Optimization Analysis of Airline A's Catering Supply

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Abstract

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Airline meal supply service is the main component of airline commercial services, which can indirectly reflect the service quality and development model of an airline. A good dining experience can increase customers' flight experience and indirectly bring more profits to the company. Airline meal supply services not only include literal catering services, but also include offline supply and production, distribution and transportation, management decision-making, and other contents.

The purpose of airline A is to continue to excel in the post pandemic civil aviation market, maintain existing customers, attract more potential customers, explore emerging markets, and achieve maximum economic benefits. In this article, I will conduct research on the catering industry of airline A as the main object. Based on this, my main research question is how to help airline A find the most suitable food supplier. Secondly, I will conduct a specific analysis of the selected partners and their solutions, and optimize the existing catering supply system of airline A. By establishing an AHP model, the leadership is assisted in selecting more excellent suppliers. SWOT analysis combined with offline research is used to assist in analyzing the model structure, testing the reliability of model data and conclusions, and ultimately helping airline A clarify its future development direction.

Key words
food supply of airline；emerging market；AHP analytic hierarchy process；SWOT

Table of contents

1 Introduction

Nowadays, airlines have been continuously developing towards a path of diversified charac-teristics, and major airlines are starting to develop their own characteristic "industries". Simi-larly, airline A, located in the southwest region, is discussing how to make the next decision with its aviation catering service as its flagship. The thesis aims to first assist airline A in selecting the most suitable food supplier, and then optimize the selected food companies and their solutions to boost service reputation and profits. Finally, it provides a rough predic-tion of airline A's future development direction.

1.1 Background of the topic

The aviation catering industry is an important advantageous industry in civil aviation trans-portation, and has a unique industry monopoly advantage in the "air economy". In recent years, significant progress has been made in the construction of civil aviation infrastructure, and the volume of air transportation has continued to grow rapidly. As an important basic industry of the national economy, the role of civil aviation has become increasingly promi-nent. However, with the continuous development of the entire industry and the upgrading of market consumption, people's growing demand for air travel has gradually been reflected in the high attention and expectations of passengers for onboard meal services. Therefore, the trend of differentiation in passenger demand for onboard meals has forced airline food companies to constantly innovate in improving meal services.

The main business components of airlines include ticket sales, freight business, advertising revenue, and onboard additional services. Among them, airline meal services are an im-portant part of achieving airline business profits, and good meals will indirectly attract more repeat customers and gold card users. The quality of an airline's meals largely affects cus-tomers' overall impression and reputation of the airline, so if we want to maximize the quali-ty of the airline's meals within a limited budget, the supply chain process is inevitably an important link. The supply chain process of airplane food mainly refers to the production and transportation process of airplane food, in addition to packaging and other costs. As the production and transportation costs play a dominant role in this process, I will focus on these two points and study them in this article. The civil aviation industry started to promote in the last century. After experiencing rapid development in the last decade, it has now en-tered the stage of medium speed development. The spread of the COVID-19 has also indi-rectly led to a slowdown in the growth of the aviation industry. Under the influence of the COVID-19, airports, airlines and airline catering enterprises have all suffered unprecedent-ed heavy losses, which have led to difficult development. In addition, in recent years, the homogenization of airline development has been severe, and competition has continued to intensify. Especially

after the aviation market has opened up to private capital, the aviation catering industry is increasingly facing pressure from airlines and passengers: personalized customer needs, shortened delivery times, increased cost pressure, and improved product quality and service requirements. Shortening the development cycle of products, improving the quality of catering, and reducing catering costs through supply chain cooperation has become the most concerned issue for catering companies. Supplier management is an important part of supply chain management. With a good supplier management system, it can effectively stabilize and improve the quality of meal preparation, achieve the company's quick response ability, and thus win more customers in the fierce market competition.

1.2 The objective of the research and research questions

The purpose of this project is to understand the overall development model of airline meal service system, and to summarize the shortcomings of Company A's development in this area. Optimize the delivery process of airline meals, and select the best partners from several reference suppliers for cooperation. Make aviation catering as popular as possible, win market favor. Finally, a certain degree of prediction is made for the future development of the aviation food distribution field. The main research question of this article is how to help airline A choose the best cooperative supplier, and the secondary research question is - What are the challenges in the development of food catering industry of airline A and how to solve them? In which way can we further improve the catering service level of airline A?

1.3 Research content and route

Airline A also faces many challenges after the epidemic, and its existing cooperative supply system is difficult to keep up with the market. Therefore, we need to help airline A select the most suitable aviation food supplier, so that airline A can continue to stand firm in the emerging aviation market.

Key content: Understand the current mainstream airline meal service content and meal de-livery process, and then compare the differences and reasons between airline A's existing meal delivery model and other airlines. Understand the main meal supply partners of airline A, learn and use AHP Analytic Hierarchy Process in this case to select the best partner based on the calculation results, through the result and market reaction to optimize the existing delivery plan. The optimized plan needs to pass market testing to see if it can meet the expected standards. Finally, make a rough outlook and prediction for the future development of aviation catering supply.

