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Abstract: Macau's return to China, its economy, represented by the tourism industry, has rapidly developed. As people's travel demands between cities have increased, the choice of transportation has become more diverse and convenient. The development of Macau International Airport (MIA) has also received increasing attention. This thesis analyzes the external environment and internal development of MIA, examines its strengths and weaknesses, opportunities, and challenges, and proposes corresponding development strategies. The aim is to provide reference and guidance for the future development of Macau International Airport.

摘要：澳门自回归以来以旅游业为代表的经济快速发展，人们城市间的出行需求也随之上升，对出行方式的选择趋于多样与快捷，澳门机场的发展也日益受到关注。本文分析澳门机场所处的外部环境和自身发展情况，分析提炼澳门机场自身的优势与劣势，及其所面临的机遇与挑战，并提出相应的发展策略，旨在为澳门机场的未来发展提供参考和借鉴。

Keywords: Macau International Airport, SWOT, Development Strategies, the Greater Bay Area

关键词：澳门国际机场，SWOT，发展策略，粤港澳大湾区

1. Introduction

1.1 Research Background

In recent years, China's civil aviation industry has experienced rapid development, driven by the country's high-speed economic growth and booming tourism. The industry has expanded its scale with the construction of numerous new airports and the improvement of its facilities and services (Liao et al.,2019). As a result, both passenger and cargo volumes have seen steady growth, further elevating the role and importance of air transportation in the country's transportation system.

According to the Civil Aviation Administration of China, the annual passenger throughput of Chinese airports has increased from 621 million in 2011 to 1.352 billion in 2019. As China's per capita GDP surpassed $10,000 in 2019, the travel demand has increased steadily. People are opting for diverse and fast modes of transportation, and civil aviation has emerged as the preferred choice for more and more people. Especially in the past 15 years, China's infrastructure construction level has been significantly improved, and more airports have been built. Newly established airlines across the country have joined the civil aviation industry one after another. Airports' ability to serve the people's needs for a better life and support national strategies has been significantly enhanced to better meet the needs of economic and social development.

1.2 Guangdong-Hong Kong-Macao Greater Bay Area Airport Cluster

The outline of the development plan of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) clearly proposes to strengthen the infrastructure construction, facilitate external connectivity, improve internal connectivity, establish a well-structured, fully functional, and seamlessly integrated infrastructure network with a reasonable layout and build a world-class airport cluster.

GBA is highly dense in terms of pedestrian flow, information flow, and industrial flow. Within this area, there are four major airports, including Guangzhou Baiyun International Airport, Shenzhen Bao'an International Airport, Zhuhai

Jinwan Airport, and Hong Kong Chek Lap Kok International Airport, in addition to Macau International Airport (Huizhou and Foshan airports are not studied due to their smaller passenger volume, late start, and dual military and civilian use.). As each airport in the region has different basic conditions and development positioning, the airport cluster in this area exhibits a relatively complex relationship between competition and cooperation (Mo et al.,2022).

Table 1. *Overview of the five major airports in GBA （Source: Collated from the official websites of airports）*

Airport Name	Airport Grade	Runway length/number	2019 Passenger Volume	2022 Passenger Volume
Hong Kong HKG	4F	3800 M/2	71.5 million	57 million
Guangzhou CAN	4F	3800 M/2；3600 M/1	73.4 million	40.3 million
Shenzhen SZX	4F	3400 M/1；3800 M/1	52.9 million	36.3 million
Zhuhai ZUH	4E	4000 M/1	12.3 million	8 million
Macao MFM	4E	3360 M/1	9.61 million	0.6 million

1.3 Literature Review of Airport Development

The development and operation of airports have a significant impact on the local economy. Jiang and Ren conducted Granger causality tests on the relationship between the air transport scale of Pudong Airport and the value-added and total output of advantageous industries in Pudong New District, and the empirical results showed that the development of modern service industries and high-tech industries (such as information services, medical equipment manufacturing, and electronic communication equipment manufacturing) is the Granger cause of the growth of the transport scale of Pudong Airport (Jiang & Ren, 2018).

