



## **Research on the Quality Evaluation of Yuantong Airlines' Freight Service Based on Analytic Hierarchy Process**

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## Abstract

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<p>With the development of the times, the global economy is on the rise, and air freight has become one of the important businesses of major airlines. The popularity of domestic air freight is more conducive to transnational e-commerce cargo transportation and the convenience of online shopping for ordinary citizens. However, as airlines scramble for business, the quality of air freight service has become a magic weapon for major companies to stand out. Therefore, establishing an effective evaluation system of freight service quality has become an important link to improve the quality of freight service.</p> <p>The main content of this paper is to establish the service quality evaluation system of Yuantong Airlines, and then through the form of questionnaire survey, combined with the weight values of relevant indicators based on AHP, it is confirmed that this method is feasible in the application of service quality evaluation. By using this method, the service quality of Yuantong Airlines is quantitatively analyzed to solve the problems that cannot be solved by qualitative analysis, and the future development direction of its freight service is clear and clear, and relevant improvement measures are put forward.</p>
<b>Key words</b> Quality of freight service; Analytic hierarchy process; Yuantong Airlines

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# 1 Introduction

This chapter mainly elaborates on the background and significance of this study, as well as the research methods and specific and detailed research ideas used in this paper, aiming to provide readers with a detailed explanation.

## 1.1 Research background and significance

The main focus is on explaining the background and significance of the research, explaining the reason for choosing the topic of air cargo service quality in this article through the research background and significance, and revealing the main significance of this study.

### 1.1.1 Research background

With the increasing development of science and technology, the global economy is accelerating, and air freight has become an indispensable part of the lives of ordinary people. The advantages of air freight transportation, such as high safety, strong efficiency, and relatively low costs, have driven the healthy development of the global logistics market and the rapid growth of the world economy. With the increasing global air cargo business, major airlines and express delivery companies have begun to extend towards air cargo. To stand out from many companies, the service quality of air cargo has become their common goal. However, people's living standards are gradually improving, and the requirements for service quality are also gradually increasing. The most basic services no longer meet people's needs, and various problems have emerged, leading to people being more picky about the cargo services of some airlines. Therefore, improving the quality of air cargo services is urgent.

Since its establishment, Yuantong Airlines has been committed to providing nationwide and global air transportation services for Yuantong express delivery, in order to meet the continuous and rapid development of the e-commerce market in the future. The establishment of Yuantong Airlines is an important guarantee for the future core competitiveness of Yuantong's express delivery business, and also a strong support for the company's market brand. However, the freight service quality of Yuantong Airlines is not outstanding among many companies, and there have even been many complaints from netizens, and the brand reputation is not ideal. Therefore, the problem that this article needs to study is how Yuantong Airlines should change, how to improve its own service quality, and how to better serve customers, so that customers can receive the best service. Therefore, it is necessary to build a service quality evaluation system, propose the problem and propose solutions to address it.

### **1.1.2 Research meaning**

Air freight is originally a service industry that focuses on serving people's needs and meeting their high-quality lives. Therefore, it is necessary to establish a reasonable service quality evaluation system to improve subsequent service quality management issues. However, relying solely on qualitative analysis cannot solve the fundamental problem. Therefore, only by establishing a set of service quality evaluation system standards, and through subsequent customer feedback, making clear improvements and improvements in areas that do not meet standards or have low standard values, can enterprises stand out in the industry and better serve the people.

The research on the quality evaluation system of Yuantong Airlines' freight service has the following three meanings:

Firstly, this article establishes the weight values of service quality indicators through chromatography analysis, and combines them with the results of the analysis of the data collected from the questionnaire survey to draw the final conclusion. If it is consistent with the actual situation, it can confirm the rationality and feasibility of the evaluation system.

The second is to conduct quantitative analysis based on the Analytic Hierarchy Process and questionnaire survey methods, combined with the current situation of the airline's freight service quality, to identify the fundamental problems that the airline has encountered, and to improve them.

Thirdly, the service quality standards established in this article can enable Yuantong Airlines to continue its development, propose solutions to improve existing problems, and achieve integrated management of service quality.

## **1.2 Research methods and ideas**

The main purpose is to elaborate on research methods and ideas. The research methods mainly use three methods, and the research ideas are the specific ideas of the entire paper research.

### **1.2.1 Research method**

The main research methods used in this article are the following three:

#### **(1) Analytic Hierarchy Process**

Analytic Hierarchy Process (AHP), also known as Analytic Hierarchy Process (AHP), refers to the process of dividing factors related to decision-making into objective, criterion, and plan execution layers. It is a combination of quantitative and qualitative analysis methods. This article requires the

use of Analytic Hierarchy Process to calculate the weight values of the indicators of the determined service quality evaluation system, and establish a set of service quality evaluation systems.

(2) Questionnaire survey method

Develop the content of the relevant questionnaire survey, distribute the questionnaire to the public, centrally process the collected data, and obtain relevant information on service quality.

(3) Empirical analysis method

On the basis of establishing a quality evaluation system for Yuantong Airlines' freight services, combining theory with practical situations, applying the service quality evaluation system to the process of service quality management, verifying the effectiveness of the system, and striving to improve the problems that arise.

### **1.2.2 Research ideas**

Firstly, it is necessary to review relevant literature, gain a deep understanding of the concept of air cargo service quality and the current research status at home and abroad, and learn the concepts and principles of Analytic Hierarchy Process. Based on literature review, determine the relevant indicators of the freight service quality evaluation system, and use the Analytic Hierarchy Process to calculate the specific weight values. Afterwards, a questionnaire survey was used to collect relevant data and information for processing, and the final conclusion was drawn. By combining the actual situation, the fundamental problem was identified and solutions were proposed, which is beneficial for the subsequent development of Yuantong Airlines.

## **2 Overview of relevant theories**

This chapter mainly explains the three concepts of air freight, service quality, and Analytic Hierarchy Process (AHP) by searching for information and reading literature.

### **2.1 Air cargo**

This summary mainly elaborates on the concept and characteristics of air freight[1].

#### **2.1.1 Air freight concept**

Air freight, also known as air cargo transportation, abbreviated as air freight, is an important component of modern aviation logistics business. Air freight is an irreplaceable mode of transportation for valuable items, fresh products, and precision instruments in international transactions. Compared to other transportation methods, its transportation characteristics include high safety, wide transportation range, efficient transportation speed, and providing more convenient services for the people. Therefore, it occupies a considerable logistics market, and delivery times also operate quickly, promoting capital turnover and circulation. Although the cost of air freight is relatively high compared to other transportation methods, However, it still remains a target for major airlines in today's society to seize industry opportunities one after another.

#### **2.1.2 Characteristics of Air Freight**

There are five modern logistics transportation methods, including railway transportation, road transportation, air transportation, waterway transportation, and pipeline transportation. Compared to the other four types, air freight has the following four characteristics:

The first is that the transportation speed is relatively fast. This is the biggest characteristic and advantage of air freight, as the distance range increases, the faster the transportation speed can be reflected. In today's rapidly changing modern society, the aviation industry is rapidly developing. Generally speaking, aircraft speed is about 900 kilometers per hour, with a maximum of 4000 kilometers. Compared to trains and ships, it is 7 to 12 times and 20 to 30 times, respectively. Therefore, for goods with very high transportation time requirements, air freight has become the best choice to ensure product sales.