Implementation approach: Firstly, search for food service content through the official web-sites of major airlines to understand the characteristics and differences of major airline food types, with a focus on understanding the characteristics of A airline's food types. Combining the company's

philosophy and geographical location, analyze the reasons for such a com-bination of food. Analyze the advantages and disadvantages of Airline A's meals compared to other major airlines using a comparative approach. To improve the quality of airline meals from the source, it is necessary to check the contracts signed between A Airlines and external airline food suppliers. From several suppliers who have already signed contracts, the AHP analytic hierarchy process is used to gradually calculate the most suitable supply partners for A Airlines' development based on cost estimation, transportation mode, and trans-portation path as three major standards. Select the best supplier, conduct on-site inspections of the supplier's production base, production process, and distribution mode, identify areas where the supplier's food supply system can be optimized, and carry out improvements and upgrades. The theoretical improvement plan alone is not enough to verify its feasibility in the market. SWOT analysis method, combined with external environmental factors, market feedback, and passenger evaluation are also needed, Comprehensively analyze whether the plan meets market expectations, aligns with the overall development philosophy of airline A, and whether it is feasible for long-term implementation. Finally, by summarizing the case and combining with the development focus of the aviation industry in recent years, analyze and predict the trends and directions of future aviation catering, and finally make a rough outlook for the future development of aviation catering.

2 Overview of the theory of airline food supply chain

The development of the aviation food catering industry has gone through decades of devel-opment and it has shown different development characteristics. Next, I will use theoretical references to introduce the general development overview of this industry.

2.1 Context with global development of airline food supply

Nowadays, there are the following trends in the concept and development model of airline meal services both domestically and internationally. Throughout the world, low-carbon travel has become a consensus among businesses and individuals, and the Global Aviation Association is also advocating for green flight, internalizing the concept of environmentally friendly travel in mind and externalizing it in action. Intended to achieve the planned targets through carbon compensation, achieving a harmonious unity of social and economic benefits. Developed countries in Europe and America, which first proposed this concept, have put it into practice, especially in the Nordic region, which has implemented environmental protection concepts to the heart. The application of carbon compensation in the economy has now been extended to the surrounding aviation industry, and is no longer simply limited to the implementation of this plan in the aviation industry. At the same time, their application in food has also achieved significant results. Firstly, they have made food supply tools environmentally friendly and prevented excessive packaging, Adhere to the principle of moderation. The tableware adopts recyclable technology, which to some extent avoids resource waste and effectively reduces supply costs. In modern society, with the development of network information, the ways of purchasing air tickets have become increasingly diverse. With the increasing number of discounted air tickets, more and more tourists and business travelers are willing to choose air travel when traveling. In recent years, economic globalization has led to increasingly close connections between countries around the world, sparking a wave of cross-border tourism worldwide, The development of the aviation food industry has also attracted more attention from enterprises. A small airplane meal may seem small, but it has all the five organs, but it is not much different from a meal eaten on the ground. But in fact, the combination of airplane meals has subtle principles that you can't imagine. When people are in the air, there may be some physiological and psychological changes. Therefore, the selection of airplane meals must take into account people's state on the plane, pay attention to the combination of meat and vegetables, and try to eat as little greasy meat as possible to maintain a good and comfortable flight state.

Compared to developed countries in Europe and America, although China's aviation food industry started relatively late, its development momentum is rapid. In recent years, despite the relatively sluggish growth rate of global aviation catering, the growth rate of China's aviation market remains stable. Apart from the impact of the COVID-19 epidemic, it is expected to continue to grow in the

next few years. So in recent years, the rapid growth rate of sales in China's aviation food industry in developing countries is evident. However, with the increase in raw material costs and the intensification of enterprise homogenization, there is also a trend of increasing costs within China's aviation food industry, which poses a huge challenge for airlines that want to provide customers with a better flight experience. While the aviation food industry is developing rapidly, people are gradually becoming aware of potential crises. Nowadays, European and American countries have achieved remarkable results in their practice in this field, and how China should explore a reasonable catering plan has become an urgent problem to be solved. (Aviation World 2020, 13-16)

2.2 The theory of airline food supply process

The supply chain process of airline meals mainly consists of the following aspects: food plan planning, food procurement, food processing and production, food transportation, and delivery. Firstly, the airline will develop relevant plans and agreements with food companies to discuss specific supply matters, such as what kind of food the airline needs the food company to produce and what types of requirements it has. According to the requirements of airlines, food manufacturers need to provide several options for customers to choose from, and then discuss whether improvements are needed in the selected options. After obtaining the supply plan, formulate a procurement plan. During the procurement and production process, food manufacturers need to strictly adhere to the food standards of Air Company A, and the food quality must meet the national food safety standards. After the production is completed, it needs to undergo acceptance before being transported to the airport. After classification, it is distributed to flight passengers according to their needs. In terms of food classification, airplane meals can generally be divided into cold and hot meals, as they require different transportation and production methods, requiring separate packaging and delivery. Hot meals require independent insulation packaging and transportation to ensure taste. Solid packaged cold food that requires inflation and expansion should be carefully prevented from being squeezed during transportation to avoid air leakage, bag expansion, and other situations. During the loading and unloading process of food, it is necessary to pay attention to the proper operation of the staff, pay attention to internal and external cleanliness, and avoid affecting the appearance and taste of the food. Special food refrigeration or insulation vehicles need to be used according to the type of food during transportation to ensure quality. Considering the special timeliness of airplane meals during transportation, the company should plan a dedicated transportation route for vehicles to facilitate transportation. Before the vehicle runs, it should be checked whether the food on the vehicle is fully loaded and whether the edge reinforcement measures are complete and correct. It is necessary to ensure that the food remains stable during transportation and prevent spillage. The packaging of machine meals should also follow international environmental standards and be as simple as possible for food packaging, saving costs while maximizing the