Song and Suh used a structural equation model to analyze a survey conducted in Korea, and the results showed that the most significant chain reaction was brought about by the increased use of air transport and communication with other regions (Song & Suh, 2022). Wang et al., analyzed the competition and sustainable development of multi-airport regions using GBA as a case study (Liao et al., 2021).

Fu and Li used PEST analysis and Porter's five forces competitive model to study the challenges, opportunities, advantages, and weaknesses of the current development of different airports, analyzed the competitive environment faced by Jieyang Chaoshan Airport and Sanya International Airport, and proposed development strategies (Fu, 2019; Li, 2021).

2. Analysis of the current situation of Macau Airport based on SWOT analysis

2.1 Overview of Macau International Airport (MIA)

MIA is located on the artificial island of Taipa in Macau, which was created through land reclamation, and began commercial flights in November 1995. After more than 20 years of development, the airport's passenger flight network covers most provincial capitals and developed coastal cities in China, as well as major cities and tourist destinations in Northeast Asia and Southeast Asia. The number of airport passengers has steadily increased year by year, exceeding the design of 6 million passengers per year before construction. Even though part of the adjacent Taipa Ferry Terminal was allocated to the MIA for use, it still could not meet the demand of the growing number of passengers.

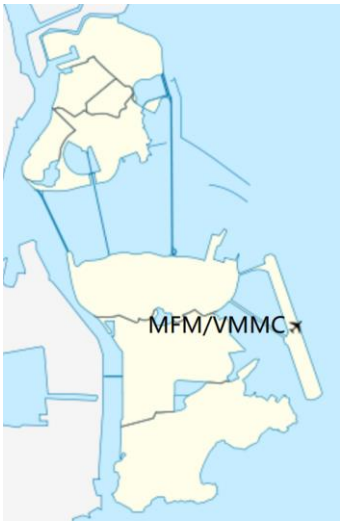

***Fig** 1. Location map of MIA （Source: Wikipedia）* ***Fig 2.** Rendering of the expanded airport (Source: Civil Aviation Authority of Macao）*

With the announcement of the development plan for GBA, Macau has established the goal of building a world tourism and leisure center and a service platform for commercial cooperation between China and Portuguese-speaking countries (Chen, 2020). Against this backdrop, various sectors of society are paying close attention to the development plan for MIA. In 2016, the Macau SAR government officially approved the "Macau International Airport Overall Development Plan" and included it in the "Five-Year Development Plan of the Macau SAR (2016-2020)". In 2022, the State Council approved the expansion of MIA through land reclamation.

2.2 Analysis of Strengths and Weaknesses, Opportunities and Challenges of MIA

SWOT analysis is an appropriate method for strategic planning and has been widely applied in the aviation industry. Some scholars have conducted studies on the development strategies of airports in Korea and Turkey (Chung & Song, 2021; Muhammet et al., 2020). This section analyzes the strengths and weaknesses of MIA's development by examining the internal operating conditions of MIA. Then, it analyzes the opportunities and threats faced by MIA by studying the macro environment, industry development environment, and nearby competitors.

2.2.1 Strengths of MIA

2.2.1.1 The unique advantage of geographical location.

The GBA, where Macau is located, is one of the most open and economically vibrant regions in China. According to statistics from the Hong Kong Trade Development Council in 2022, GBA has a population of over 80 million and a GDP of nearly 2 trillion US dollars. Macau is one of the four central cities in this area, and its prosperity is of great significance in enhancing the development level of the western Pearl River Delta.

By taking the Guangzhou-Zhuhai intercity railway, it only takes an hour to travel from Zhuhai Station, which is adjacent to Macau, to Guangzhou South Station. It also takes only an hour to travel by boat from Taipa Ferry Terminal in Macau to Shenzhen. With the completion of the Hong Kong-Zhuhai-Macau Bridge, it only takes 50 minutes to travel from the Zhuhai-Macau artificial island to the Hong Kong port. The one-hour living circle in GBA has basically been established. As the Shenzhen-Zhongshan Channel and other high-speed rail lines are successively completed, travel between Macau and other surrounding cities will become even more convenient.

