

How will non-aeronautical revenue benefit large civil airports? — An analysis of Shanghai Pudong International Airport.

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Abstract:

This article will take Shanghai Pudong Airport as a research case. Through the search of previous literature materials and the exploration of non-aeronautical income of the airport, etc. it will explore the composition of non-aeronautical income of the airport and the deficiencies in the current development of non-aeronautical resources and discuss the methods that can effectively increase the proportion of non-aviation income and non-aviation industry income of the airport.

Keywords: non-aeronautical revenue; non-aeronautical resources; non-aeronautical service; large civil airport.

1. Introduction

Non-aeronautical revenue, which is an important component of the total revenue gained by civil airports, refers to the revenue generated by the airport in meeting the basic needs of aircraft take-off and landing, passengers, cargo transportation and other business related to aviation business (Wang 2021). In recent years, China has invested more and more resources in construction and development in different fields. In terms of airport construction, since non-aeronautical revenue is the main part of airport revenue (Ye 2022), major airports in China have taken the construction and improvement of non-aeronautical revenue as the main strategy for the sustainable development of airports. However, after years of development, although the proportion of non-aeronautical revenue of China's major airports has increased significantly compared with previous years, there is still a certain gap between them and world-class airports (Ye 2022). Data from "Forward-The Economist" in 2019 showed that for airports in China such as Shanghai Pudong International

Airport, Beijing Capital Airport, the non-aeronautical revenue accounted for 62.7%, 62.1% of their total revenue. However, for major international airports, such as Singapore's Changi Airport, Tokyo Airport, non aeronautical revenues take up a much higher percentage, accounting for 79%, 72% of total revenues (Zhuo 2019). These data imply that China's aviation industry still has room for development and still needs to be continuously developed and improved. Based on the actual phenomenon, this study will take Shanghai Pudong Airport as a sample to explore and focus on the shortcomings of the current development status of China's civil aviation airports, and put forward some useful improvement plans to improve the passenger experience and increase the proportion of non-aeronautical revenue of China's airports in the total revenue, in order to achieve the sustainable development of the aviation industry in the future. This survey will use both primary and secondary research. Through data on the Internet and the literature of this research will understand the basic knowledge of non-aeronautical income and the current situation of

its development. Through questionnaire survey for passengers and interviews with aviation industry insiders, the study will obtain information regarding the current situation of the development of non-aeronautical resources in China and the areas that need to be improved. This paper will also summarize and explore the solutions to increase non-aeronautical revenue and explore ways to develop non-aeronautical business.

2. Literature Review

Non-aeronautical revenue accounts for a significant portion of the airport's total revenue, which is closely linked to the development of the airport. The amount of non-aeronautical income is mainly determined by the management of non-aeronautical resources. This literature review primarily discusses the composition of non-aeronautical revenue and its importance to airports, as well as problems that exist and measures to assist airports in achieving high-quality development.

2.1 Classification of non-aeronautical revenue and its importance to airports

Nowadays, the homogenization of the aviation industry has become more and more serious. In the last 10 years, the profit margin of the aviation industry has gradually decreased, only about 2%, but the profit margin of the side industries of the aviation industry and other related industrial chains has increased steadily, about 40%. Major airlines are aware of the importance of developing non-aeronautical revenue(Wang 2021). Therefore, it is very important to know about non aeronautical resources. The non-aeronautical resources can be broadly divided into the following four types.

2.1.1 Passenger Resources

These are resources such as catering, commercial retail, advertisements in the terminal building.

The previous study used to take the data of Beijing Capital Airport as an example, in 2020, the total revenue of catering, retail, and advertising resources in this category of resources was 121345 yuan, accounting for 52.97% of all non-aviation business revenue, and in 2019, this proportion reached an astonishing 76.31% (Mu 2022).Therefore, revenue gained from passenger resources accounted for a significant proportion of the airport's total revenue. Moreover, In-depth development of passenger resources will be the key to increasing non-aviation revenue.

2.1.2 Logistics resources

These are resources such as packing and boarding, packaging, transportation.

In 2022, Shanghai Airport (including both Shanghai Pudong Airport and Shanghai Hongqiao Airport) acquired a

logistics company, and the cargo throughput in 2022 was about 3.3 million tons, which has increased to 4.2 million tons in 2024(Snowball). That's quite a staggering volume of freight.