recycling and utilization of packaging, achieving the unity of social and economic benefits. (Ye Xiaoqin 2008, 78-82)

3 Introduction of the current situation of airlines' catering supply

In this chapter, I will provide a brief introduction to the overview and food supply status of airline A for future analysis.

3.1 Overview of airline A

Airline A, headquartered in Chengdu, is a large domestic airline established less than 20 years ago. The airline has subsidiaries in major cities across the country, covering more than 80 major cities. It has developed from a few backbone routes at the beginning to a large state-owned airline with over 200 backbone and branch routes running side by side. Airline A has attracted a large number of gold card customers with its excellent development strategy and unique service philosophy, and has recently been awarded the "Best Service airline". Therefore, it can be said that airline A is one of the most distinctive airlines in China. Airline A focuses on showcasing strong Chinese elements in its brand design philosophy. Firstly, the team uniform is mainly colored in traditional Chinese red, with a small panda doll pinned to the chest at the left end of the collar. The unique cultural output is impressive. Secondly, the emblem of airline A is a sea swallow, with its unique image of striving to soar and fearless of hardships, which closely aligns with the upward spirit of the company's staff. The circle represents the vast earth, and the four waves below the sea swallow symbolize the scene of a hundred rivers flowing into the sea and a surging current. It corresponds to the core value concept of fearlessness and lofty aspirations, symbolizing airline A taking off from the inland, absorbing the firmness and stability of land civilization and the vastness of ocean civilization, building a profound strategic layout that spans land and sea, facing the world, and erecting air bridges that cross China and foreign countries. In addition to the soaring sea swallows, the red background in the icon of airline A symbolizes the local culinary culture characterized by spicy and spicy flavors. The cooking recipe is often supplemented with mahjong flavors such as chili peppers, constantly reflecting the importance of catering services in the development process of airline A. Besides, through visits, surveys, and personal travel experiences, it is not difficult to find that airline A has a much higher frequency of setting up meals on their flights than other airlines. Generally, airlines only provide corresponding meals during meal time to save costs, while non meal time flights only provide snacks such as fruit and bread or even no meals. However, Airline A is very humanistic in this respect. Even in non meal time, it will also provide a rich catering experience, such as providing snacks and snacks unique to the province where Airline A is located, exquisite matching Dim sum, and local unique drinks and beer. The main food choices provided during meal time are more dazzling, including carbon water noodles, western food, and Chinese set meals, As far as possible to meet the needs of food culture of people in all regions and increase the sense of passengers' flight experience, airline A is definitely the leader in the Chinese

aviation industry. However, airline A is able to achieve industry-leading food service standards, which undoubtedly relies on excellent food supply solutions. Therefore, I will focus on analyzing and discussing the entire process of airline A's food delivery.

3.2 Description of the current situation of airline A’s meal supply

After experiencing the epidemic, airline A's food supply system has undergone new changes. For example, before the epidemic, Z Food Factory, which specialized in providing meals to major airlines, almost monopolized the aviation catering business due to its large scale and low-priced supply, making it difficult for new food companies to enter this field and compete, resulting in Z Food Supply Company becoming dominant. After monopolizing the market and mastering the market initiative, Z Company gradually raised the price of food supply, resulting in high airfare costs. Major airlines are helpless. During the three-year epidemic period from 2019 to 2022, flights between different regions were almost at a standstill, with a significant reduction in flights. The orders of Z Company, which mainly engaged in this business, were also significantly reduced. Due to its too single business, its operations were in a difficult situation, which also caused Z Company, which monopolized the supply of plane meals, to encounter unprecedented operational difficulties. Many businessmen saw this situation and joined the competition in this line, Many food factories that specialize in serving machine meals have sprung up like mushrooms after rain. Its service quality and price are better than those of Z Company, which had previously monopolized the business. After a period of development, the industry has gradually returned to its normal supply state before the epidemic, with B and C being the largest and highest in service quality. Both catering and food enterprises have mature systems and distribution centers, but the production and distribution processes of food and the location of factories are not the same. Moreover, after years of exploration and cooperation, airline A's food supply system has gradually become more perfect. They are familiar with the cost composition and business negotiations of this business, and the cost of food supply mainly consists of three parts: raw materials, packaging costs, and transportation and loading and unloading costs. So now there are new choices in the market, not just the previous situation, but the challenge that airline A is facing now is how to select a partner from multiple food factories in the city that specializes in providing airplane meal services for airline A. By searching for the factory addresses of two food companies, B and C, the distance between each factory and the airport where airline A's headquarters is located varies, and the types of food they produce also vary. In addition, the transportation pricing system is also different. Because the enterprise indicators in this article only include Z, B, and C enterprises, some data information can be collected through online retrieval, and due to cost constraints, it is difficult to conduct experimental verification. Therefore, we can establish mathematical models to analyze and predict the possible outcomes of a certain decision. In this article, we have multiple indicators, and we need to establish