2.2.1.2 Leading edge of specialty airline routes

Macau Airport's aviation business, particularly its Southeast Asia, Japan-Korea, and cross-strait routes, has a clear leading advantage in the western Pearl River Delta and even Guangdong province. After the relaxation of epidemic prevention and control measures, MIA's passenger routes quickly resumed, and as of May 2023, its route network has covered 14 cities in Southeast Asia. The diverse international routes can attract not only overseas tourists to visit Macau for tourism consumption but also mainland Chinese tourists who can take advantage of the policy

convenience of visa-free transit when holding Chinese passports and traveling through Hong Kong or Macau to go abroad. In the future, popular tourist destinations such as Okinawa, Japan, and Pattaya, Thailand, are also key markets for development. It is expected that under the strong driving force of the tourism industry, MIA's advantage in route richness will continue to strengthen.

2.2.1.3 Operating Performance of the Base Airline: Positive

As the base airline of Macau Airport, Air Macau has invested in the largest capacity and route scale in the local market. However, Air Macau has also gone through operational crises. In 2008, the opening of direct cross-strait flights caused Air Macau to a significant decline (over 60%) in the passenger and cargo business. To save a company on the verge of bankruptcy, the Macau SAR government, the Liaison Office, and China Aviation Group provided funding support to Air Macau. Under the leadership of Air China, they carried out equity restructuring and capital injection to Air Macau, injecting 159 million yuan and sending out professional teams to reduce excess capacity and improve aircraft asset utilization by leasing aircraft. Air Macau's mother company, Air China, joined the Star Alliance, enabling Air Macau to engage in code-sharing with other airlines such as ANA, Korean Air, and Thai Airways, which helped to enhance its market competitiveness.

As of January 2021, Air Macau operated a total of 30 domestic and international routes, covering mainland China, Southeast Asia, and Northeast Asia. It currently has a young fleet of 22 Airbus passenger aircraft and plans to introduce new A320NEO and A321NEO passenger aircraft to further expand its fleet size and enhance its competitive advantage.

2.2.2 Weaknesses of MIA

2.2.2.1 Land space constrains further development of airport scale

MIA is located on reclaimed land in the eastern part of Taipa Grande Hill, with Taipa Ferry Terminal and Ka-ho Pier at its south and north ends, respectively. The airport's runway expansion is limited to the eastern waters, as the current 3,360-meter runway cannot accommodate large aircraft like the Airbus A380. Despite an expected annual passenger flow of over 10 million in the post-pandemic era, the airport's runway, passenger terminal, and cargo facilities are insufficient to meet the spatial demands of further development due to land space constraints.

2.2.2.2 Macau has a relatively small population.

Although the GBA where Macau is located has a population of tens of millions, the small population size of Macau itself makes it difficult to support the stable development of passenger traffic at MIA. According to data from the Statistics and Census Service of Macau, the population of Macau in the first quarter of 2023 was 674,000, and it is expected to reach around 800,000 by 2040, which is only the population size of a developed county-level city in mainland China. The low local population size results in the high dependence of the airport's passenger flow on external sources. If there are any changes in public health emergencies or geopolitical environments, MIA will also be greatly affected and impacted.

2.2.2.3 The airspace in the Pearl River Delta is tense.

The Pearl River Delta where MIA is located is one of the most complex and busiest airspace areas in the world and is subject to strict restrictions on air traffic by the government. As a result, the airspace in this region is already very tense. Military exercises, air traffic control, typhoons, and severe convective weather events can all affect flight punctuality and cancellation rates, leading to increased airport operating costs and decreased competitiveness.

2.2.2.4 Intense competition from neighboring city airports.

The nearby Hong Kong Airport, Guangzhou Airport, and Shenzhen Airport have rich route networks and operate intercontinental routes to Europe, America, Africa, and Oceania, with significant transportation hub status. Compared to MIA, the neighboring Zhuhai Airport has lower labor and logistics costs and has opened more routes to central, western, and northeastern China, which will generate direct and intense competition.