With the rapid development of emerging cross-border e-commerce platforms such as TEMU. Airports, as a part of cross-border air logistics, are expected to further increase revenue, thereby increasing the demand for logistics and transportation and increasing the income of logistics resources. As a fixed income for airports, logistics resources can increase the airport's ability to respond to operational crises (Xiao Niu Hang Yan). So, the overall competitiveness of airports will also be enhanced through the development of logistics resources.

2.1.3 Licensed Resources

These kinds of resources usually take the form of franchise operations, such as ground service, aviation fuel refueling, aviation catering, aircraft maintenance.

The study of Ye (2022) has mentioned that, at present, the business model of large airports in China is gradually changing from self-operation to franchising, which can reduce the pressure on the operation and management of airports (Ye 2022). At the same time, Ye also mentioned that, compared with self-operation, specialized operators know more about the operation and management of non-aviation business. Finally, leading the non-aeronautical revenue increased.

2.1.4 Digital Resources

These are network platform resources.

The Action Plan for the Construction of China's Civil Aviation Airport Type 4 (2020-2035) clearly states that smart airports are airports with comprehensive production factors, data sharing. The promotion and application of intelligent technology in the airport makes the passenger boarding process more efficient, which may increase the time of passengers staying at the airport and increase passenger consumption. Secondly, the use of technology with Internet platforms and new media as carriers. It can help airport businesses make use of the airport's unified intelligent information platform and big data system to open up online drainage and increase business revenue (Zou 2022).

Zou (2022) also believed the development of digital resources also means an increase in overall strength, which helps to increase overall revenue in the context of global competition.

Therefore, airports need to build the network platform as quickly as possible.

2.2 Problems exist in the management of non-aeronautical resources of airports

2.2.1 The price of goods in the airport terminal is high

Li (2021) believed prices are a major disincentive for consumers to spend at the airport, and sometimes travelers would rather buy souvenirs in advance outside the airport than in the airport, where retail goods are too expensive. It is unacceptable to travelers (Li 2021). Therefore, the result in the low revenue gained by the retail stores in the airports, which also represent the passengers' resources have not been fully developed in most of the airports.

2.2.2 The allocation of passenger resources is not flexible

The allocation of retail stores and restaurants has a problem. At present, it is difficult for large-scale commercial airports to optimize the resource area of commercial retail and catering after they are put into use. The more obvious problem is the limitation of retail resources due to water and electricity. It is difficult to convert into catering resources, which limits the utilization of tourist resources to a certain extent (Mu 2022).

2.2.3 Lack of professionals

Nowadays, airports also do not have enough professionals for management and technology. As a result, although some airports have added digital management, intelligence departments, due to the shortage of human resources, not all their subordinate employees are talents in the field of intelligence, and their daily work is only superficial data statistics. Lack of ability to use analytical tools to analyze business data in depth (Zou 2022). This also makes the new airport digital intelligence platform unable to serve its original purpose.

2.3 Measures that have been proposed to increase non-aeronautical revenues

2.3.1 Control the price of goods and services

Li (2021) described in her paragraph, the reasons for the expensive prices in the airport. First, commercial prices are driven by the interests of the national economy, and it is necessary to increase profits. At the same time, the rent of shops in the airport is generally relatively high, coupled with the cost of the product itself, and to earn income, many stores choose to increase the price of the product. Therefore, the business strategy should become more accessible, and activities such as discounts can be increased to reduce the price difference (Li 2021).

2.3.2 Expand non-aeronautical business areas

The advantages of the airport can be used to expand the scope of non-aeronautical services, such as cooperating with travel companies to create complete travel routes, through cooperating with travel companies to carry out activities such as fare discounts, not only to increase the number of tourists of travel companies, but also to obtain non-aeronautical income through cooperation. It can also

expand the scope of investment attractions and introduce entertainment facilities such as beauty, cinema, bookstore in the terminal building to provide more entertainment. Meet the diverse needs of passengers (Ye 2022). As a result, the non-aeronautical revenue can be increased.

2.3.3 Transform the airport operation model

The previous study mentioned that airports should change from the traditional self-operated model to the franchise model, hand over more non-aeronautical business to specialized operators, which can reduce the pressure on the operation and management of the airport, ensure the effective development of non-aeronautical business, and greatly improve the profitability of non-aeronautical business. Eventually, improving the overall operating efficiency of the airport (Mu 2022).

