were averaged to obtain the data in the above table. From the above table, it can be seen that brand awareness is more important for the transportation situation of airlines' aviation logistics compared to the external environment, strengthening cooperation relationships, and researching and developing science and technology. Furthermore, strengthening cooperation relationships is more important compared to researching and developing science and technology.

#### 4.2.3 Calculate weight vector

Research on AHP Analytic Hierarchy Process by Using the Sum Product Method

Table 6 AHP Analytic Hierarchy Process Results

term	feature vector	Weight value	maximum eigenvalue	CI value
External environment	0.511	12.786%	4.118	0.039
Brand awareness	1.058	26.454%		
Strengthen cooperative relationships	1.331	33.265%		
Research and development of science and technology	1.100	27.495%		

From the above table, we can see that a total of four items, including external environment, brand awareness, strengthening cooperation, and research and development of science and technology, were constructed to construct a 4-order judgment matrix for AHP hierarchical analysis (calculated using the sum product method). The eigenvectors obtained were (0.511,1.058,1.331,1.100), and the corresponding weight values of the four items were: 12.786%, 26.454%, 33.265%, and 27.495%, respectively. In addition, by combining the feature vectors, the maximum feature root (4.118) can be calculated, and then the CI value (0.039) [ $CI=(\text{maximum feature root } n)/(n-1)$ ] can be calculated using the maximum feature root value. The CI value is used for consistency testing as follows.

#### 4.2.4 Consistency check

When we use the Analytic Hierarchy Process (AHP) to calculate weights, consistency testing is required. Consistency testing requires the use of two indicator values, CI and RI. However, the CI value has been calculated, and the RI value can be obtained by querying in the table below. The RI value is the data used for consistency test. It is the average value obtained by scientists from 500 sample tests.

Table 7 Random Consistency RI Table

N-order	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RI	0.52	0.89	1.12	1.26	1.36	1.41	1.46	1.49	1.52	1.54	1.56	1.58	1.59	1.59

value														43
N-order	17	18	19	20	21	22	23	24	25	26	27	28	29	30
RI value	1.6064	1.6133	1.6207	1.6292	1.6358	1.6403	1.6462	1.6497	1.6556	1.6587	1.6631	1.6670	1.6693	1.6724

The judgment matrix constructed in this study is a 4th order judgment matrix, which corresponds to the random consistency RI value of 0.890 obtained from the above table. Therefore, consistency testing can be carried out next.

Table 8 Summary of consistency inspection results

Maximum characteristic root	CI value	RI value	CR value	Consistency inspection results
4.118	0.039	0.890	0.044	pass through

Generally, the smaller the CR value, the better the consistency of the judgment matrix. Generally, if the CR value is less than 0.1, the judgment matrix meets the consistency test; If the CR value is greater than 0.1, it indicates that there is no consistency, and the judgment matrix should be adjusted appropriately before further analysis. The CI value calculated for the 4th order judgment matrix is 0.039, and the RI value is 0.890. Therefore, the CR value calculated is  $0.044 < 0.1$ , indicating that the judgment matrix in this study meets the consistency test and the calculated weights have consistency. (Xi 2021, 102-105.)

#### 4.2.5 Strategic Analysis

Based on the comprehensive SWOT and AHP analysis results, it can be concluded that the weights of SO, ST, WO, and WT strategies are 0.39, 0.54, 0.46, and 0.61, respectively. Therefore, the strategic ranking for NF airlines to develop aviation logistics should be WT defense strategy > ST adjustment strategy > WO reversal strategy > SO development strategy.