2.2.3 Opportunities of MIA

2.2.3.1 Support from the central government for Macau.

Since Macau's return to China over 20 years ago, the central government's support for the development of Macau has continued to increase, covering various aspects such as economic cooperation, large-scale infrastructure construction, talent exchange and training, and livelihood security. Macau's development has entered a period of great opportunities as an important node of the "Belt and Road" initiative and a core city in GBA.

2.2.3.2 The development of diversified industries enhances the city's resilience

For a long time, the economic structure of Macau has been relatively single and heavily dependent on the gaming and tourism industry. To address this, the SAR government adopt a "1+4" moderately diversified development strategy. "1" refers to building a world-class tourism and leisure center. "4" refers to continuously promoting the development of the four key industries of health, modern finance, high-tech, convention and exhibition, culture and sports, and gradually increasing their proportion in the economy. The development of diversified industries can enhance Macau's risk resistance, promote the flow of people within and outside the region, and also help to supplement the passenger flow of MIA during non-weekend and non-holiday periods.

2.2.3.3 The transportation network connecting Macau Airport is becoming more comprehensive.

The transportation network connecting MIA to various parts of the city is becoming increasingly comprehensive, which is improving the airport's accessibility. By optimizing connections between the airport, ferry terminals, light rail stations, and bus stops, passengers have more transportation options. As of 2023, the light rail station adjacent to the airport can reach major tourist areas in Taipa and the Hengqin Port. Meanwhile, the ferry routes from the Taipa Ferry Terminal in the north of the airport cover Hong Kong, Shenzhen, Zhuhai, and other cities. Construction of the new light rail line connecting the Macau Peninsula (Gongbei Port) is underway. The increasingly comprehensive public transportation network not only serves the local residents of Macau but also attracts passenger flow from nearby cities to MIA.

2.2.4 Challenges of MIA

2.2.4.1 Intense competition from other modes of transportation.

China's high-speed railway has developed rapidly, with the operating mileage ranking first in the world. It has basically formed a planning pattern of eight horizontal and eight vertical lines, and over 90% of cities with a population of over one million have high-speed railways passing through them. The Zhuhai High-speed Railway Station is adjacent to the Gongbei Port, China's largest land port, and is one of the main transportation hubs for mainland and Macau residents. Compared to air travel, high-speed railways have advantages such as shorter station entry time, lower delay rates, lower and more stable prices. Therefore, many passengers choose to travel in the GBA and surrounding provinces by high-speed trains. With the construction and opening of more high-speed railway lines and stations, it is expected that more residents of third and fourth-tier cities will choose to travel by high-speed train, which will directly compete with civil aviation passenger transport.

Table 2. *Overview of some train services departing from Zhuhai Station. (Source: Collated from Ctrip.com)*

City station	Number	Ride time	Ticket Price
Wuhan Station	G544	5 hours 9 mins	532 YUAN
Changsha South Station	G544	3 hours 40 mins	385 YUAN
Guilin North Station	D2882	4 hours 34 mins	219 YUAN
Nanning East Station	D3842	4 hours 37 mins	320 YUAN
Chaoshan Station	G6340	3 hours 46 mins	280 YUAN
Meizhou West Station	G6340	5 hours 5 mins	334 YUAN
Xiamen North Station	D942	5 hours 12 mins	299 YUAN

2.2.4.2 Continuous expansion of Airports in neighboring cities

Although Macau has launched recent and long-term expansion projects to attract and accommodate more passenger flows, the airports in surrounding cities are also rapidly expanding. Hong Kong Airport is constructing a third runway and supporting facilities such as an aviation city, which is expected to handle 120 million passengers and 10 million tons of cargo annually after completion in 2024. The third phase of Guangzhou Airport expansion and the construction of a third runway at Shenzhen Airport will both be completed by 2025. Zhuhai Airport, which is only 26 kilometers away from MIA, will also be completed and put into use in 2023 with a new Terminal 2, and is actively promoting the opening of international routes. Despite the unique advantages of MIA, such as its small, intensive, and sophisticated characteristics and proximity to large hotel clusters and tourist destinations, the competition and passenger diversion from surrounding airports cannot be ignored.