The second is that it is not limited by terrain and has strong maneuverability. Due to its ability to fly in the air, airplanes are relatively less restricted by routes compared to trains, cars, and ships. Air transportation can connect two navigation points on the ground, regardless of the distance between them. As long as there is an airport between two locations, whether passing through the ocean, mountains, deserts, or large rivers, routes can be opened, without geographical limitations,



and communication lines can be quickly established from large and medium-sized cities and remote areas in a short period of time to support politics, economy, and military affairs.

The third is the low rate of goods damage and high safety. The ground operation process of air transportation is very strict, and the subsequent management work such as aircraft maintenance and the training management of flight personnel have undergone strict supervision. The transportation procedures are relatively simple, the safety index is relatively high, and there are fewer accidents. Airplanes usually fly at relatively high altitudes and are relatively smooth, greatly reducing cargo damage caused by squeezing, significant shaking, and other reasons during transportation.

The fourth is limited carrying capacity, and transportation costs are relatively high. The capacity of an aircraft is limited, and its carrying capacity is also limited, sometimes even more affected by various factors such as weather. The high cost of air cargo due to the use of aircraft parts, maintenance costs, and fuel has also hindered the development of air cargo to some extent.

## **2.2 Quality of service**

This summary mainly elaborates on the concept of service quality and its several aspects, as well as the concept of a service quality evaluation system and the basic principles for establishing a service quality evaluation system[2].

### **2.2.1 Quality Of Service Concepts**

Service quality is the sum of the characteristics and characteristics of the services or service industry that meet specified or potential requirements (or needs) in product production, and is the core of service marketing. Characteristics are the concepts used to distinguish different categories of products or services, such as tourism that cultivates people's character and brings comfort and comfort, and hotels that provide rest and sleep. Features are concepts used to distinguish different grades, specifications, styles, and tastes of the same type of service. The shallowest meaning of service quality will include general requirements such as security, applicability, effectiveness, and economy of the service.

Service quality must be recognized and recognized by customers. Therefore, in the process of service transactions, customer participation and production and consumption are two inseparable and important parts, and service quality should include the following aspects:

The first service quality is something that customers perceive intuitively, and enterprises need to serve their target audience. The object of service is customers, and customers are an important

link that directly reflects the quality of service. Therefore, enterprises should provide various types of product services for different target customers.

The second coherence is one of the basic requirements for service quality. Service quality occurs in the process of service production and trading, and in this cumbersome process, if the distribution network of services becomes more dispersed, the intermediate links become more complex, and it becomes increasingly difficult to maintain consistency in service levels.

The evaluation of the quality of the third service not only requires objective methods to be formulated and measured, but also needs to be measured and tested based on the subjective understanding of customers. Therefore, there is no standard answer to the quality of service. Management personnel should first recognize the service level that the company is pursuing. When a service can meet the expectations of its target customers, it can be considered that it has reached an excellent level.

### **2.2.2 Service quality evaluation system**

Service quality evaluation refers to the process of objectively evaluating the quality of service based on certain rules or standards and adopting appropriate measurement methods. The service quality evaluation system refers to a scientific and complete overall system composed of a series of interrelated evaluation elements, which needs to have inherent characteristics such as integrity, representativeness, and scientificity. The main core emphasizes putting people first. The service quality evaluation system is mainly people-oriented, which can not only help managers analyze, measure, control, and evaluate service quality more conveniently and accurately, but also effectively promote and ensure comprehensive management of service quality.

The basic principles for establishing a service quality evaluation system include the following:

The first is that the evaluation system needs to be practical on a scientific basis. The service quality evaluation system not only requires sufficient understanding and systematic research to objectively reflect the actual status of service quality, but also needs to be easy to operate, clear, reliable, and easy to understand in the specific implementation process.

The second is that the service quality evaluation system needs to be systematic and hierarchical. Service quality involves different levels and elements, including different types of people, organizations, and their mutual behaviors. Service quality evaluation must undergo systematic analysis and hierarchical examination. It can be divided into levels based on the system structure, making the evaluation system structure clear, easy to use, and effectively achieving systematic and hierarchical consistency.

The third is to be representative while considering comprehensively. The elements of service quality have multiple characteristics, and it is necessary to objectively and effectively evaluate the service quality status of enterprises. Generally, comprehensive evaluation should be considered and combined with multiple elements for comprehensive evaluation. In the actual operation process, due to objective differences in service supply and demand, in order to reflect the local service quality situation, it is necessary to evaluate the highly representative service quality to ensure consistency in comprehensiveness and representativeness.

The fourth is to have both dynamic and static aspects. Service quality is not only a static goal that needs to be achieved, but also a dynamic process that requires every effort. Therefore, the service quality evaluation system must have the characteristics of dynamic changes. Within a certain period of time, service quality indicators and their evaluation content are not suitable for repeated changes, and a certain degree of stability should be maintained to ensure consistency between dynamic and static aspects.

## **2.3 AHP**

This summary mainly explains the concept and basic principles of Analytic Hierarchy Process, and provides a detailed introduction to the several steps required by Analytic Hierarchy Process[3].

### **2.3.1 Concept of Analytic Hierarchy Process**

Analytic Hierarchy Process (AHP), also called AHP for short, 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 he was studying for the US Department of Defense. This method decomposes complex problems into multiple elements and performs hierarchical processing, using pairwise comparison to determine the relative importance of all elements in a certain level, and finally sorts them.

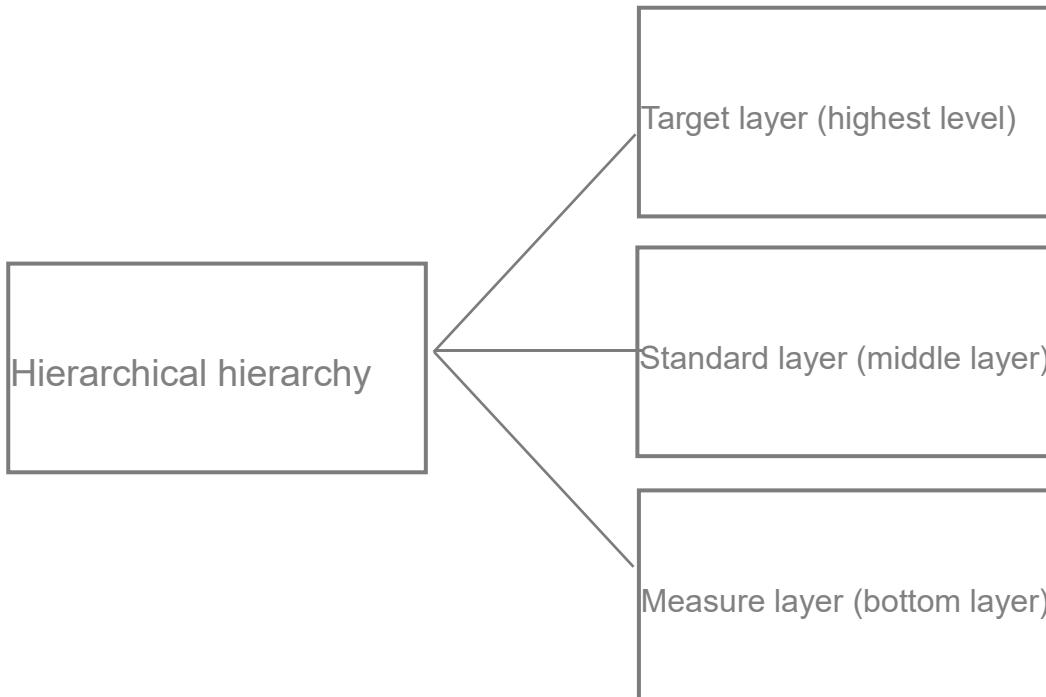


Figure 1.AHP Hierarchy

### 2.3.2 Basic Principles of Analytic Hierarchy Process

By using the Analytic Hierarchy Process (AHP), the problem is decomposed into different constituent factors based on its nature and the overall goal to be achieved. Factors are aggregated and combined at different levels according to their interrelationships and relationships, forming an AHP structural model. This ultimately boils down to the determination of the relative important weights of the measure layer relative to the target layer or the arrangement of the relative order of advantages and disadvantages.