mutual levels and correlations among the factors in the problem to make them organized, and compare each indicator to obtain the final evaluation value. Through consulting materials, we have learned that the AHP model precisely meets our model testing standards. As a decision-making method with multiple criteria, the AHP Analytic Hierarchy Process (AHP) can divide the enterprises and indicators we have listed, compare the importance of indicators based on certain subjective judgments, and calculate the quantitative description of weights. Therefore, in this article, I will use the AHP model to specifically analyze how airline A should make the right decisions and seek better development prospects.

4 Empirical analysis on optimization of airline A's catering supply

In this chapter, I will select correct methodology to analyze data from multiple companies introduced, helping airline A select the best cooperative supplier

4.1 Problem description

According to the current situation in the previous chapter, it can be seen that the epidemic has broken the original industrial supply mode, and the pattern of Z enterprise determining the food distribution method no longer exists. The monopoly position of Company Z in the aviation food distribution industry has been threatened, and an increasing number of emerging enterprises have joined the aviation food industry chain. After the epidemic, airline A faces some selective issues, such as how to choose new food suppliers to reduce production costs. However, Company Z, which had previously been a long-term partner, can also be included in the comparison with Company B, which has recently developed rapidly, The development model and strategy of Company C are jointly incorporated into the AHP model, and the best solution is obtained through data analysis. However, the best choice in theory may not necessarily stand the test in practice. In order to ensure the validity of the data conclusions, it is also necessary to visit the dining experience of passengers during on-site inspections, whether the cost expenditures of airline A are reasonable, and whether the additional benefits brought are outstanding. And whether the plan is feasible in long-term future practice is worth carefully exploring. So next, I will start with a mathematical model and use data analysis to determine the theoretical best solution. Then, I will conduct online testing of the feasibility of the solution and use commercial analysis methods to predict whether the supply model will have long-term sustainability in the future.

4.2 Overview of companies

As mentioned earlier, there has been a new turning point in the aviation food industry at this stage. Firstly, an increasing number of food manufacturers are participating in competition. Secondly, Z Company, which originally collaborated with airline A, has encountered operational difficulties. Based on the current market size and number of cooperative enterprises, only B and C, two emerging enterprises, maintain close cooperation with many airlines, can compete with the original Z Company, And has gained high recognition and approval in the industry. So the next step is to explore the competitiveness rankings of the following three companies: Z Company, B Company, and C Company.

Company Z is an established food supply enterprise located in the northern suburbs of the city. It is approximately 25 kilometers away from the airport and passes through the main roads in the city.

During peak hours, it occasionally encounters traffic congestion, with poor punctuality and fuel consumption costs sometimes exceeding budget. Z Company adopts a contracted transportation system, which means that after signing an agreement with the airline, all property rights belong to Z Company, and then Z Company's own trucks transport these foods. This means that customers and manufacturers are in a separate state of decision-making.

Company B is a food industry park located in the southern suburbs of the city and the urban-rural fringe. It is 30 kilometers away from the airport and has a dedicated department to produce aviation food meals. The industry has a high degree of specialization, and the park has a complete food supply chain structure network and a dedicated railway supply line, which can deliver goods at any time. The transportation time is more timely than road transportation. Due to its rapid development and growth in a short period of time, it has solved the employment of many local workers and driven the economic development of the region. The government has recognized the importance of Enterprise B and increased support for it, hiring more professional technical personnel to upgrade its industry. Moreover, due to the government's financial subsidies year-round, the transportation and food production prices of Company B are fixed year-round. The disadvantage is that the meals on train transportation flights are relatively small in scale, which is insufficient to make up for the operating costs. Secondly, secondary loading, unloading and h andling are required, and labor costs remain high.

Company C is a small aviation food industry manufacturer located in the city center, located in the alleys and alleys of the city center, adjacent to a large vegetable market. The supply of raw materials is sufficient and can meet customers' ever-changing needs at any time, with low variable costs. And it is relatively close to the airport, less than 15 kilometers away. Due to the small scale, fewer employees, and low level of specialization of Company C, the food production is relatively simple, and the scale of one-time food production can only meet the supply needs of a few small flights. So small airlines that do not plan to put in effort in the catering service field will prefer Company C. Because it can save costs as much as possible. In addition, the transportation fleet adopts outsourcing, so there is no need to worry about whether the transportation vehicles will return empty during the return journey. Overall, it is the lowest cost option.