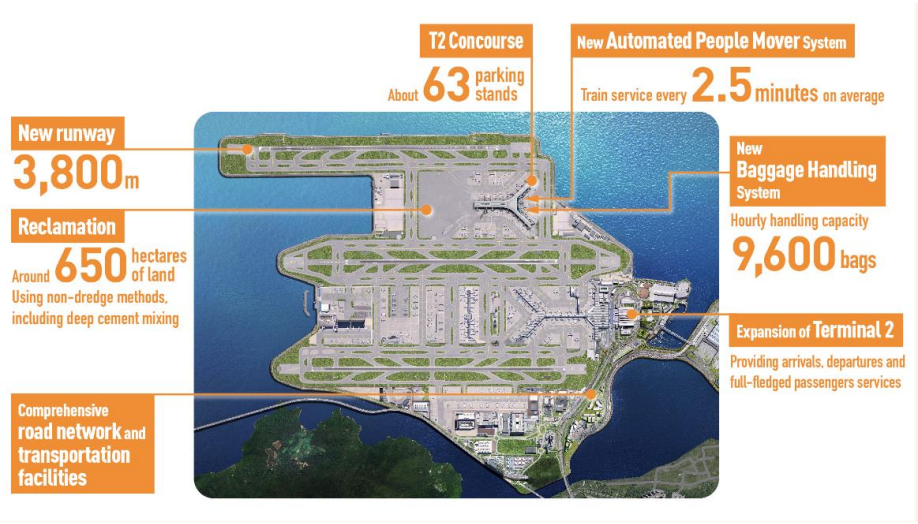

***Fig** 3. Hong Kong Airport Third Runway System Expansion Diagram（Source: Hong Kong International Airport Official Website）*

2.2.4.3 Competition from other tourist cities at home and abroad

Macau is famous for its tourism and gaming industry, and is known as a shopping paradise and the Monte Carlo of the East. In recent years, cities both at home and abroad have been focusing on tourism, developing new tourism models, creating unique attractions and offering a variety of cultural experiences to attract more visitors.

With the release of the "Overall Plan for the Construction of Hainan Free Trade Port," document supports the construction of Hainan International Tourism Island and Hainan International Tourism Consumption Center. Overseas citizens from 59 countries can enjoy a visa-free stay of 30 days for tourism in Hainan, and mainland Chinese tourists visiting Hainan's outlying islands can enjoy duty-free shopping. Shopping centers and resorts in various parts of Hainan are accelerating their construction, greatly improving the consumer experience for tourism and shopping.

Guangdong has the longest coastline in the country and has unique coastal tourism resources. Like Macau, many cities in Guangdong also have a long-standing traditional Chinese culture mixed with Western-style charm. Cities such as Jiangmen, Zhanjiang, and Shantou are actively maintaining and updating Lingnan arcade buildings, which have become popular through movies and TV shows on the internet.

After countries in Southeast Asia such as Singapore and Malaysia have built casinos to attract tourists, the Japanese government approved the construction of a casino resort in Osaka in 2023 to attract visitors from various Asian countries.

It can be found that many cities are actively promoting the development of tourism, and the corresponding upgrade and expansion of airport facilities are also underway, forming competition with MIA.

3. Development Strategies for MIA

Based on the SWOT analysis of MIA in the previous chapter, the following future development strategies are proposed, taking into account Macau's positioning as a world tourism and leisure center and a service platform for

business cooperation between China and Portuguese-speaking countries.

3.1 Expand and strengthen the passenger, cargo transportation, and business aviation

Aviation is the foundation of airport operations, and increasing flight routes will attract more passengers and reduce dependence on a single market.