2.3.4 Strengthen human resource management

In addition, the airport can also hire professional trainers from other airports or the aviation industry to train relevant business personnel. At the same time, regular assessments are carried out to find out the deficiencies of personnel in a timely manner, check and fill in the gaps, improve the overall professionalism of the airport management team, and better manage non-aeronautical resources (Ye 2022). Therefore, professionals can manage non-aeronautical resources effectively and increase the non-aeronautical revenues of the airports.

3. Methodology

The following section provides an overview of the questionnaire design to obtain passengers' consumption habits at the airport, as well as their satisfaction with non aeronautical services such as shopping services at Pudong Airport. At the same time, by conducting interviews, the components of non-aeronautical revenue and the current use of non-aeronautical resources in Pudong Airport will be understood. Based on the results from primary and secondary research, this paper aims to deduce an effective way to increase the non-aeronautical revenue of Pudong Airport.

3.1 Primary Research: Questionnaire

3.1.1 Questionnaire purpose

This questionnaire focuses on collecting passenger data, investigating passengers' spending patterns at the airport and passengers' overall experience of non-aeronautical resources and services at Pudong Airport. By analyzing the results through specific apps, it is possible to deduce the direction in which the airport can improve the use of non aeronautical resources and derive the actions that can be taken.

3.1.2 Questionnaire Research Design

The questionnaire consists of 17 closed-ended questions, which makes the statistical analysis less difficult.

It is divided into two parts. The first part is a personal information survey, such as the gender and age of the respondents.

The second part is about the non-aeronautical resources of the airport, the content of the questionnaire changes according to the respondents' choices, to exclude responses that are not highly relevant to the research. This section will also provide a deep look at passengers' spending

habits and attitudes towards the airport's non-aeronautical services. Finally, based on the perceptions and attitudes of the people obtained from the questionnaire, measures to increase non-aeronautical income are discussed.

3.1.3 Sampling

The questionnaire collected different responses from 311 people, and at the same time, information about the respondents, such as gender, age, occupation, and annual income, was also gathered, as shown in the graphs below.

Gender:↵	↵
Man↵	112↵
Woman↵	197↵
Others↵	2↵
Age:↵	↵
14-18↵	13↵
19-30↵	86↵
31-40↵	139↵
41-50↵	51↵
51-60↵	21↵
Over 60↵	1↵
Annual personal income:↵	↵
0↵	14↵
Under50000↵	42↵
50000-100000↵	66↵
100000-200000↵	86↵
Over 200000↵	103↵
Times to take flights every year:↵	↵
Below 5↵	184↵
5 times – 10 times↵	82↵
10 times – 20 times↵	30↵
Over 20 times↵	15↵

Figure 1: information about the respondents

3.1.4 Data Collection and analysis of the Questionnaire

The questionnaire is designed in both English and Chinese to ensure that respondents can clearly understand the questions. For data presentation, bar charts will be used to show the share of different groups of people in all respondents. The results of questionnaires and the literature will also be combined to further analyze the reasons behind the results presented in the questionnaire results. Of the total number of questionnaires collected, 14 respondents

said they had never spent money at the airport, so these responses would not be used as a condition to supplement the results of the survey and were at risk of being eliminated.

3.1.5 Privacy Protection

There is an informed consent form designed at the beginning of each questionnaire. This form fully explains the purpose of the questionnaire, its privacy - related aspects, as well as its voluntary nature. The questionnaire does not

include questions that may involve sensitive information, and the privacy of everyone who participates in the questionnaire is taken seriously.

3.2 Primary Research: Interview

3.2.1 Interview purpose

The interviews focused more on airport management insiders' attitudes towards the allocation of non-aeronautical resources at Pudong Airport. At the same time, since industry insiders have a clearer judgment on the airport's resources than passengers, an analysis of the lack of development and management of non - aeronautical resources at Pudong Airport can be conducted from the perspective of objective and realistic resource utilization at the airport. Then, solutions can be further proposed to improve non - aeronautical revenue. Interviewing professionals can also provide theoretical support for research, and it is important to understand the importance of airports.

3.2.2 Interview design

The interview consists of seven open-ended questions, which give the interviewee a greater degree of freedom, so that more information can be obtained.