### 2.3.3 Basic steps of Analytic Hierarchy Process

- (1) Determine AHP hierarchical structure

Further analyze the problem, clarify the target layer, standard layer, and measure layer, and construct a hierarchical structure. The target layer is the predetermined goal of the problem, the standard layer is the criterion that affects the achievement of the goal, and the measure layer is the measure that promotes the achievement of the goal.

- (2) Building a judgment matrix

To calculate the weight value using Analytic Hierarchy Process, it is necessary to construct a judgment matrix. Instead of comparing all factors together, it is necessary to compare them in pairs

and use relative scales to avoid the problem of comparing multiple factors with different properties, which can improve accuracy. The following introduces a five level scale:

Value	Factor i is more than factor j
1	Be of equal importance
3	Important
5	Very important
2, 4	Comparison value between the two
The reciprocal of the above values	Contrary comparison

Form 1. Five level proportional scale table

(3) Calculate weight vector

Multiply each row element of the judgment matrix to obtain  $M_i$ :

$$M_i = \prod_{j=1}^n a_{ij}$$

Calculate  $M_i$  to the nth power:

$$\overline{W}_i = \sqrt[n]{M_i}$$

Normalize the weights to obtain the normalized weight value, which is the percentage of each indicator in the upper level indicator:

$$W_i = \frac{\overline{W}_i}{\sum_{i=1}^n \overline{W}_i} (i=1,2,\dots,n)$$

Construct a normalized weight vector:

$$W = (W_1, W_2, \dots, W_n)^T$$

To calculate the maximum eigenvalue:

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i}$$

Where  $(AW)_i$  represents the i-th component of the  $AW$  vector.

(4) Consistency check

Calculate the consistency indicator CI of the matrix:

$$CI = \frac{\lambda_{max} - n}{(n - 1)}$$

Where n is the order of the matrix.

Then divide CI and RI to obtain:

$$CR = \frac{CI}{RI}$$

When  $CR < 0.1$ , it indicates that the consistency of the matrix is within an acceptable range.

Otherwise, it is necessary to rectify the matrix again until the consistency is acceptable. The RI value is a constant value that varies with the order:

n	1	2	3	4	5
RI	0	0	0.58	0.90	1.12

Form 2. Average random consistency index RI standard value

The above is the basic steps for obtaining weight indicators using Analytic Hierarchy Process.

### **3 Building a Quality Evaluation System for Yuantong Airlines' Freight Service**

This chapter mainly determines the quality evaluation system of Yuantong Airlines' freight service. By searching for information and considering various aspects involved in the service, the evaluation system indicators are determined, and then the weight values of each indicator in the system are calculated using Analytic Hierarchy Process.

#### **3.1 Establishment of Quality Evaluation System Indicators for Yuantong Airlines' Freight Service**

Based on literature review and online search for information, considering that the service process involves transportation processes, information network technology, and subsequent customer service, a quality evaluation system for Yuantong Airlines' freight services is established from seven indicators: safety, timeliness, cargo quality, network coverage, logistics information update speed, customer feedback, and customer service. The following will be explained in detail.

##### **3.1.1 Safety**

For civil aviation transportation, safety is the most basic guarantee, and safety is also an indispensable part of air cargo. If safety is not guaranteed, it will not only cause huge losses, but also prevent the goods from reaching customers in a timely manner. If it is a relatively valuable item, it will also cause losses to customers, inconvenience to customers, and the scope of impact is relatively large. Therefore, safety is to ensure that air cargo avoids damage caused by unexpected situations during transportation, thereby avoiding the normal and smooth operation of cargo.

##### **3.1.2 Timeliness**

Timeliness means that air cargo should be shipped and transported in a timely manner, and for modern people, time is very important. The goods that can be transported as soon as possible can meet the needs of most people, so timeliness is very important. Compared with other transportation, air transportation has received more restrictions, such as weather, air traffic control, damaged or poorly maintained parts of the aircraft itself, which lead to the failure of the aircraft to take off on time, thus affecting the efficiency of transportation. Timeliness will greatly affect whether customers choose this freight company again.

### **3.1.3 Cargo quality**

The indicator of goods quality refers to whether the goods are in good condition during transportation. In the process of air cargo loading, transportation, and unloading, it is necessary to pay attention to whether the items are in good condition. If there are fragile and explosive items, it is necessary to pay more attention to them, and handle them gently. Some items may even require refrigeration and other storage methods. Before loading, it is necessary to prepare and take a series of protective measures. Generally speaking, in the process of air transportation, without any accidents, the goods will not be damaged or contaminated in the secondary stage. This depends on the advance preparation of the loading process. As long as there are no loopholes in the loading process, the transportation process will not cause damage to the goods or pollution of the items. The final unloading also needs to be handled with caution, ensuring that the items that arrive in the customer's hands are intact.

### **3.1.4 Network coverage rate**

Network coverage refers to the ability of Yuantong Airlines' business outlets to be distributed in various regions, evenly distributed, not only in urban areas, but also in remote counties and rural areas. High network coverage can facilitate customers' operations such as receiving, sending, and returning goods, which also indicates that the public prefers the company's transportation services. Setting up multiple business outlets can meet the needs of people in different regions, cities, countries, and delivery points. With the rapid development of the times and the catalyst of COVID-19, most people are more inclined to online shopping, and can help consumers to achieve cross-border and trans regional online shopping, so that they can buy their favorite goods without leaving home, which can enable customers to meet their psychological and material needs, which has greatly changed the previous consumption concepts, methods and habits.

For the network coverage rate in remote areas, with the increasing development of internet technology, the coverage rate of township networks has reached 98%. Each grassroots network can leverage its own traffic advantages, strive to achieve "one network for multiple purposes", promote the efficiency of decentralized coverage of rural networks, reduce costs, and improve quality.

### **3.1.5 Logistics information update speed**

The speed of information update refers to whether the product information displayed online can be updated in real-time, whether the dynamic situation and location address of the package can be presented to customers in a timely manner, and whether the logistics status can be reflected to customers at any time, so that customers can have a clear understanding of the package, so that



customers do not have to worry about the destination and arrival time of the package. This indicator can effectively demonstrate the company's level of information construction and the information docking work with its cooperating e-commerce enterprise platforms.

If there are issues such as package damage or accidents during transportation or loading and unloading, it is necessary to promptly communicate the message to the customer, provide corresponding responses, solutions and measures, and provide corresponding compensation. This issue cannot delay the update of information, let alone deceive consumers according to normal logistics information. Strict internal supervision and management of the company are required.