4.3 Determine the method of the research

The main research question of this article is to select the most suitable one among several food manufacturing enterprises to cooperate with A Airlines in production, so that A Airlines can improve the quality of food services and thereby increase the company's revenue. So, with various theoretical data perfect, we need to choose a method to analyze and evaluate the parameters of these companies in order to achieve the research purpose of this article.

Quantitative analysis is a commonly used method to analyze enterprise data and determine the development model of the enterprise, which only processes and evaluates the data in the company's financial statements. The advantage of this approach is that it is more direct and only considers the company's financial situation, making it easy to quickly obtain analysis data. However, the drawbacks of this approach are also obvious, as it does not take into account the comprehensive evaluation of the enterprise by society, The data obtained is one-sided and only applicable to the current development situation, not to the long-term development of the enterprise. So in this article, I will incorporate the Analytic Hierarchy Process (AHP) and conduct a systematic analysis of various factors affecting the operation of the enterprise model in conjunction with society. This will make it easier to obtain comprehensive analysis data, which is closer to public opinion and suitable for the development of the company.

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. So this is the definition of AHP method.

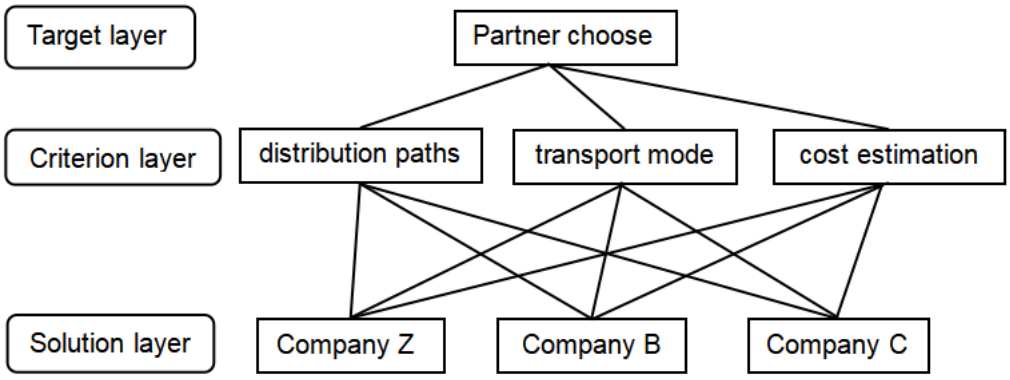
4.4 AHP analysis and design of airline A's food Supply

After determining the model tools we need to use, we need to clarify the basic process of the AHP model. Firstly, we need to establish a hierarchy, then evaluate various indicators, and finally calculate the scores to draw the final conclusion

4.4.1 Building a hierarchy

Select three indicators from the criteria layer to establish the following hierarchical structure: (picture 1)

Picture 1. Hierarchy structure



4.4.2 Building a judgment matrix

Construct a pairwise comparison matrix (judgment matrix) for the importance of an element at the same level relative to a criterion at the previous level. When determining the weights between various levels and factors, the consistent matrix method proposed by T.L. Saaty in 1970s is used to minimize the difficulty of comparing factors with different properties by comparing them in pairs, in order to improve accuracy.

Table 1 shows the 9 importance levels and their assigned values given by T.L. Saaty

Table 1. Importance ranking

Factor i compared to factor j	quantizer
equal importance	1
slightly important	3
strongly important	5
extremely important	7
median	2,4,6
by contrary	count backwards

Table 2-5. Establish a judgment matrix

	distribution path	Transport mode	Cost estimation
distribution path	1	2	5
Transport mode	1/2	1	1
Cost estimation	1/5	1	1

Table 3.

	Company Z	Company B	Company C
Company Z	1	1/3	1/2
Company B	3	1	2
Company C	2	1/2	1

Table 4.

	Company Z	Company B	Company C
Company Z	1	1/3	2
Company B	3	1	4
Company C	1/2	1/4	1

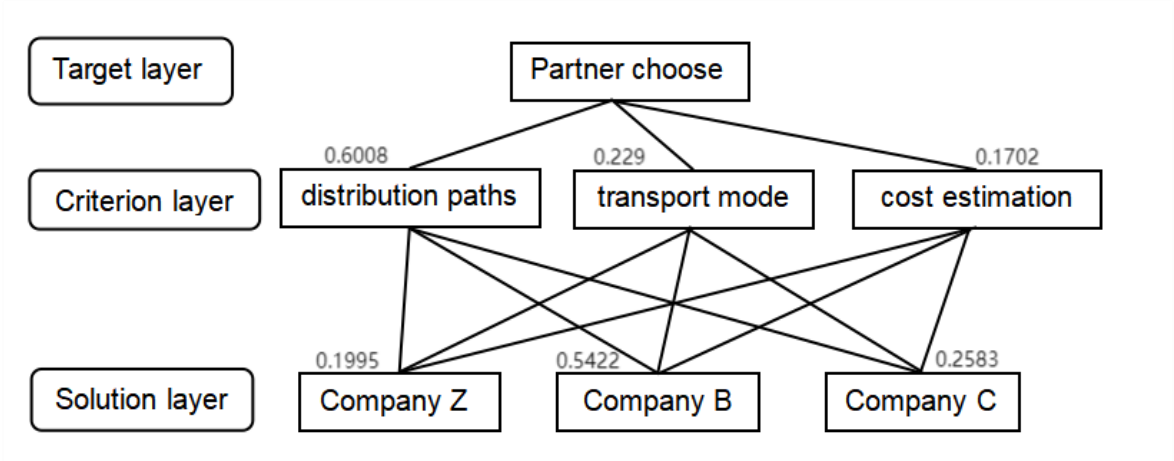
Table 5

	Company Z	Company B	Company C
Company Z	1	1/3	1/5
Company B	3	1	1/3
Company C	5	3	1