The design of the questions revolves around the utilization of non-aeronautical resources at Pudong Airport. Through the interviews, theoretical knowledge of non-aeronautical resources can be supplemented, and finally ways to increase the proportion of non-aeronautical revenue of Pudong Airport can be explored.

3.2.3 Interviewee

There were two interviewees in this interview, both of whom are employees of a Chinese airplane company, who have a certain understanding of the current non-aeronautical income of Pudong Airport and its resource allocation. Therefore, they can provide accurate information on the utilization of non-aeronautical resources at Pudong Airport, which can help the research.

3.2.4 Analysis

For the results of the interviews, the main method of thematic induction was used. The two interviews have a lot in common. By extracting the same keywords from the two interviews, the author can obtain useful information for the research.

3.3 Secondary Research:

Literature provides theoretical knowledge and lays the foundation for this research. At the same time, the focus of the literature is related to the current development of large - scale civil airports in China and the utilization of non - aeronautical resources. In addition, the content of the literature is highly correlated with the questionnaire and

interview results, which can help explain passengers' consumption patterns at the airport. There are some similarities between the literature findings and the survey results, confirming that the methods for improving the utilization of non - aeronautical resources are relatively clear and are helpful for summarizing effective methods to enhance the non - aeronautical revenue of Pudong Airport.

4. Results and discussion

This section will focus on the different perspectives found in the survey. Taking Shanghai Pudong International Airport as an example, through a comprehensive analysis of the questionnaire and interview outcomes and try to deduce the attitudes of airport passengers and professionals towards the current development status of airport non-aeronautical revenue and the shortcomings of the current airport non-aeronautical resource management. At the same time, exploring and summarizing feasible solutions to improve the airport's non aeronautical revenue. Further comparative analysis with previous studies to identify similarities and differences to gain a profound understanding.

4.1 The current state of non - aeronautical resource management at Pudong Airport

1.1.1 Commencing from passenger satisfaction

Figures 2, 3 and 4 show the results of the survey on Pudong Airport passengers' satisfaction with the airport's catering, retail, and overall experience. According to the data, 43.09% and 49.01% of the passengers expressed satisfaction with the variety of goods and prices and catering services of Pudong Airport, while 53.29% of the passengers were dissatisfied with the overall non-aviation services of Pudong Airport.

These data can prove that even the proportion of China's non-aeronautical income has risen rapidly, it has not yet met the expectations of most passengers. Therefore, large civil airports still need to increase the amount of non-aeronautical revenue.

Ye(2022)'s research corroborates this conclusion, estimating that there is still a gap of about 15 percent in the share of non-aeronautical revenue between top airports in China and the world's top airports. This also proves the necessity of increasing the non-aeronautical revenue of China's airports.

As a result, there are still shortcomings in the non-aeronautical revenue and resource management of China's airports, such as Pudong Airport.

Question 14 How satisfied are you overall with the food and drink service at the Shanghai Pudong International Airport?

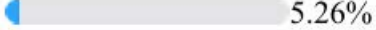
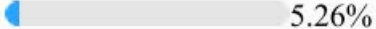
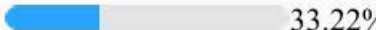
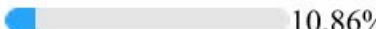
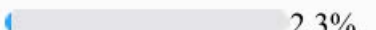
Options	subtotal	proportion
very dissatisfied	16	 5.26%
not satisfied	16	 5.26%
general	131	 43.09%
satisfied	101	 33.22%
very satisfied	33	 10.86%
have not experienced it	7	 2.3%
total	304	

Figure 2: the overall satisfaction with the food and drinks service at the Shanghai Pudong International Airport

Question 15 How satisfied are you with the variety and prices of the products in the Shanghai Pudong International Airport shopping area?

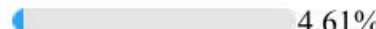
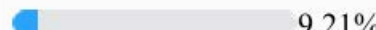
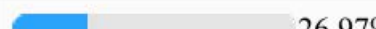
Options	subtotal	proportion
very dissatisfied	14	 4.61%
not satisfied	28	 9.21%
general	149	 49.01%
satisfied	82	 26.97%
very satisfied	19	 6.25%
have not experienced it	12	 3.95%
total	304	

Figure 3: the overall satisfaction with the variety and prices of the products in the Shanghai Pudong International Airport shopping area

Question 16 What is your overall experience with the airport's non-aeronautical services (e.g. dining, shopping, entertainment, etc.)?