### **3.1.6 Customer feedback**

Customer feedback refers to customer maintenance services during the subsequent transportation process. If a customer is dissatisfied with the service quality of the company's transportation and complains about the transportation due to damage or accidents caused during the transportation process, this is a situation in customer feedback. If the transportation service quality of the company has always been favored by customers, their feedback is that they will always rely on the company's transportation and recommend it to people around them, which can maintain the company's good reputation. Customer feedback requires staff to communicate with customers in a timely manner, understand customer needs, record problems encountered by customers, and provide timely feedback to management personnel for corresponding rectification. Customer feedback is in order to better understand the mistakes that have occurred in the work process, improve them, maintain whether customers can continue to choose the company in the future, improve the service quality of the company's transportation, and stop losses in a timely manner.

### **3.1.7 Customer service**

Customer service is integrated throughout the entire transportation process, such as issues such as delayed updates of logistics information and unexpected situations during transportation. Customer service needs to be fully armed, communicate with customers in a timely manner, and solve this problem. The biggest difference between customer service and customer feedback is that customer service is to solve various problems encountered by customers and needs to help them solve difficulties as promptly as possible. Customer feedback is the attitude feedback of customers after a series of services are completed, which needs to be recorded and fed back to the upper level by staff in a timely manner. Rectification needs to be carried out according to customer requirements to improve the service quality of the company's transportation.

The work of customer service is relatively trivial and covers a wide range, requiring staff to have great pressure resistance and promptly and enthusiastically solve problems for customers,

including the processing cycle of some returns and exchanges, quick response after delivering wrong goods, and corresponding handling and compensation for lost or damaged goods. Compared to customer feedback, it is more important.

### 3.2 Determination of weight indicators for service quality system based on Analytic Hierarchy Process

After the system indicators are fully established, it is necessary to use the Analytic Hierarchy Process to calculate the weight values of the indicators according to its steps, in preparation for subsequent research.

#### 3.2.1 Building a hierarchical model

The first step is to construct a hierarchical structure model. For the quality evaluation system of Yuantong Airlines' freight service, the first step is to define the Yuantong Airlines' freight service quality evaluation system as the target layer of the Analytic Hierarchy Process, which is the highest level. The three subdivided elements are divided into intermediate layers, called standard layers, including transportation indicators, information indicators, and customer indicators, Finally, based on literature review, these seven indicators are taken as the bottom level - the measure layer, which are safety, timeliness, Cargo quality, network coverage rate, logistics information update speed, customer feedback, and customer service.

Target layer	Standard layer	Measure layer
A Yuantong Air Cargo Service Quality Evaluation System	B1 Transportation indicator	C1 Safety
		C2 Timeliness
		C3 Cargo quality
	B2 Information indicator	C4 network coverage rate
		C5 Logistics information update speed
	B3 Customer indicator	C6 Customer feedback
		C7 Customer service

Form 3. Yuantong Airlines Freight Service Quality Evaluation System

### 3.2.2 Comparison Matrix of Standard Layer Indicators

The indicators in the middle standard layer are divided into three parts: B1 transportation indicator, B2 information indicator, and B3 customer indicator. The following is a pairwise comparison matrix constructed for the three factors in the standard layer. The data scored by experts is averaged (the numerical values are retained to two decimal places):

A	B1	B2	B3
B1	1	4	3
B2	0.25	1	2.5
B3	0.33	0.4	1

Form 4. Comparison Matrix of Standard Layer Indicator

Normalize the weights to obtain normalized weight values:

A	B1	B2	B3
B1	0.6	0.6	0.6
B2	0.25	0.25	0.25
B3	0.15	0.15	0.15

Form 5. Weights of each element in matrix A

Assuming that the judgment matrix between the various evaluation criteria under the overall objective "YT Airlines Freight Service Quality Evaluation System" is A:

$$A = \begin{bmatrix} 0.6 & 0.6 & 0.6 \\ 0.25 & 0.25 & 0.25 \\ 0.15 & 0.15 & 0.15 \end{bmatrix}$$

Then the normalized weight vector of matrix A is:

$$W = (0.6, 0.25, 0.15)^T$$

The maximum eigenvalue of matrix A is:

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i}$$

$$= 3.03$$

The consistency indicator of matrix A is:

$$CI = \frac{\lambda_{\max} - n}{(n - 1)}$$

$$= 0.02$$

According to the table, when  $n=3$ ,  $RI=0.58$ , then  $CR = \frac{CI}{RI} = 0.03$ .

As long as  $CR < 0.1$ , the matrix is consistent with the consistency matrix, therefore matrix A passes the consistency check.

### 3.2.3 Comparison matrix of measure level indicators

Construct a pairwise comparison matrix for each measure layer, summarize expert scoring data, calculate the average (to two decimal places), determine the weight value, and verify it.

(1) Transportation indicators (three indicator schemes): C1 safety, C2 timeliness, and C3 cargo quality.

Build a matrix of 'transportation indicators':

B1	C1	C2	C3
C1	1	3	2.6
C2	0.33	1	2
C3	0.38	0.5	1

Form 6. Comparison matrix of transportation indicators

Normalize the weights to obtain normalized weight values:

B1	C1	C2	C3
C1	0.58	0.58	0.58

C2	0.25	0.25	0.25
C3	0.17	0.17	0.17

Form 7. Weights of each element in matrix B1

Assuming the judgment matrix between various evaluation criteria under the sub objective "transportation indicator" is B1:

$$B1 = \begin{bmatrix} 0.58 & 0.58 & 0.58 \\ 0.25 & 0.25 & 0.25 \\ 0.17 & 0.17 & 0.17 \end{bmatrix}$$

Then the normalized weight vector of matrix B1 is:

$$W = (0.58, 0.25, 0.17)T$$

The maximum eigenvalue of matrix B1 is:

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i}$$

$$= 3.07$$

The consistency indicator of matrix B1 is:

$$CI = \frac{\lambda_{\max} - n}{(n - 1)}$$

$$= 0.04$$

According to the table, when  $n=3$ ,  $RI=0.58$ , then  $CR = \frac{CI}{RI} = 0.06$ .

As long as  $CR < 0.1$ , the matrix is consistent with the consistency matrix, so matrix B1 passes the consistency test.

(2) Information indicators (two indicator schemes): C4 network coverage rate, C5 logistics information update speed.

Building the 'information indicator' Matrix:

B2	C4	C5
----	----	----

C4	1	1.2
C5	0.83	1

Form 8. Comparison Matrix of Information Indicator

Normalize the weights to obtain normalized weight values:

B2	C4	C5
C4	0.55	0.55
C5	0.45	0.45

Form 9. Weights of each element in matrix B2

Assuming the judgment matrix between various evaluation criteria under the sub objective "information indicator" is B2:

$$B2 = \begin{bmatrix} 0.55 & 0.55 \\ 0.45 & 0.45 \end{bmatrix}$$

Then the normalized weight vector of matrix B2 is:

$$W = (0.55, 0.45)^T$$

The maximum eigenvalue of matrix B2 is:

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i}$$

$$= 2$$

The consistency indicator of matrix B2 is:

$$CI = \frac{\lambda_{\max} - n}{(n - 1)}$$

$$= 0$$

According to the table lookup, when  $n=2$ ,  $RI=0$ , then  $CR = \frac{CI}{RI} = 0$ .

As long as  $CR < 0.1$ , the matrix is consistent with the consistency matrix, so matrix B2 passes the consistency check.

(3) Customer indicator (two indicator schemes): C6 customer feedback, C7 customer service.