For the domestic passenger routes in China, we should strengthen the backbone routes such as Shanghai, Beijing, and Taipei, improve the quality of operation and revenue of the backbone routes, and at the same time, expand the domestic route network to most of the provincial capitals in western China and the third-tier cities in the east, and explore the active cooperation with other airlines and airports under the China International Airlines Group to develop connecting routes.

Regarding international passenger transportation, the proposed first strategy is to consolidate and gradually develop the routes in Southeast Asia and Northeast Asia, and actively explore distant routes. Then, based on the statistics of inbound tourists from 2017 to 2019, the number of annual tourists entering Macau from the Americas and Europe exceeded 200,000 respectively. Currently, most intercontinental passengers enter Macau via Hong Kong. If Macau Airport opens intercontinental routes, it can attract not only European and American tourists but also mainland Chinese residents who travel to Europe and America via Macau. Although achieving direct flights to North America in the short term is not feasible, it is possible to explore code-sharing flights from Japan and South Korea to North America by collaborating with partners of the Star Alliance such as All Nippon Airways and Korean Air. After the relaxation of COVID-19 control measures, passenger traffic at many airports has strongly rebounded. According to the International Air Transport Association's statistics on passenger traffic of various airports in 2022, the annual passenger volume of Dubai International Airport, Istanbul Airport, London Heathrow Airport, Paris-Charles de Gaulle Airport, Delhi Indira Gandhi International Airport, Amsterdam Schiphol Airport, and Madrid-Barajas Airport all exceeded 50 million people, and their status as aviation hubs is significant. If Macau Airport can have a direct connection with these international airports, it will greatly enhance its market competitiveness. Furthermore, there are only a few flight routes between China and Portuguese-speaking countries. As Macau has close connections with Portuguese-speaking countries and has broad prospects for economic cooperation and personnel exchanges, it should actively open airlines to countries such as Portugal and Brazil to better promote trade and cooperation.

Table3. *Annual passengers at selected major world airports in 2022 （Source: Airports Association International）*

Airport Name	Country	Annual passengers	Compared to 2021
Dubai International Airport	UAE	66069981	127% rise
Istanbul Airport	Turkey	64486000	74.3% rise
London Heathrow Airport	UK	61599196	217.6% rise
Paris Charles de Gaulle Airport	France	57474033	119.3% rise
Indira Gandhi International Airport	India	57290033	54.3% rise
Amsterdam Airport Schiphol	Netherlands	52472188	105.8% rise
Madrid-Barajas Airport	Spain	50633652	110% rise
Tokyo Haneda Airport	Japan	50334534	89.1% rise

Just like passenger routes, cargo routes can also increase airport revenue and promote regional economic development. Macau is actively building itself into an important support point for the GBA's technology and innovation corridor. By opening cargo routes, MIA can help promote the development of high-end manufacturing industries and transport products such as electronic devices and biopharmaceuticals to destinations worldwide. As of May 2023, only a few cargo airlines, including Qatar Airways, Turkish Airlines, and MY Jet Xpress Airlines, operate at MIA. With the good development of regional high-tech manufacturing industries represented by Hengqin, there is great potential for opening up new cargo routes.

Table4. *Macau Cargo Route Network（Source: Civil Aviation Bureau of Macau SAR）*

Airline destinations	Airlines	Frequency
Doha - Macau - Mexico City - Dallas - Liege - Doha	Qatar Airways	1 flight per week
Doha - Macau - Nagoya - Mexico City - Bogota - Miami - Brussels - Doha	Qatar Airways	1 flight per week
Doha - Singapore - Macau - Doha	Qatar Airways	1 flight per week
Istanbul - Almaty - Macau - Bishkek - Istanbul	Turkish Airlines	4 flights per week
Kuching - Macau - Kota Kinabalu	MY Jet Xpress Airlines	4 flights per week
Kuching - Macau - Kuala Lumpur	MY Jet Xpress Airlines	3 flights per week