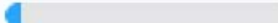
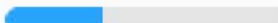
Options	subtotal	proportion
very dissatisfied	10	 3.29%
not satisfied	19	 6.25%
general	133	 43.75%
satisfied	107	 35.2%
very satisfied	26	 8.55%
have not experienced it	9	 2.96%
total	304	

Figure 4: the overall experience with the airport's non-aeronautical services

1.1.2 Commencing from the perspective of airport industry managers

In the interview about the current non - aeronautical resources and income of Pudong Airport, the two interviewees were workers related to non - aeronautical resources at Pudong Airport and they also mentioned that there was still room for growth in Pudong Airport's non aeronautical revenue. The interviewees also discussed that Pudong Airport has even begun to build the T3 terminal, so the non - aeronautical resources are still constantly being updated, far from reaching full utilization. This view is also supported by literature, specifically by Mu from the Beijing Capital Airport Group, who mentioned in the article that, many indicators of China's large airports, such as Shanghai Pudong Airport, are at a high level both domestically and internationally, but there are still gaps in per - passenger consumption of retail, catering, and other services in most domestic airports compared with the airports with a higher degree of development in the world (Mu 2022). Overall, whether from the perspective of passengers or airport managers, the current situation of non-aeronautical resource management at Pudong Airport is still improving, and there is room for improvement since it has not reached a very good level.

1.2 Current problems in the management of non-aeronautical resources at Pudong Airport

1.2.1 Analysis from the perspective of passengers

1.2.1.1 The prices of food and retail goods at the airport are excessive

Figure 5 illustrates the reasons why the 162 respondents in the questionnaire survey are dissatisfied with or have a neutral feeling about the current management of Pudong Airport's non aeronautical revenue resources. The reason for the largest proportion is that the price of goods at the airport is too high, accounting for 45.06%. This also proves that excessive prices are recognized as a problem by most Pudong Airport consumers. Li (2021)'s research can also prove the existence of this problem. In the article, she mentioned that the cost of retail and food in the airport is very high due to many unnecessary costs, such as expensive venue rent, utilities and other expenses. Eventually, it causes stores to inflate prices to cover costs, but this also results in inconvenience for consumers. Therefore, the excessively high price reduces the profit that the airport store can earn and finally reduces the non-aeronautical revenue of Pudong Airport.

Question 17 Why are you dissatisfied or feeling average about your overall experience with Pudong Airport's non-aeronautical services?

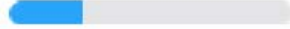
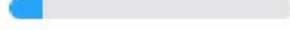
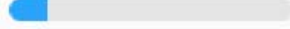
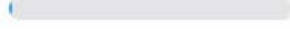
Options	subtotal	proportion
There are too few categories of non-aeronautical services to cover all your needs	43	 26.54%
The price is too expensive	73	 45.06%
You don't experience many non-aeronautical services at Pudong Airport	20	 12.35%
The quality of non-aviation services is not good (e.g. the catering is too simple, the taste is not good, the massage chair is more faulty, etc.)	22	 13.58%
others	3	 1.85%
total	161	

Figure 5: the reasons why passengers are dissatisfied with Pudong Airport's non-aeronautical services

1.2.2 Analysis from the perspective of managers

1.2.2.1 The prices of food and retail goods at the airport are excessive

An interviewee mentioned that it is rare to see decorations that can represent Shanghai's cultural characteristics at Pudong Airport. Compared with popular scenic spots, it is difficult to find shops selling Shanghai-related tourist souvenirs, so the income from the sale of souvenirs in Pudong Airport stores is not substantial, which is also a reflection of the incomplete development of non-aeronautical resources. This situation is also mentioned in Li (2021)'s research, and she believes that travelers' desire to spend will be stimulated when they are in a certain atmosphere, such as an environment where they can feel the local cultural connotation (Li 2021). Therefore, exploration of local cultural experience is also very important for the airport. However, Pudong Airport did not do this.