(Each factor in the matrix needs to be manually filled in based on experience)

4.4.3 Obtaining enterprise scores based on the matrix

Picture 2. Eventual score



4.4.4 Hierarchical single sorting and consistency testing

Simply put, hierarchical single ranking refers to calculating the weights of each indicator in the judgment matrix; Corresponds to the maximum eigenvalue of the judgment matrix λ The feature

vector of max is normalized (so that the sum of the elements in the vector is 1) and denoted as W. The element of W is the ranking weight of the relative importance of the same level element to a certain factor in the previous level, and this process is called hierarchical single ranking.

Firstly, calculate the m-th power of each row's product to obtain an m-dimensional vector:

Distribution path: $\sqrt[3]{1 \times 2 \times 5} = 2.154$

Transpant mode: $\sqrt[3]{\frac{1}{2} \times 1 \times 1} = 0.794$

Cost estimation: $\sqrt[3]{\frac{1}{5} \times 1 \times 1} = 0.585$

Normalizing vectors yields weights:

Distribution path: $\frac{2.154}{2.154+0.794+0.585} = 0.610$

Transpant mode: $\frac{0.794}{2.154+0.794+0.585} = 0.225$

Cost estimation: $\frac{0.585}{2.154+0.794+0.585} = 0.166$

After obtaining the weight matrix, the maximum feature root can be calculated using the formula: $\lambda_{max} = \frac{1}{n}\sum_{i=1}^{n}\frac{(AW)_i}{w_i}$ Where n is the number of dimensions.

So $\lambda_{max} = 3.08$, and because $\mathrm{CI} = \frac{\lambda_{\max}-\mathrm{n}}{\mathrm{n}-1} = 0.04$

Define the consistency indicator as CI. The closer the CI is to 0, the higher the degree of consistency. To measure CI, the random consistency index RI is introduced, which is known; The RI value can be determined by looking up the table, which is the random consistency indicator R.I. value table obtained from Satty's 1000 simulations (as shown in the following table)

Table 6. RI Value table

dimension(n)	1	2	3	4	5	6	7	8	9	10	11
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51

And our matrix is of order 3 (the number of criterion layer factors) , through the calculation the value is less than 0.1, it can be theoretically confirmed that choosing Company B is correct through consistency testing. The advantages of using Company B are very clear because Company B has

the most average data and the most stable indicators in the comprehensive analysis of the model. However, there are slight disadvantages in the distribution model and costs. In the actual production operation process, it is necessary to combine local production conditions and market evaluation to improve the transportation costs with higher prices to achieve theoretical and practical unity.

5 Verify feasibility

Now we have used the Analytic Hierarchy Process (AHP) to theoretically determine the best cooperative supplier. Next, we need to continue to verify whether this conclusion is reasonable, both through market feedback and theoretical model analysis to ultimately determine the solution.

5.1 Feedback on airline A's catering market

Based on the analysis and conclusions of the AHP model mentioned above, it can be concluded that Company B is the best solution. Although the delivery plan of Company B holds an advantage in theory, whether it can pass practical testing and market recognition is the current challenge that airline A needs to solve. So we conducted random interviews at the airport where airline A's headquarters is located with passengers who took airline A and tasted the plane meal. The interview questions were as follows:

Do you think there has been a change in the food of airline A compared to before?

And what are the points of change?

Are you satisfied with the food provided by airline A?

How do you feel about the freshness of airline A's food ingredients?

Do you think there are any areas where airline A's meals need improvement?

We conducted a random survey on passengers traveling on different flights of airline A, with a total of 15 respondents. Among them, 12 were valid responses. Excluding repeated responses from different age groups, a total of 5 were valid responses from each age group. This includes two adults (arriving domestically), two elderly people (returning from abroad), and one adolescent (arriving domestically). The survey results are as follows:

Adult A (gender female): I believe that airline A's meals have always been at a leading level in the industry. Taking this flight, I feel that the packaging of the meals is more simplified than before, without too much cumbersome packaging. Most of them use single-layer packaging, and the lunch boxes have become environmentally friendly boxes that fit the size of the food and are easy to recycle, highlighting their environmental friendliness. There are many types of food to choose from, with a rich taste and good quality control. I hope that A Airlines' meals can always maintain this level of quality.