Fig *4. Private jets parked at MIA（Source: Civil Aviation Authority of Macao）*

Fig *5. Interior photo of MIA（Source: Civil Aviation Authority of Macao）*

As China's low-altitude airspace management reform gradually deepens, the business aviation market is becoming increasingly prosperous, and business jets are gaining popularity among entrepreneurs, with demand increasing year by year. Thanks to the prosperous local economy and the well-developed gaming industry, the business aviation in Macau has maintained steady growth over the past few years. In 2017, Macau International Airport handled 20,802 business flights, with a total of 3,078 business jet takeoffs and landings. Currently, China's business jets are mainly concentrated in first-tier cities, with high purchase, idle, and maintenance costs. However, hub airports such as Beijing, Shanghai, and Guangzhou severely lack takeoff and landing slots and parking spaces, urgently requiring the addition of runways, parking spaces, and future new airport operations. The construction of the GBA's world airport cluster will alleviate this fundamental problem. MIA can take a series of measures to expand and enhance its business aviation business, such as continuously improving airport facilities, establishing broader and deeper cooperative relationships, strengthening market promotion, and improving service quality, to increase MIA's revenue and visibility.

3.2 Expansion of the airport and its supporting facilities

Expanding the airport and its supporting facilities has become an urgent issue for airport development, as the existing airport facilities have become saturated and are unable to cope with the growing demand for passenger and cargo transportation. Since the reclamation project for the expansion of the airport is located between two aircraft taxiways, efforts should be made to overcome the technical challenges and complete the project within a short timeframe, while minimizing its impact on the current airport operations.

In addition to expanding the airport internally, building supporting sea, land, and air intermodal transportation infrastructure and optimizing the connections between the airport, port, light rail stations, and bus stations can turn the area into an important transportation hub, enhancing the accessibility of MIA. This can attract more passengers to take public transportation via Hengqin Port and Gongbei Port to travel to and from MIA.

3.3 Expanding non-aviation businesses and increasing the promotion of Macau tourism and MIA

Diversifying airport functions is beneficial for the integration and development of the airport and the city. Based on the development needs of the city, the airport with its surrounding areas can add other functions such as parks, exhibition centers, shopping malls, and hotels to increase the proportion of non-aviation revenue in the airport's income. Taking

Shanghai Pudong Airport as an example, non-aviation revenue accounted for 57.38% of total revenue, with airport retail accounting for 79.63% of non-aviation revenue in 2019. MIA can strengthen its cooperation with companies such as China Duty-Free Group and Shinsegae Duty-Free Shop to develop its airport retail sector.

Airports worldwide are increasingly focusing on developing airport tourism attractions to enhance passenger experience and promote their respective regions. Singapore Changi Airport's recent expansion project is an excellent example of this trend, as it seamlessly integrates commercial spaces with lush greenery, creating an attractive and relaxing environment for passengers to enjoy. This development aligns with the city-state's reputation as a garden city, further enhancing its image and attractiveness to tourists. Similarly, Frankfurt Airport has established an airport experience center inside the terminal, featuring interactive exhibitions and airport models that showcase airport operations processes, such as ground control, route management, and logistics systems. Such initiatives provide a unique opportunity for visitors to learn about the airport's operations and increase their understanding of the aviation industry.

***Fig** 6. Indoor waterfall at Singapore Changi Airport（Source: www.gooood.cn）Fig 7. Experience Center at Frankfurt Airport（Source: www.gooood.cn）*

MIA can draw inspiration from these global best practices and explore ways to develop creative and appealing urban attractions that highlight the city's unique cultural and natural heritage. Through the use of interactive devices such as virtual reality, MIA can enhance the passenger experience and contribute to the city's overall tourism offerings.

MIA should actively increase its promotional efforts and collaborate with local tourism groups and business partners to promote the airport through multiple channels and modes. For offline promotion, MIA can conduct roadshows in popular shopping malls and squares in major cities in Mainland China, interact with local residents, and promote Macau's urban charm. Additionally, MIA should actively organize events such as the Macau Business Aviation Exhibition and participate in the Macau International Tourism (Industry) Expo to enhance its influence through publicity.