1.2.2.2 Incomplete construction of digital information resources

One interviewee introduced that in 2024, Pudong Airport listed six columns of data products on the Shanghai Data Exchange, but these resources can still be developed by the airport in the future, so Pudong Airport has not fully realized the economic value of data resources for the time being and has not been able to maximize the airport's non-aeronautical revenue. Digital information resources

are very important, in Mu (2022)'s research, it has also been mentioned that most of China's airports need to promote digital infrastructure construction, intelligent transformation, there is no interconnection of information resources between airport commercial business units, registered members and passenger members big data is not shared. There is no online service scene or online marketing platform, which is also a problem (Mu 2022).

1.2.2.3 Licensed resources are not fully developed

In interviews, both interviewees mentioned that there are also problems in the development of Pudong Airport's concession resources. At present, they mentioned that Pudong Airport has adopted a franchise model in terms of duty-free, aviation fuel and other businesses. However, there are still some businesses that have not been franchised or are in the exploration stage, such as some basic businesses of the airport, like venue leasing, airport transportation. To a certain extent, this has led to the failure to maximize Pudong Airport's non-aeronautical revenue.

Wang(2020) and Ye(2022) both agree on the existence of this problem, Wang mentioned that at present, most airports in China still lack consensus on the traditional business model and franchise model, and because it is difficult to predict the impact of the airport industry after the implementation of the law, most airports in China have not fully developed franchise resources(Wang 2020). Ye believes that those resources that have not yet been converted into franchises require the airport to spend a lot of

manpower, material resources and energy to operate and manage, which is also the reason for the slow increase in the proportion of non-aeronautical revenue of Pudong Airport (Ye 2022).

Overall, the current management of non-aeronautical resources at Pudong Airport, whether from the perspective of consumers or from the perspective of resource managers, there are deficiencies and areas that can be improved or further developed.

1.3 Possible policies to increase Pudong Airport's non-aeronautical revenue

This section mainly summarizes the possible policies that can increase the non-aeronautical revenue of Pudong Airport, and compares them with the methods proposed by previous ones.

1.3.1 To improve the passenger comfort of Pudong Airport

1.3.1.1 Reduce the prices of retail and food at the airport

According to the results of the survey, the price problem is considered by travelers to be quite serious. Therefore, reducing the price of goods in the airport will be an effective strategy to improve passenger satisfaction, and by reducing the rent of retail stores at the airport, it may be possible to reduce the cost of stores, which in turn will decrease prices. Li (2021) agrees with this approach in her research, agreeing that airport managers should try to use a more people-friendly way of operating, which can increase customers' desire to spend to a certain extent and reduce the difference in the price of goods sold at the

airport inside and outside the airport (Li 2021). Finally, if passengers' desire to buy increases, passengers' spending at the airport may increase, so the non-aeronautical income obtained by the airport's passenger resources can be improved.

1.3.1.2 Change the business management model of Pudong Airport

By changing the business management model of the airport, it can effectively improve the comfort of passengers. For example, as shown in the figure 6, it show the non-aviation service items that passengers choose in the questionnaire survey that tend to be willing to consume, and it can be seen from the figure that quite a number of passengers will experience catering(75.56%), so the airport can attract investment, let well-known catering brands compete with each other, introduce internationally renowned brands, enrich the airport catering industry. Some passengers will want to experience beauty and other services at the airport, so the airport can also expand the scope of services, add beauty salons and other service facilities, meet the passengers' consumption desires, and ultimately achieve the purpose of increasing non-aviation income.

Ye (2022) also mentioned such methods in the article, and she believes that these changes in business management models will not only create more convenience for passengers, but also greatly increase the airport's revenue level(Ye 2022). Ultimately, the proportion of non-aeronautical revenue of airports will be increased.

Question 9 What kind of services or facilities will encourage you to spend more time at an airport?

Options	subtotal	proportion
plenty of dining options	235	 75.56%
quality shopping experience	198	 63.67%
rest and recreational facilities	103	 33.12%
special events or promotions	132	 42.44%
others	9	 2.89%
total	311	

Figure 6: services that passengers will spend more time

1.3.2 The utilization of non-aeronautical resources at the airport shall be the starting point

1.3.2.1 According to local characteristics, add cultural experience areas in the airport

According to the questionnaire survey, as shown in Figure 7, except the food, there are also passengers who express a desire to experience or buy local specialties at the airport (36.33%). During the interview, it was also mentioned that the airport management could incorporate cultural decorations into the airport environment. For example, in

Shanghai, large - scale replicas of iconic landmarks could be erected, such as the Oriental Pearl and the Bund building complex. In this way, tourists from other places can sense the rich cultural ambiance after arriving at Pudong Airport.