Adult B (gender male): I feel that the food of airline A is generally rich in taste. Although the variety of food has changed, it is relatively greasy for fitness enthusiasts and there are not many choices for light carbon water foods. I hope airline A can add some food types for fitness, weight loss, and health shaping in the future.

Elderly person A (gender female): This is my first time traveling abroad on airline A's flight. Lunch brings together dietary habits from around the world, including Asian rice, Western pasta, beef and potatoes. I chose rice, which has a strong taste and a combination of meat and vegetables. The rice has a moderate softness and hardness, taking into account the experiences of various age groups and is also more in line with our appetite.

Elderly person (gender male): I have taken two flights with A Airlines, one on a domestic route, and this time on a multinational route. The dining experience is very satisfactory. In addition to regular Chinese and Western cuisine, there are also a variety of drinks to choose from, including orange juice, cola, soda, coffee, and red wine. In addition, there are ice cubes to choose from, which is what I am most satisfied with and can meet the needs of various groups of people. In terms of service, airline A is truly a pioneer in the food service industry. We hope to update our dishes more in the future and provide passengers with a better service experience.

Teenager (gender male): I took A Airline this time because among airlines of the same service type, airline A s' ticket prices are the most reasonable and affordable compared to others. As a student party, choosing A Airlines is the most cost-effective choice. And for me, the food section serves as an added value to my flight ticket, and I don't have high specific requirements for food. But the most prominent feeling for me is that there are more independent packaging, which takes up a lot of usage space. When eating staple food, it is easy to drop some tableware and packaging, and some food and tableware packaging can be combined together. For example, as a side dish, pre meal fruits and appetizers, as well as butter and bread, can be placed in a separate box. Using three independent packaging will incur additional costs, Moreover, for passengers, having too many items on the table can become crowded and affect their flight experience. The food tastes good and is considered good among the airlines I have traveled with.

According to random interviews, it is not difficult to find that A Airlines' current meal services provide a good overall experience for customers, with diverse service characteristics. The meal production takes into account various groups of people and covers a wide range. The quality control of ingredients is also very well done. However, the drawback is that although food packaging has to some extent implemented environmental policies and uses more environmentally friendly recyclable materials. However, the issue of excessive packaging was overlooked. Due to the current problem of too many independent individual packaging quantities and limited table area for A Airlines'

food, it is necessary to update the supply plan in a timely manner and simplify the packaging quantity. Secondly, high-quality young people who are now promoting healthy vegetarianism are new target customers in the aviation market. Airline A needs to keep pace with the times and adjust the service supply scheme in time according to the preferences of target customers. It cannot be limited to the traditional supply mode for mass production. Airline A needs to convey this demand to the supply enterprises to improve the scheme.

5.2 Establish SWOT model and analysis

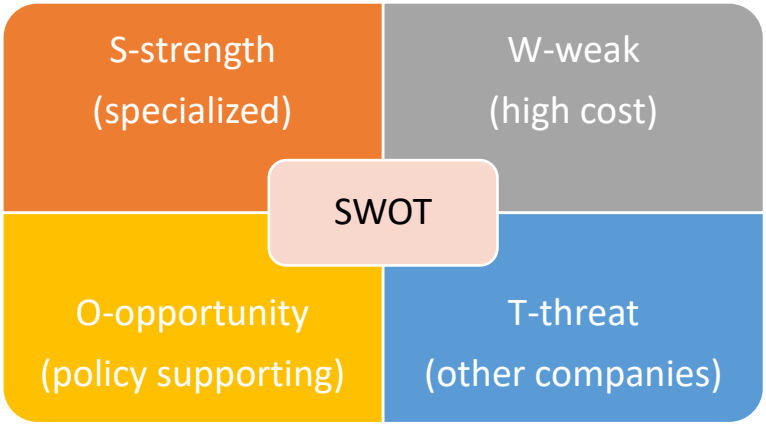
The use of SWOT in business cases can be described as endless, and many companies use this analysis method to make detailed predictions about the situation and future development of the enterprise. SWOT analysis refers to starting from the internal and external competitive environment and conditions of things, and listing various internal strengths, weaknesses, and external opportunities and threats of the research object through investigation. Then, using the idea of system analysis, the listed conditions are matched with various factors to analyze, and a series of corresponding conclusions are drawn, which usually have 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. Firstly, we need to clarify the specific meanings represented by the four letters of SWOT. S is strength, W is weak, O is opportunity, and T is 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). So we can use this method to assist in verifying the reliability of our model.