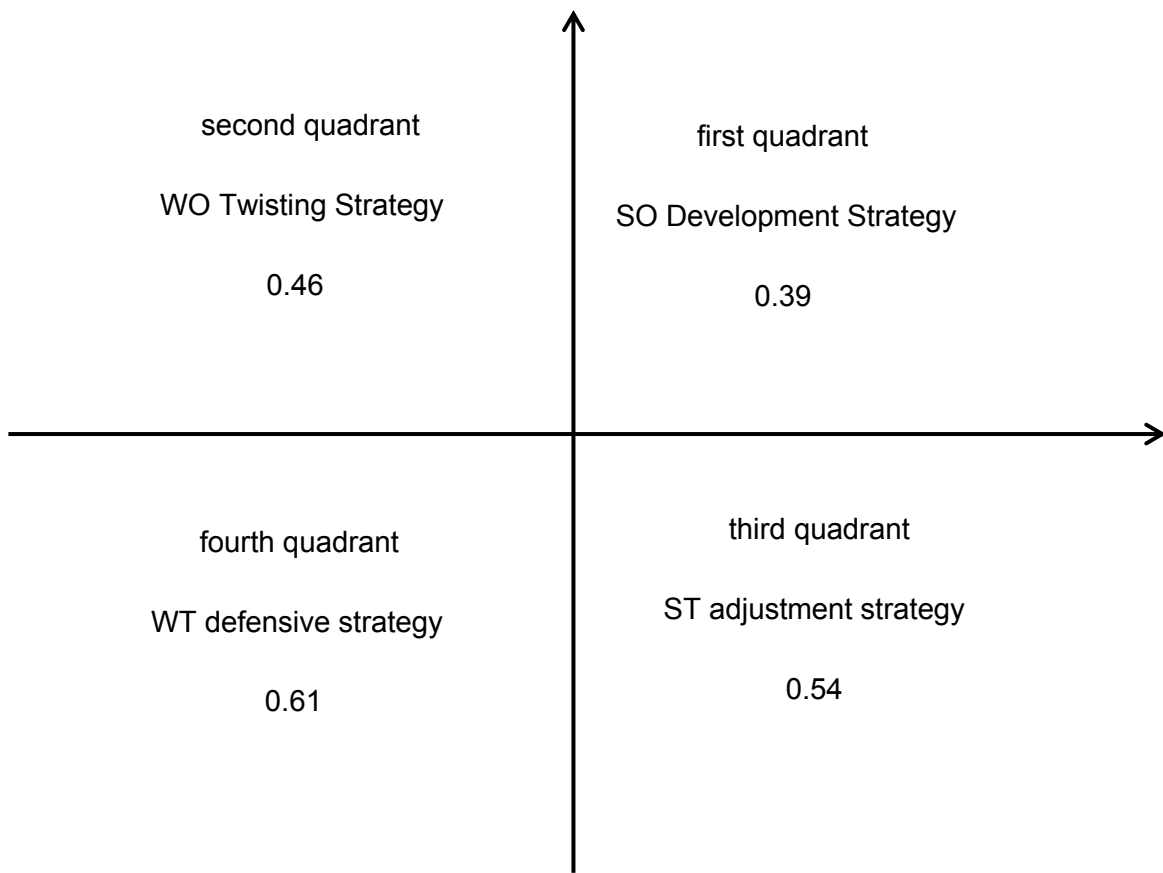


Figure 1 Strategic Selection Coordinate Map

## **5 Results**

Seek the development path of aviation logistics of NF Airlines. This time, AHP is used to analyze the aviation logistics situation of NF Airlines. By constructing the external environment, brand awareness, strengthening cooperative relationship, and developing the fourth order judgment matrix of the four influential factors of science and technology, it is found that among the four influential factors, The influence of brand awareness on the aviation logistics of NF Airlines is more important, followed by the influence of strengthening cooperative relations on the aviation logistics of NF Airlines, and then the degree of influence of R&D science and technology and the external environment is not different.

### **5.1 Seeking government policy support**

NF airlines should actively communicate with the government, allowing the government to formulate a high-level aviation logistics industry development plan with forward-looking, systematic, and scientific standards based on the general laws and characteristics of aviation logistics operation from the perspective of the entire industry chain. In terms of finance, land, franchising, talent introduction, etc., actively apply to the government for more aviation logistics support policies, and at appropriate times, dynamically adjust industrial policies based on NF Airlines' competitive advantages in aviation logistics at different stages, in order to create a good operating environment for the development of aviation logistics in the airport. Actively communicate with the government to establish a special development fund for air freight, and refer to the subsidy amount for aviation development funds in surrounding cities to significantly increase financial support, providing financial support for the expansion of freight routes, especially international routes, and the construction of airport freight facilities. Actively communicate with the government to obtain a license for international cargo business, fully utilize the advantages of airports like NF Airlines, and develop international air logistics.

### **5.2 Enhance brand awareness**

According to the research results, it is analyzed that if NF Airlines wants to better develop aviation logistics, they need to expand their brand influence, establish their reputation among professional aviation logistics transportation companies, and improve their visibility. Only in this way can they occupy more market share, which is conducive to the development of aviation logistics. NF Airlines is the largest airline in China, which has accumulated a large amount of user data in its operations, providing a very important basis for enterprises to improve their operational level and service quality. Beihang needs to use big data to analyze the dynamics of the Hainan market, flexibly adjust its sales strategy, accurately position the market according to customer requirements,

launch products, carry out precise marketing, and improve operational efficiency; At the same time, with a focus on service work, we will do a good job in collecting, analyzing, and making decisions on data from various channels, identify the pain points of passengers and their own shortcomings, and improve the service to enhance the customer experience. The explosive development of social media has led to the rapid decline of traditional media. Nowadays, social media has become the information center with the largest amount of information, the fastest dissemination speed, and the widest range of voice groups in the entire network. The official social media accounts of enterprises have played an increasingly important role in marketing, customer service, and public relations maintenance. NF Airlines needs to effectively integrate the company's WeChat official account, enterprise Weibo and other social media accounts, unify management, develop novel and interesting marketing plans with strong interaction, and make full use of the advantages of the Internet's rapid and extensive participation to accelerate the market spread of products. Maintain account activity, centered around industry information and knowledge, with appropriate high-quality information, expand fan base, customer base, and promote the company to the outside world, spreading company culture; Strengthen the connection with company customers and active fans, and use social media to facilitate interaction to narrow the distance with customers, making social media an important communication channel for NF Airlines' customers.