According to Li (2021) in her article, these decorations can showcase the business - friendly atmosphere of the airport and stimulate the desire of tourists to spend, such as buying souvenirs. Finally, the purpose of increasing non-aeronautical revenue should be achieved.

Question 10 Which non-aeronautical services in the airports do you typically consume for?

Options	subtotal	proportion
food & drinks	285	 91.64%
shopping	195	 62.7%
entertainment (such like cinema , gamnes area)	71	 22.83%
health & beauty services (such as massage , yoga)	39	 12.54%
children's equipments	49	 15.76%
facatural display , cultural and creative products , local characteristic experience	113	 36.33%
others	8	 2.57%
total	311	

Figure 7: types of non-aeronautical services that passengers will consume for

1.3.2.2 Build digital platform

With the development of the big - data platform, the airport can present various non - aeronautical services to passengers, thereby enhancing passengers' recognition of airport services. At the same time, big - data analysis and other techniques can be employed to identify the types of businesses that tourists are inclined to patronize. Then, commercial initiatives aimed at boosting passengers' willingness to consume can be implemented throughout their journeys. In the interview, some interviewees also mentioned that big data and other technologies can be used to targeted advertising and stimulate consumers' desire to consume. Moreover, by integrating mobile terminals and aerial display screens, the airport can intelligently inform passengers about non - aeronautical services and provide

them with electronic coupons. In Zou (2022)'s view, such digital development can achieve the upgrading of airport business. Finally, increase the airport's non-aeronautical revenue.

1.3.2.3 Development of licensed resources.

Some interviewees proposed that Pudong Airport can augment its non - aeronautical revenue by expanding the scope of concessions, for instance, by including airport transportation services. This would enhance the overall operational efficiency of the airport, potentially leading to an increase in revenue from non - aeronautical resources and a higher proportion of non - aeronautical revenue in the total.

Both Mu(2022) and Wang(2020) agreed that the franchise model plays an extremely important role in the operation

of the airport, and that the development of concession resources can not only ensure the effective development of non-aeronautical business, but also greatly improve the overall non-aeronautical profitability of the airport and increase the non-aeronautical revenue.

However, Li(2021) has a different view on this aspect, and while she also agrees that the franchise model will bring benefits to airports, she also believes that airport terminal managers cannot be directly involved in the social activities of cargo operations. The need for more comprehensive supervision of the objects of special permits has increased the operating costs of airports, which is also a disadvantage of large-scale development of concessions.

2. Evaluation

This study successfully demonstrates the importance of non-aeronautical resources and identifies existing issues in the management of these resources through an exploration of non-aeronautical resources and revenues. Ultimately, it deduces possible strategies to increase non-aeronautical revenues at airports, addressing the initial research objectives and questions, and providing a certain direction for development and reference for large airports in China in the future. However, there are still areas for improvement in the overall project.

Regarding primary research, although two reasonable research methods were employed, there is room for enhancement in both. Firstly, for the questionnaire, although 311 valid responses were collected, which represents a reasonable sample size, the survey was constrained by factors such as the social circle of the survey distributor and age. As a result, the types of respondents were not comprehensive. Therefore, the data obtained from this survey has a certain degree of one-sidedness and cannot represent the situation of all individuals. Secondly, regarding the interview research, only two interviewees were included in this study, which is far from sufficient. The views of only two interviewees do not have the universal applicability of a questionnaire survey and may be influenced by factors such as the interviewees' personal emotions and cognitive levels. Therefore, in this aspect, the implementation of this research method lacks sufficiency and exhibits one-sidedness.

There are also certain limitations to the scope of this research topic. Since this study is based on factual situations, many development strategies for non - aeronautical resources have not been fully implemented and are still at the planning stage. For example, the construction of large airport - adjacent economic zones. Therefore, this research focuses more on explored non-aeronautical resources. In future research, attention may also be given to the possibility of innovative strategies for enhancing non-aeronautical resources, such as incorporating large shopping malls

into airports and promoting tourism collaboration between airports and local cultural attractions. These areas await future practical observation and research.