The best conclusion drawn from the AHP model is that Company B is currently the best choice. Based on the above introduction, it can be seen that Company B is a highly specialized food industry park with a large number of food production departments supplying different airlines. The quality of the food produced can be guaranteed, and at the same time, a large number of machine meals can be produced to ensure its continuous supply capacity. For A Airlines, B Company's level of specialization in the field of aviation catering production is sufficient to meet the requirements of various passengers for aviation meals. The production quality and efficiency are far higher than other similar enterprises, making it a large food manufacturer that can engage in stable cooperation. In the distribution model, Company B uses trains for food transportation, which can transport goods in large quantities without space constraints, and then unload the goods when passing through the airport. However, the disadvantages of Company B are reflected in the following aspects. Compared to car transportation, train transportation is more suitable for long-distance

transportation of bulk commodities. Transporting small sized food can lead to insufficient space utilization, resulting in excess space waste and increasing transportation costs. Secondly, the B Food Industrial Park is less than 30 kilometers away from the airport, and according to the characteristics of train transportation, it is more suitable for long-distance transportation of large-scale goods. Short transportation distances can lead to higher transportation costs than car transportation. Secondly, automobile transportation can achieve point-to-point transportation, which means unloading can be directly transported to the aircraft cabin, but trains require secondary transportation to transport food to the cabin. This will also add an additional cost. Although it can solve the employment problem of more workers, in this article we will focus more on the development issues of airline A and tend to make strong strategic decisions for airline A. In just a few years, A Airlines has developed rapidly, with its output value and social benefits expanding day by day. While expanding its industrial scale and maturing its industrial system, this type of food manufacturing enterprise will also receive policy support from the local government. The government has also seen the influence of company B in the local area, and hopes to use investment attraction to promote the industry to more fields and promote the development of the local economy. Government financial support can promote the research and development of high-tech industries in enterprises, making the industrial system more advanced and perfect.

Picture 3. SWOT model of company B



So based on the SWOT model, we analyzed the advantages and disadvantages of Company B from four aspects. The scale of Company B can ensure long-term supply to partners, and a strong production system can also quickly respond to emerging demand brought about by market changes. To better adapt to market changes and attract a large number of emerging customers, other airlines may be researching corresponding strategies in a short period of time, which will be relatively slower than the first batch of innovative and reformed enterprises. Therefore, the scale benefits brought by this period of time are extremely significant. For example, based on the above

interviews with passengers traveling on A Airlines, we have seen that in the current aviation market, more and more passengers have shifted their boarding philosophy from convenience and comfort to high-quality, fast-paced boarding. In these aspects, both Company Z and Company C are unable to reach the level of Company B due to their own corporate system or scale limitations. Secondly, in order to better reduce costs and save more budget for Company A, Company B should make some strategic adjustments to the transportation method from the production workshop to the airport. Based on the analysis of the transportation methods of the above-mentioned enterprises, it is not difficult to conclude that the cost of truck transportation will be much lower than that of train transportation. Because trucks can achieve point-to-point transportation, transport a batch of plane meals to the airport at once, and minimize loading and unloading and labor costs. However, train transportation is not very suitable for short distance small batch cargo transportation. The waste of cargo space, the start-up and loss costs of trains will be much greater than the value of that batch of goods. It is also necessary to recruit more workers for cargo loading and unloading and secondary transfer, which will greatly reduce profit costs. So switching to truck transportation can better align with future development directions. Company B can expand its business projects with other companies in this regard and transport a batch of goods they need without detours, maximizing the utilization of the transportation fleet. Only in this way can the overall transportation costs of Company B be reduced, and Air Company A has the opportunity to reduce corresponding costs. These saved budgets can be used to improve the quality of flight meals, optimize passenger services, and improve the flight experience.

6 Summary

Aircraft has become one of the top choices for people's transportation due to its safety and convenience. When choosing an airline, people not only consider the differences in model and price, but also prefer to provide more appetizing cuisine. With the gradual opening up of domestic and international aviation markets, new domestic airlines are constantly entering and occupying some of the aviation market share, making the competition in the Chinese aviation market even more intense. The aircraft meal market that relies on airlines also needs to improve competitiveness. Therefore, providing personalized and rapid transformation to survive and develop in competition has become an urgent task. More and more airlines are reducing the cost of aviation catering in order to seek more benefits, so the quality of many airlines' meals is worrying. In recent years, the market response to aircraft meals, which has been criticized by consumers, has undergone significant changes. According to market feedback, there is a trend of "slimming down" in the plane meals of multiple airlines. Airplane meals, once represented by "rice noodles", may also develop towards light meals such as "fruit snacks" in the future. In the opinion of industry insiders, the future of aircraft catering supply still requires better provision of precise services. The healthy and high-quality dining experience led by the new generation of young people has quietly become the most popular flight service content. Airline A, which focuses on catering services, sees this opportunity and is striving to find more suitable catering service partners. Company B stands out among numerous food manufacturers, as it aligns with the development philosophy of airline A and the stability of long-term cooperation in the future. The two sides will engage in extensive cooperation in the supply of food for aircraft meals. After preliminary on-site investigation, there are still areas for further improvement in Company B. Corresponding changes need to be made in the mode of transportation. Using a dedicated truck fleet to transport catering and food to achieve point-to-point transportation can reduce costs while also investing more budget in food research and development and improving food quality, taking airline A's service quality to the next level.

The strategic goal of airline A is very clear, expanding its advantage in the catering service industry to attract more customers, maximizing profits, and enhancing its reputation in the industry. Namely, amplify and highlight own advantages, and take a unique path of development. Continuously research the market, understand industry changes, actively seek improvement solutions, expand cooperation channels with emerging enterprises, and seek the best development path in the changing market.

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