Building a 'customer indicator' Matrix:

B3	C6	C7
C6	1	1.5
C7	0.67	1

Form 10. Customer Indicator Comparison Matrix

Normalize the weights to obtain normalized weight values:

B3	C6	C7
C6	0.6	0.6
C7	0.4	0.4

Form 11. Weights of each element in matrix B3

Assuming the judgment matrix between various evaluation criteria under the sub objective "customer indicator" is B3:

$$B3 = \begin{bmatrix} 0.6 & 0.6 \\ 0.4 & 0.4 \end{bmatrix}$$

Then the normalized weight vector of matrix B3 is:

$$W = (0.6, 0.4)^T$$

The maximum eigenvalue of matrix B3 is:

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i}$$

$$= 2$$

The consistency indicator of matrix B3 is:

$$CI = \frac{\lambda_{max} - n}{(n - 1)}$$

$$= 0$$

According to the table lookup, when  $n=2$ ,  $RI=0$ , then  $CR = \frac{CI}{RI} = 0$

As long as  $CR < 0.1$ , the matrix is consistent with the consistency matrix, so matrix B3 passes the consistency check.

### 3.2.4 Determination of Index Weight Values Based on Analytic Hierarchy Process

In summary, the weight values of each indicator are as follows:

Target layer	Standard layers and weight values		Measure layer and weight value		Comprehensive weight
A YT Airlines Freight Service Quality Evaluation System	B1 Transportation indicator	0.6	C1 Safety	0.58	0.35
			C2 Timeliness	0.25	0.15
			C3 Cargo quality	0.17	0.1
	B2 Information indicator	0.25	C4 network coverage rate	0.55	0.14
			C5 Logistics information update speed	0.45	0.11
	B3 Customer indicator	0.15	C6 Customer feedback	0.6	0.09
			C7 Customer service	0.4	0.06

Form 12.Weight values of each element indicator

### 3.3 Summary of this chapter

This chapter constructs the quality evaluation system for YT Airlines' cargo service. Firstly, the evaluation indicators need to be determined through literature review. Then, the weight values of



YT Airlines' cargo service quality evaluation indicators are calculated using the Analytic Hierarchy Process (AHP), and the weights of the first level indicators of YT Airlines' cargo service quality evaluation system, including transportation indicator, information indicator and customer indicator, are 0.6, 0.25, and 0.15, respectively. The seven secondary indicators in the quality evaluation system of YT Airlines' cargo service have an important impact on the quality evaluation of YT Airlines' cargo service. The order of importance is: safety 0.35, timeliness 0.15, cargo quality 0.1, network coverage rate 0.14, logistics information update speed 0.11, customer feedback 0.09 and customer service 0.06.

## 4 Application of YT Airlines' Freight Service Quality Evaluation System

### 4.1 Application of YT Airlines' Freight Service Quality Evaluation System

Based on the weight values of service quality evaluation indicators calculated using Analytic Hierarchy Process in the previous section, combined with questionnaire survey data, the evaluation results of YT Airlines' freight service quality can be obtained. Combined with the current situation of YT Airlines' freight service quality, the effectiveness of the system can be proven, and corresponding problems can be identified to propose feasible solutions.

#### 4.1.1 Clarify evaluation indicators and scoring standards

According to the above determination, the factors affecting the quality of YT Airlines' freight services are composed of two levels of evaluation indicators. The first level of evaluation indicators includes transportation indicator, information indicator and customer indicator, which in turn include safety, timeliness, cargo quality, network coverage rate, logistics information update speed, customer feedback and customer service indicators.

First level evaluation indicators	Secondary evaluation indicators
A1 Transportation indicator	B1 Safety
	B2 Timeliness
	B3 Cargo quality
A2 Information indicator	B4 Network coverage rate
	B5 Logistics information update speed
A3 Customer indicator	B6 Customer feedback
	B7 Customer service

Form 13. Classification of Factors Influencing the Quality of YT Airlines' Freight Service

The evaluation grading of YT Airlines' freight service quality is 1 (very poor), 2 (poor), 3 (average), 4 (good), and 5 (very good). The quantified values and standard scores of service quality levels at all levels are shown in the table below:

Grade	Level 1	Level 2	Level 3	Level 4	Level 5

	(Very poor)	(poor)	(general)	(good)	(very good)
Quantified value	1	2	3	4	5
Standard score	0.00—1.00	1.01—2.00	2.01—3.00	3.01—4.00	4.01—5.00

**Form 14. Quantitative Value and Standard Score of YT Air Cargo Service Quality Evaluation Level**

The specific evaluation criteria for the 5-level scoring of the secondary evaluation indicators are shown in the table below:

Level Index	Level 1	Level 2	Level 3	Level 4	Level 5
A1 Safety	Safeness0%-20%	Safeness20%-40%	Safeness40%-60%	Safeness60%-80%	Safeness81%-100%
A2 Timeliness	Efficiency less than 30%	30%-45% efficiency	45%-60% efficiency	60%-85% efficiency	Efficiency higher than 85%
A3 Cargo quality	Encountered countless instances of damage	Encountered damage more than three times	Encountered three instances of damage	Encounter damage once or twice	No damage was encountered
B1 Network coverage rate	<30%	30%-45%	45%-60%	60%-85%	>85%
B2 Logistics information update speed	Rate below 30%	The rate is 30% -45%	The rate is 45%-60%	The rate is 60%-85%	Rate above 85%

C1 Customer feedback	Customer feedback rating<60score	Customer feedback rating60–70score	Customer feedback rating70–80score	Customer feedback rating80–90score	Customer feedback rating>90score
C2 Customer service	Customer service rating<60score	Customer service rating60–70score	Customer service rating70–80score	Customer service rating80–90score	Customer service rating90–100score

Form 15.Evaluation Criteria for Level 5 Scoring of Secondary Evaluation Indicators

#### 4.1.2 Questionnaire survey data processing

Distribute the designed questionnaire online, and then process the collected data to obtain the distribution of scores for various service quality indicators:

First level evaluation indicators	Secondary evaluation indicators	Level 1	Level 2	Level 3	Level 4	Level 5
A1 Transportation indicator	B1 Safety	0.00%	0.96%	26.92%	59.62%	12.5%
	B2 Timeliness	0.96%	1.92%	44.23%	47.12%	9.62%
	B3 Cargo quality	0.96%	9.62%	2.88%	44.23%	42.31%
A2 Information indicator	B4 Network coverage rate	0.96%	6.73%	41.35%	37.5%	14.42%
	B5 Logistics information update speed	0.96%	2.88%	42.31%	44.23%	9.62%
A3 Customer indicator	B6 Customer feedback	0.96%	4.81%	31.73%	48.08%	24.04%

	B7 Customer service	0.96%	3.85%	25%	49.04%	21.15%
Comprehensive distribution		0.82%	4.40%	30.63%	47.12%	19.09%

Form 16. Distribution Table of YT Air Cargo Service Quality Evaluation Index Scores

By quantifying the values of each level as 1, 2, 3, 4, and 5, the evaluation score of each indicator can be calculated, and the relationship between each score and its level can be determined, thus determining the evaluation results of each secondary evaluation indicator:

First level evaluation indicators	Secondary evaluation indicators	Score result	Evaluation level
A1 Transportation indicator	B1 Safety	3.84	Good
	B2 Timeliness	3.74	Good
	B3 Cargo quality	4.17	Very good
A2 Information indicator	B4 Network coverage rate	3.61	Good
	B5 Logistics information update speed	3.59	Good
A3 Customer indicator	B6 Customer feedback	4.18	Very good
	B7 Customer service	3.86	Good

Form 17. YT Air Cargo Service Quality Evaluation System Level 2 Evaluation Indicator Scoring Results

Combining the weight values of each secondary indicator with the evaluation results in the table above, the scoring results of each primary evaluation indicator can be calculated, and the

relationship between each score and its level can be obtained to determine the evaluation results of each primary evaluation indicator:

First level evaluation indicators	Weight value	Score result	Evaluation level
A1 Transportation indicator	0.6	3.87	Good
A2 Information indicator	0.25	3.6	Good
A3 Customer indicator	0.15	4.05	Very good

#### Form 18.YT Airlines Freight Service Quality Evaluation Index Level 1 Scoring Index Scoring Results

Based on the weights and scoring results of the above level evaluation indicators, a comprehensive score of 3.83 points can be calculated for the quality of YT Airlines' freight services. Based on the relationship between the score value and level, it can be concluded that YT Airlines' freight service quality level is good.