3. Conclusion

In conclusion, this article primarily explores non - aeronautical revenue at airports through the study of existing literature. It demonstrates that enhancing non - aeronautical income can bring benefits to airports from various resource perspectives, which is crucial for the overall development of airports. Taking Shanghai Pudong International Airport as an example, based on questionnaires and interviews with managers of non - aeronautical resources at Pudong Airport, it is inferred that general passengers are somewhat dissatisfied with the non - aeronautical services offered, indicating significant room for improvement in the management of non - aeronautical resources at Pudong Airport. Furthermore, it deduces that there are deficiencies in the management of non-aeronautical resources at most large airports. Additionally, it explores strategies for enhancing non - aeronautical revenue from two different starting points: improving passenger comfort and increasing the utilization of non - aeronautical resources. Currently, regarding the development of airports in China, although, as exemplified by Pudong Airport, the overall level of non - aeronautical income has reached a medium level globally, it has not yet reached the top. The management measures for non-aeronautical resources proposed in this study can effectively support the commercial development of large airports in China. In the future, it may be possible to develop an airport business circle focused on managing the various non - aeronautical resources mentioned in this study. By treating the airport and its surrounding areas as a small economic entity, we can foster the airport economy. Ultimately, this will lay a foundation for the continued development of airport commerce in our country, supporting the realization of the national objectives through the rapid growth of the airport industry in the future.

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Ac knowledgements

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Appendix: Further findings

This appendix documents some of my other findings and explorations in the dissertation research.

Regarding the problems in current non - aeronautical resources management, in addition to the reasons mentioned earlier, the contradiction between the terminal's commercial

positioning and the actual operating brands can also be a significant issue. The operators introduced through the ,highest - price - wins' bidding method do not consider the preferences and convenience of passengers flying to different regions, nor do they compete to provide suitable goods for different passenger groups. This, in disguise, has caused a waste of commercial resources. Therefore, the airports failed to maximize non-aviation revenue(Meng and Wu 2019).

The coverage of non-aeronautical resources at Pudong Airport is also too narrow. One reason for some passengers' dissatisfaction with non - aeronautical services is that there are too few non- aeronautical services at Pudong Airport to meet their full needs. Some travelers even felt that they had little exposure to non - aeronautical services at Pudong Airport, which reflects the irrationality in the management and arrangement of non - aeronautical resources at the airport. This reflects the irrationality of the management and arrangement of non-aeronautical resources of Pudong Airport. In Ye (2022)'s research, she also mentioned that the reason for the low-income level of many non- aeronautical businesses today is that the field is too narrow to better meet the diversified consumption needs of passengers (Ye 2022), which also supports the results of the questionnaire. Therefore, the lack of a wide range of non-aeronautical services is also a serious problem.

Lack of the development of real estate resources can be seen as a problem, too. The development of the area around Pudong Airport was touched upon in the interview. Both interviewees pointed out that there are many vacant office buildings around Shanghai Pudong Airport. This indicates that the airport management has not recognized the importance of these idle real - estate resources, resulting in the airport's inability to obtain lease fees from these sites to supplement operating costs.

What's more, technical resources of most of the airports are not fully exploited. Technical resources were also mentioned in the interview, with one interviewee mentioning that despite the importance of technical resources for airport development, the current provision of a wide range of technical and commercial consulting services to airports in other regions is not sufficient, resulting in the fact that the revenue generated by Pudong Airport through the trading of technical resources is not maximized. This problem was also mentioned in Zou's (2022) article. He explained that in the development and construction of most airports in China, there is a shortage of professionals, and many employees in airport management positions face a ,professional mismatch' dilemma. He believes this has, to some extent, slowed down the development of non - aeronautical resources and businesses at airports, preventing non - aeronautical revenue from achieving new breakthroughs.

Therefore, to increase airports' non - aeronautical revenue, measures can start with real - estate and technical resources. For example, airports can lease idle office buildings to obtain rental income. They can also improve the construction of technical resources, such as building a digital business information - sharing mechanism covering the

application, service, and function - realization fields. This can effectively avoid the formation of commercial islands, promote competition and development among different airports, and ultimately increase non - aeronautical revenue.



Figure 8 and figure 9: Empty interior of airport terminals⁴