Furthermore, MIA can also collaborate with local hotels, restaurants, shopping malls, and tourist attractions to offer exclusive discounts for passengers with round-trip tickets to and from MIA, actively promoting tourism development. For online promotion, MIA can leverage its airline partners such as Air Macau, and actively operate its official website, WeChat platform, short video platform, and collaborate with companies such as Ctrip and Meituan to launch promotional activities, such as buy-one-get-one-free offers, to increase ticket sales and drive tourism consumption. Such efforts can help to enhance the airport's competitiveness and contribute to the overall development of Macau's tourism industry.

4. Conclusion

Against the backdrop of the development of the Greater Bay Area airport cluster and Macau's establishment of the new city’s positioning, this paper analyzes the external environment and internal development of Macau International Airport, examines its strengths and weaknesses, opportunities and challenges, and proposes corresponding development strategies. These strategies include strengthening passenger transportation, cargo transportation, and business aviation services, expanding the airport and its supporting facilities, expanding the non-aviation business, and increasing the promotion of Macau International Airport and Macau tourism. The aim of these strategies is to provide reference and

guidance for the future development of Macau International Airport.

Author Introduction

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References

Antonin Kazda, Benedikt Badanik, Anna Tomova, Isabelle Laplace, & Nathalie Lenoir. (2013). Future Airports Development Strategies. Komunikácie : Vedecké Listy Žilinskej Univerzity = Communications : *Scientific Letters of the University of Žilina*, 15(2), 19 – 24.

Chung, & Song, K. H. (2021). Regional economic structure and airport-centric development strategy formulation: The case of South Korea. *Science Progress* (1916), 104(3_suppl), 368504211021695–368504211021695.

Liao, Cao, X., & Li, S. (2019). Competition and Sustainability Development of a Multi-Airport Region: A Case Study of the Guangdong–Hong Kong–Macao Greater Bay Area. *Sustainability* (Basel, Switzerland), 11(10), 2958–.

Song, & Suh, W. (2022). Perceptions on Regional Benefit of Airport Development and Operation. *Applied Sciences*, 12(9), 4340–.

Zhang, & Xie, T. (2023). A key to urban economic growth or an unnecessary burden? Opening airports in small and medium-sized cities. *Cities*, 133, 104105–.

Muhammet, Muharrem, E. Ç., & İbrahim, Z. A. (2020). Strategical Analysis and the Impact of Istanbul Airport on Turkish Airlines. *Journal of Economic and Social Development* (Varaždin), 7(1), 71–81.

陈朋亲 & 郑天祥.(2019).澳门融入粤港澳大湾区世界机场群路向研究. *广东工业大学学报*(06),45-52.

陈以乐.(2020).基于澳门机场口岸交通现状探析对葡语国家航线的建设. *IETI Transactions on Social Sciences and Humanities*, 7.

付聪.(2019).揭阳潮汕国际机场发展战略研究(硕士学位论文,南京航空航天大学).

蒋荷新 & 任敏媛.(2018).航空运输对地区产业结构影响的研究——以上海浦东机场为例. *城市发展研究*(03),118-124.

李伟伟.(2021).三亚国际机场发展战略研究(硕士学位论文,广西大学).

廖望,曹小曙,林雄斌 & 马仁锋.(2021).旅客机场选择行为意向的形成机制——以粤港澳大湾区为例. *地理科学*(12),2107-2116.

莫辉辉,王姣娥,彭峥 & 肖凡.(2022).机场群航线网络竞合评价方法及实证探讨——以粤港澳大湾区世界级机场群为例. *热带地理*(11),1797-1805.

潘圆圆.(2019).澳门对接“一带一路”和粤港澳大湾区的机遇及建议. *宏观经济管理*(10),79-83+90.

周金泉.(2020).异地展览会推广对城市形象与旅游意愿的影响——以活力澳门推广周为例. *世界地理研究*(02),428-438.