### **5.3 Strengthen cooperative relationships**

NF Airlines can adopt the development model of "aviation logistics company+hub", leveraging SF Express's early cooperation with all cargo aircraft at the airport, introducing SF Express to participate in the airport's aviation logistics planning, construction, and operation, and guiding SF Express to use the airport as a transit and distribution center, fully leveraging its advantages in the size and capacity range of all cargo aircraft fleet, and further integrating routes and cargo, Establish a complete supply chain, form an axial radial route, and establish a comprehensive distribution center, warehousing, distribution, and transportation functions. By optimizing logistics organization methods, quickly improve the operational efficiency of airports, transform from "on-site" to "door-to-door" modern airport logistics services, and promote the development of airport and airport related industries, Form a pattern of "big hub, big logistics, and big industry" to promote the development of airport logistics industry in airport areas.

NF Airlines should take the lead in promoting the construction of an aviation logistics industry alliance that connects the upstream and downstream of the industry chain. It should fully leverage the coordination, guidance, and service roles of the alliance, explore, expand, and integrate aviation logistics resources, form a joint force, develop together, and create an influential and competitive large-scale comprehensive logistics group and aviation logistics service brand. To

establish a public information platform that can provide services for the entire industry, establish a one-stop information release channel for logistics orders, goods tracking, multimodal transportation, and provide a query window. We should actively promote information sharing and standardization among airports, freight forwarders, freight stations, and airlines, so that information resources can be shared among different entities, thereby achieving the goal of reducing social circulation costs and enterprise management costs. Support various air freight enterprises and their upstream and downstream enterprises to transform from a single carrier to a logistics integrator, provide customers with high-quality services from air to land to hand, enhance the logistics integration capabilities of "one-stop" and "door-to-door", promote the development of air freight towards modern air logistics that integrates transportation, warehousing, loading and unloading, processing, packaging, distribution, and information processing, and enhance the core competitiveness of the industry.

#### **5.4 Improve technological level**

By aligning with international standards and strengthening the application of new technologies, the efficiency, accuracy, and safety of logistics have been greatly improved, reducing costs. We need to vigorously promote radio frequency identification technology, change the current paper-based office system, optimize and simplify freight processes, and promote electronic tracking and automatic tracking functions. Build a logistics big data platform that connects various logistics entities such as customs, airports, airlines, freight forwarders, and logistics companies, actively providing customers with more convenient services. Firstly, before goods arrive, perform one click customs clearance online, and then use the airline's order code to promote "one order to the end". The second is to connect with major transit trains, trucks, cargo ships, etc. to achieve electronic transportation. Through big data platforms, according to users' preferences in terms of economy, timeliness, etc., provide optional information such as freight forwarders and logistics companies, and register them electronically for pre loading, greatly saving time in handling procedures and automatically identifying arrival times; The third is to use big data to automate services by analyzing data such as processing time and complaint frequency in each link. Through docking with internationally renowned aviation logistics companies, data and experience can be shared, thereby continuously improving service quality and ultimately achieving the goal of convenience, efficiency, and low cost.

## 6 Discussion

Through the above analysis, this paper concludes that the actual situation of aviation logistics of NF Airlines is not well developed. Through SWOT analysis, it is concluded that NF Airlines needs to continue to expand its brand influence, update more modern infrastructure, and improve its service quality, so as to develop aviation logistics. Through the further study of AHP, the importance of four factors to the development of aviation logistics is obtained, namely, the external environment, brand awareness, strengthening cooperative relations, research and development of science and technology. Therefore, NF Airlines can innovate and improve the development of its aviation logistics through the above methods.

As a logistics model, aviation logistics has significant characteristics of convenience and speed, but the types and scale of transportation that aviation logistics can transport are limited. Aviation logistics can develop towards industrialization, and the industrialization of aviation logistics means that the development mode of aviation logistics will deepen in a vertical direction, forming a work operation mechanism that cooperates and cooperates with other logistics models, Maximize the effectiveness and functionality of aviation logistics.

Moreover, on the international route, aviation logistics should also focus on the development of high-end logistics. Due to the different consumer groups, the markets that logistics should cater to should also be differentiated. In the trend of internationalization, attention to the international market can be segmented into high-end users as a special group for aviation logistics. It can be said that aviation logistics has extremely unique advantages in occupying this market, and this significant feature can widen the gap between aviation logistics and other logistics models. This is a unique advantage of aviation logistics. To better promote the development of aviation logistics, it is necessary to expand this advantage and use it as a breakthrough to truly fully utilize the advantages of aviation logistics and achieve further development of aviation logistics.

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