## 4.2 Result analysis

After applying the quality evaluation system for YT Airlines' cargo services, the evaluation results of the current situation of YT Airlines' cargo service quality were obtained. 0.82% of people believe that YT Airlines' cargo service quality is level 1 (very poor), 4.40% think it is level 2 (poor), 30.63% think it is level 3 (average), 47.12% think it is level 4 (good), and 19.09% think it is level 5 (very good). The comprehensive rating of YT Airlines' freight service quality is 3.83, with a rating of 4 (good).

From the rating results of the secondary evaluation indicators of the service quality evaluation system in the above chart, the seven evaluation indicators are ranked in descending order of grade and score: Level 5 is very good (goods quality, customer feedback) and Level 4 is good (safety, timeliness, network coverage, logistics information update speed, customer service). From these 7 evaluation indicators, it can be seen that the logistics information update speed score is the lowest.

Except for the high scores of goods quality and customer feedback, the other five indicators are rated at 4 (good), which is a very significant difference from these two indicators.

### **4.3 Propose issues based on the current situation of YT Airlines' freight service quality management**

The base of Yuantong Airlines is located at Xiaoshan International Airport in Hangzhou, Zhejiang Province. It is a wholly-owned subsidiary of Yuantong Express Co., Ltd. and the only large-scale aircraft public air transportation carrier enterprise operating under CCAR-121 in Zhejiang Province. As a professional freight aviation enterprise under Yuantong Group, Yuantong Aviation is committed to promoting the development of aviation logistics and building Hangzhou into a first-class "express delivery city" in China. Yuantong Airlines will leverage its various advantages in operational management and market cooperation in the air cargo and express delivery industries, promote the development of China's express delivery industry towards specialization and standardization, and support the sustainable development of Yuantong Group's "leading" strategy.

On the basis of the analysis of the results calculated by the Analytic Hierarchy Process, it is indicated that the safety and timeliness of the company's cargo transportation are not high, and the coverage rate of logistics outlets is not very high. The speed of logistics information updates cannot meet the standards that customers consider superior, and the quality of customer service is not good, and the service attitude still needs to be improved.

### **4.4 Improvement measures**

Based on the above description and corresponding issues, improvements will be made in the following text. Here are the specific solutions.

#### **4.4.1 Improve transportation safety**

Establish a safety management organization, appoint full-time management personnel, incorporate safety and quality indicators into the job responsibility system, strictly assess, and ensure the achievement of safety and quality objectives. Establish a regular safety evaluation and inspection system for aircraft, identify potential safety issues, propose corrective measures, continuously improve the safety technical performance of the aircraft, do a good job in daily maintenance and upkeep of the aircraft, keep the aircraft in good technical condition at all times, and ensure flight safety. For special goods, special management is required to avoid unnecessary accidents.

#### **4.4.2 Improve transportation efficiency**

Optimizing the efficiency of unit loading equipment can improve the efficiency of the air freight industry. The main focus of investing in general containers is on multiple application purposes, improving durability, improving loading speed, and optimizing cargo capacity. These containers help accelerate the loading process, alleviate the life of loaders, and make it possible to ship large quantities of goods in one container.

Utilizing document digitization and technology to ensure effective management of logistics operations, this is achieved through practices that improve document processing efficiency. Document digitization can ensure secure storage, retrieval, and transmission of information, improve logistics operational efficiency, and combine technology to help provide real-time data, seamlessly coordinate tasks, and achieve timely delivery management of goods.

Improving fleet optimization and understanding how to improve fleet utilization is the first step in determining more convenient services. Consider extending operating hours and increasing daily flights to increase air freight volume.

#### **4.4.3 Expand network coverage**

Try to set up as many stations as possible in rural township areas, or temporarily use agency points to gradually cover the rural express delivery market with small investment, to solve the problem of receiving and dispatching rural express delivery at the end. The government can also introduce relevant policies to encourage and support the low population or low business season.

By utilizing third-party resources to establish comprehensive stores for township express delivery, enterprises can concentrate their business, establish comprehensive stores, and undertake express delivery services. This can not only reduce the cost of setting up separate stores, but also facilitate the general public to receive goods and improve the quality of life of township people.

#### **4.4.4 Accelerate the update speed of logistics information**

Regularly maintain the network information system, eliminate issues such as lag, slow network, and untimely information updates, increase efforts to implement supervision, update in real time, replace and repair the system and equipment in a timely manner, and pay attention to timely updates of logistics information. When encountering cargo transportation accidents, promptly provide feedback to customers and take corresponding measures. We should utilize informatization and intelligence to improve the speed of logistics information updates, accelerate the construction of logistics information systems, facilitate the masses, and serve the people.



#### **4.4.5 Strengthen customer service capabilities**

Based on our own conditions, we tailor our services to meet the needs of each customer and complete the "tasks" assigned by them with high quality and quantity. We conduct market research targeting our target customers and strive to meet their every requirement.

Enterprises need to achieve the service level required by customers and achieve high customer satisfaction, and must have corresponding service hardware conditions. Therefore, it is not only necessary to purchase modern logistics equipment or renovate existing facilities to meet the specific needs of customers, but also to attach importance to the establishment and improvement of logistics information systems, improve logistics efficiency, and establish an information-based logistics platform, in order to reflect a good brand image, retain more old customers, and attract new customers.

## 5 Conclusion

Service quality is a key factor affecting an air freight company, and building a good service quality evaluation system can facilitate the management and improvement of service quality for enterprises, ensure good brand reputation, and bring more thoughtful services to the public.

This article establishes various indicators of the service quality evaluation system through literature review. By using the Analytic Hierarchy Process, the weight values of the indicators are calculated. Then, through online distribution of survey questionnaires, the quality of Yuantong Airlines' freight service is scored. The final result is that the comprehensive score of Yuantong Airlines' freight service quality is 3.83, and the rating is 4 (good). From safety, timeliness, network coverage Improve the speed of logistics information updates and customer service to better provide customers with better service quality.

## Sources

[a]Air freight related concepts(Carriage of Cargo by Air,Hong Ye,2011).URL:

<https://baike.baidu.com/item/%E8%88%AA%E7%A9%BA%E8%B4%A7%E8%BF%90/3581102>

[b]Concepts related to service quality(Service Quality Management,Gu Xingquan,2019).URL:

<https://wiki.mbalib.com/wiki/%E6%9C%8D%E5%8A%A1%E8%B4%A8%E9%87%8F>

[c]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.(American operations researcher and Professor T.L. Saaty at the University of Pittsburgh, 1971).URL:

<https://baike.baidu.com/item/%E5%B1%82%E6%AC%A1%E5%88%86%E6%9E%90%E6%B3%95/1672?fr=aladdin>

[d]Introduction to Yuantong Airlines.URL:

<https://www.ytglobal.com/about-us/>

[e]Chen Yongyu, Tu Jiabin. A Study on the Relationship between Service Quality, Customer Satisfaction, Relationship Quality, and Customer Loyalty: A Case Study of Taiwan's Air Cargo Industry. Logistics Technology, 2010, 29 (09), 12-15+27.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=j4P7AvXq4Pv%2B30AY2a3t4FAh34a%2BsBYPjMNQnXPmlcO3QcTJXKhBX2%2B2aVZL0NdtqWSIUcTsEEg7I%2BEDGcEDzfuR0WpCK5lzwUH%2BAAHtqsCMJQ5CYNOskHjaUnkXx2IJyCxdKDZ5RQezMG%2FkS2ZmE9jjmW2IHCdXROjYZLZRLQ%3D&DBCOD=CJFD&FileName=WLJS201009006&TABLEName=cjfd2010&nonce=6C25EE39BF194E0EBA0C9A99A4D98A4E&TIMESTAMP=1683968402146&uid=>

[f]Wang Miao. Good Service is Marketing - Reflections on Air Freight Services. Air Freight Business, 2010, (04), 28-31.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=KUqwGaPm3ubSpXVR0srll1LRylcpV9Ic6x7s2PDMgUDMsAcGm6Xz8h5Jeo4Cpep17N1iPLWM8mDVaBdqM3XJk%2BIVKD7K3zNcXH1xvgWFK7GJjc2VO3tFEutizc%2BAoWwQNb%2B%2FXncGs6Vm0Od5LdF4t6OB5eWtx%2BpFFBkXI8FmQeY%3D&DBCOD=CJFD&FileName=KYSW201004028&TABLEName=cjfd2010&nonce=2B4FD1019F11451580A816D0EC11439E&TIMESTAMP=1683968467464&uid=>

[g]Wang Yi, Xu Dakui. Customer Satisfaction Survey Report on Yuantong Express. Modernization of Shopping Mall, 2016, (03), 45-46.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=YMd78W5uBJQJBWNvcbND5uxQdM%2BVEcwhNVBPjQSC4K4Ymcl9zMggbA%2F6Hulo2Z6cOYQsPPaeLIRRJXMN9wxVEpgWn44PdJq4P7yleNvZthJWrnGrGOWr%2BReDMjIwaeT7O1792ZsD418hTivGFXBXY18la0aiJOaX1AH6Eg5K1Og%3D&DBCOD=CJFD&FileName=SCXH201603026&TABLEName=cjfdlast2016&nonce=7B6FF8B03EB2441DA882EFF8A209EEBA&TIMESTAMP=1683968980144&uid=>

[h]Mei Yingtian, Zou Wangping, Zhang Wei. Fuzzy Comprehensive Evaluation of Railway Freight Service Quality Based on AHP. Railway Computer Application, 2019, 28 (08), 5-9.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=Cutedv%2FLf1RUrHZl762Kw9h6lMNdG1Zq7bWjekF5XfWH%2BTRh2LmxPePG2Gwj9%2BzUEyHT0Y93TTcG79qFXSgl28zlfL2sZalxaDdqouSI3y7tayytJIXLDLfMDClwkKCZwyJXvDjqDuLTJoVg3OUfoNR%2B6c0yiARQ8D9tE6acjAg%3D&DBCOD=CJFD&FileName=TLJS201908002&TABLEName=cjfdlast2019&nonce=3022E84878924872857ECEBD62E13F1E&TIMESTAMP=1683969188278&uid=>

[i]Su Jing. Research on the Service Quality Evaluation System of Shenzhen Airlines. 2018-03-01.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/reader/read?invoice=hOECmNf7RRmQqjrhbg%2FQ0jsW3KNFFTZXePzvaa64oWeRm8Unzl9vSi%2FV9kwu2bGUgOnEW%2Fp%2FZMW74sYzTmgbsrxKD65jkk1e7EAOEyLycqDv9tZa4o9LxLsnE0HdYcn85FFKK%2BbpbivzIRKcgdjdYUTQISE7g75LtcX3tmWKOk%3D&platform=NZKPT&product=CMFD&filename=1019687248.nh&tablename=cmfd202001&type=DISSERTATION&scope=trial&cflag=overlay&dflag=&pages=&language=chs&trial=&nonce=4A085133CBD74BFA94EA217C1E3D6802>

[j]Wang Yan, Xu Dakui. Research Report on Customer Satisfaction of Yuantong Express. 2016-03.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=NuT%2BsWb6vsCyXRas4HyJ%2FOAer62KKMedZk1r73jbX1RCn70BAILrMkdwlKmAHQU5%2BbADxcRac06gYGRd7dwAC43XPE7TUVfRFf5KSulK4H8yNme8xA2L2HtW3jiiU8oWGZJnjKWak1gx%2Fugx%2FUIGTGAG6m4utvX2Zm5hHLKMVcU%3D&DBCOD=CJFD&FileName=SCXH201603026&TABLEName=cjfdlast2016&nonce=AADA6B2F557E44D3A207CEBF195FBB5F&TIMESTAMP=1685004262930&uid=>

[k]Yu Zhixiang. Rethinking the Reform Direction of Aviation Logistics Enterprises from the Last Kilometer. 2020-01-25.URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=gpHvWTLCksjoKjHvv>

LVW9fi2nh1V8qtTxzNgYheX%2ByyAR2vWLgWXRnOvkt9ZDGCu9S8NlJyQHmR3nxinnxIS%2FV agyiow3g4oNnPVRNjONaqz1NxtJwlsxQRKSnEJTNBHIXixEUv2tYgXQksI9JTOocOH2D6u01nqb7 ztcEeEY%3D&DBCOD= C JFD&FileN= KYSW202001018&TABLEN= c jfdlast2020&nonce =B7E267C20E94453F93D5CFCC5D9529CB&TIMESTAMP=1685004599792&uid=

[l]Gu Guolin, Wu Bingzhi, Wang Bei. Research on the Evaluation of Railway Freight Service Quality Based on SERVQUAL Method. 2021. URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=vAPrhiRxPqyZgypo8n vRwCaBvT1WM0MQ5Tifp4LmmhgyEDQS5qzzyPkmzhvd9LyzbxbBMkv%2F%2FLhERkz%2B1k1 WdkaoqeE7cUYSjreK5RiwLK5cvAzANz7D%2BejO%2FPR8e2T40Wxi%2Funa%2FzgiG4xHOvCs 4kXTIY5Lv7jRY34LjzUJtuA%3D&DBCOD= C JFD&FileN= TDHY202105008&TABLEN= c jfdlast2021&nonce=5B88223E1C2B41BC9D632F7811E9C900&TIMESTAMP=1685004684509&uid =>

[m]Wang Yiru, Liu Xuejing, Han Xi, Lu Siting. Research on the Construction of Airport Freight Station Logistics Service Quality Evaluation System Based on WSR Methodology. 2022. URL:

<http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/KXReader/Detail?invoice=ii36KAVSaSLkDTRw4 AZ7Ok9kY9bowKdhojK9Z0xK0XmVTNkoxaDp3KF43Cti71m9ZZetA65ohkPt5giKeBg22k3w%2BkL m6kq6boZOFU8F9XCSK1cW7wc5DFPKQXa97E7gf5q6%2B1%2FQ8%2B0ZwkaPDxaHeHFv8pd 6wkCUBzpKtsmr3Rk%3D&DBCOD= C JFD&FileN= ZWZJ202223019&TABLEN= c jfdlast2 023&nonce=7D1CDF393816489282ECCCCE3D11FF5E&TIMESTAMP=1685004912233&uid=>

[n]Wangchuk Rabten, Narat Hasachoo, Pornwasin Sirisawat. A Fuzzy Analytic Hierarchy Process Approach to Identify the Relative Importance of Factors Influencing Air Cargo Operation: A Case Study with Paro International Airport in Bhutan. 2021. URL:

<http://spis.hnlat.com/scholar/detail/7fb79001bcf8561cc8e95f5b36e2c94d>

[o]Suchat Lainamngern, Sudaporn Sawmong. How customer relationship management, perceived risk, perceived service quality, and passenger trust affect a full-service airline's passenger satisfaction. 2019. URL: <http://spis.hnlat.com/scholar/detail/8b1dd9de067df0b4ffbcdf2d11862d3e>

[p]Muhammad Rizal, Isnaini Hanim Khoironi, Muchamad Sugarindra, Ahmad rizal Yassaruddin. Logistic Service Quality Evaluation Using KANO on Gap Analysis Model. 2019. URL: <http://spis.hnlat.com/scholar/detail/c5cf1435d0ca667634e49f59f4409041>

[q]Charles Omagor, Owen Robert Nsamba, Edith Mwebaza Basalirwa. Internal Marketing Practices, Job Satisfaction and Service Quality in the Airline Service Industry: A Case Study of

Entebbe Handling Services.2012.URL :

<http://spis.hnlat.com/scholar/detail/73de00fe01e2979e858b44cf887166b7>

[r]Syahrum Agung.The Effect of Service Quality,Service Marketing Mix and Costumer Value on Consumer Satisfaction and its Impact on the Loyalty of the Consumer Industry of the Low-Cost Carrier Flight in Indonesia.International Journal of Innovative Science and Research Technology.2020.URL :

<http://spis.hnlat.com/scholar/detail/961840c557ea9335928444d56504b04e>

[s]Ali Ramezani Ghotbabadi, Rohaizat Baharun, Setareh Feiz.Service quality measurements:a review.2015.URL: <http://spis.hnlat.com/scholar/detail/da119b580c43e173accc95f824152254>

[t]Su Jing.Research on the Service Quality Evaluation System of Shenzhen Airlines.2018-03.URL: <http://wxlib.cqust.edu.cn:8000/c/https.kns.cnki.net/reader/read?invoice=a0zurxyYh1bdAmAgEhmTKKHRXtsSGcaJ7W1rGIVhE3owX9wZyre%2Bt1X2aFsbac5pCB4W3p3BTSPgvYLq3oqIFwiGaj5O70DQVovb%2BpGovkhUhxIOIBvSq3d9E4cUsGN6aMC0n3I0T7wpq2IQXDcqZsOhj1A2iqLpwn%2B3bE5z1R4%3D&platform=NZKPT&product=CMFD&filename=1019687248.nh&tablename=cmfd202001&type=DISSERTATION&scope=trial&cflag=overlay&dflag=&pages=&language=chs&trial=&nonce=97D36BF3EFC04B0192D92418C888F7FA>

## Appendices

### Appendix 1. Expert scoring questionnaire

The expert scoring questionnaire was filled out by five teachers respectively, and the results of the third chapter above were obtained by arithmetic mean processing according to the data they filled in. The following is the specific content of the expert scoring questionnaire:

Dear teacher,

Hello! Thank you very much for taking the time out of your busy schedule to fill out the questionnaire! This is a survey questionnaire. The main purpose of this study is to study the weights of various indicators in the evaluation index system of TY Airlines' freight service quality. Based on your actual work experience, please compare the importance of each indicator in pairs and give a score on a scale of 1-5 in the table. The obtained results will serve as an important basis for determining the weight of evaluation indicators. Thank you for your support!

Value	Factor i is more than factor j
1	Be of equal importance
3	Important
5	Very important
2, 4	Comparison value between the two
The reciprocal of the above values	Contrary comparison

1. How important are transportation indicators (including safety, timeliness, and cargo quality) compared to information indicators (including network coverage and logistics information update speed)?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

2. How important are transportation indicators (including safety, timeliness, and cargo quality) compared to customer indicators (including customer feedback and customer service)?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

3. How important are information indicators (including network coverage and logistics information update speed) compared to customer indicators (including customer feedback and customer service)?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

4. How important is safety over timeliness in transportation indicators?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

5. How important is safety over cargo quality in transportation indicators?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

6. How important is timeliness over goods quality in transportation indicators?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

7. In information indicators, how important is the network coverage compared to the speed of logistics information update?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

8. How important is customer feedback compared to customer service in customer metrics?

A.1 B.2 C.3 D.4 E.5 F.1/2 G.1/3 H.1/4 I.1/5

## **Appendix 2. Investigation on Freight Service Quality of Yuantong Airlines**

Investigative questions	Theoretical framework	Result	Questionnaire questions
About Security	3.1.1	4.1.2	3
About freight efficiency	3.1.2	4.1.2	4
About the quality of goods	3.1.3	4.1.2	5
About network coverage rate	3.1.4	4.1.2	6
About the update	3.1.5	4.1.2	7



speed of logistics information			
About customer feedback	3.1.6	4.1.2	8
About customer service	3.1.7	4.1.2	9

Based on the seven indicators established above, develop a questionnaire for the cargo service quality survey of Yuantong Airlines, and distribute it to people around you to fill out a total of 100 copies. Obtain the percentage of people at each level of each indicator, calculate the scoring results of the second level indicator using these percentages, and then calculate the scoring results of the first level indicator using the weight values of the first level indicator previously calculated, Finally, the total score of the company's freight service quality is calculated through the comprehensive weight value. The following are the questions from the questionnaire survey:

1. Have you ever had the service experience of Roundtrip Express?

A.Yes B.No

2. Do you often use Roundtone Express?

A.Never B.Occasionally C.Often D.Frequently E.Use every time

3. Do you think it is safe to choose Roundtone Express? Especially for transnational transportation, have you ever lost your package?

A.Particularly unsafe B.Not very safe C.General safety D.Safer E.Very safe

4. Do you think Yuantong Express is efficient?

A.Very inefficient B.Inefficiency C.General efficiency D.High efficiency E.Very efficient

5. Have you ever experienced damage to your package or contamination of other goods?

A. Encountered countless times B.More than three times encountered C.Met three times D.Once or twice E.Not at all

6. Does Roundtrip Express have more coverage in your area? Can you collect, send, return and return items anytime, anywhere?

A.Almost no coverage B.Less distributed C.General distribution D.Distributed but not dense E.Very large and dense distribution

7. What do you think about the speed with which logistic information is updated?

A.Slow as a snail B.Slower C.Normal speed D.Quicker E.Quickly

8. If you need to give feedback on the quality of service of Yuantong Express, how much would you score? (The larger the number, the higher the score)

A.1 B.2 C.3 D.4 E.5

9. Have you had a similar situation? For example, if you encounter any difficulties in the process and need help from customer service, how much would you rate the service? (The larger the number, the higher the score)

A.1 B.2 C.3 D.4 E.5