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A Comparative Study of Global Multi-Airport Systems: Differentiation and Development Approaches

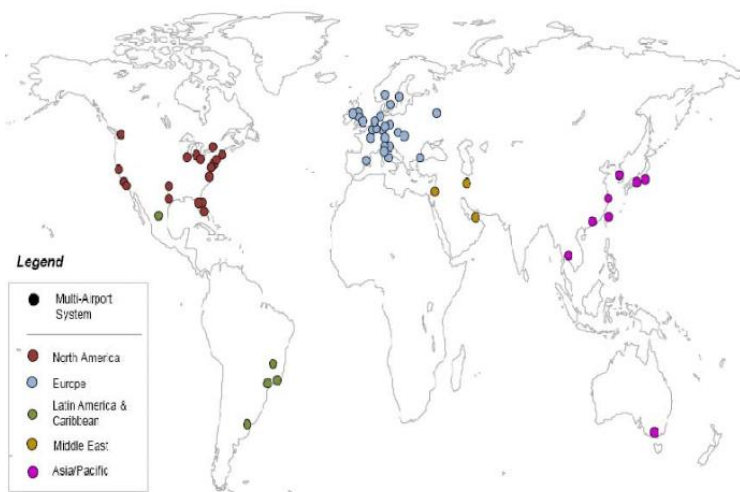
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Abstract: This study examines the strategies and best practices for differentiated passenger development within multi-airport systems. As the aviation industry continues to evolve, airports within multi-airport systems face increasing competition in attracting and serving diverse passenger segments. The analysis presented highlights key areas for differentiation, including service quality enhancement, price positioning, and specialized market segmentation. The study emphasizes the importance of collaborative efforts among airports, local authorities, airlines, and other stakeholders to optimize the collective capacity and passenger experience across the multi-airport network. The insights and recommendations provided serve as a valuable reference for airports seeking to navigate the complexities of multi-airport system development and deliver exceptional travel experiences for their customers.

Keywords: Multi-Airport Systems, Passenger Development, Service Quality Differentiation, Price Positioning, Market Segmentation, Collaborative Strategies

1. Introduction

The rapid growth of air travel and the increasing complexity of urbanization have necessitated the development of multi-airport systems (MAS) in numerous metropolitan areas worldwide. A multi-airport system consists of two or more significant airports serving a single urban area, providing a crucial infrastructural framework to accommodate rising passenger and cargo demands, alleviate congestion, and enhance the overall efficiency of air transportation. Currently, there are more than 60 multi-airport systems in operation globally. These multi-airport systems are mainly dependent on the metropolitan areas they are located in, forming a closely-related multi-airport system. Typical multi-airport systems include London and Paris in Europe, New York and Chicago in North America, and Tokyo, Seoul, and Bangkok in Asia, with the spatial



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distribution as shown in the figure.

Figure 1, Geographical distribution of multi-airport systems worldwide (source:ALG:Global)

The evolution of multi-airport systems can be attributed to several factors, including population growth, economic development, and the limitations of expanding single airports due to spatial, environmental, and regulatory constraints. Major metropolitan regions such as New York, London, Tokyo, and the Pearl River Delta in China exemplify the diverse configurations and operational strategies of MAS. These systems not only support the burgeoning demand for air travel but also stimulate regional economic growth, improve connectivity, and contribute to the global competitiveness of cities.

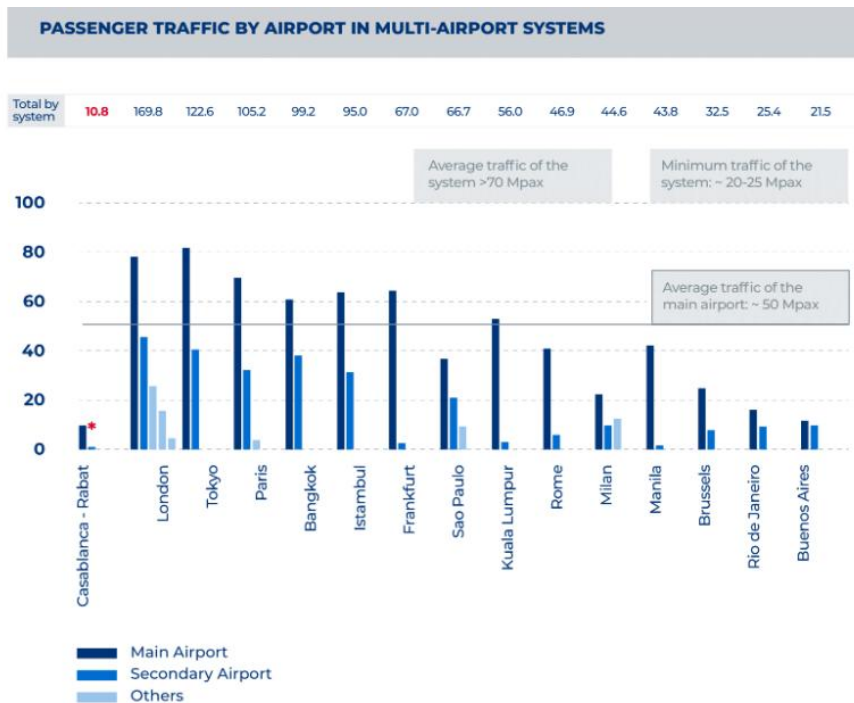


Figure 2, Passenger traffic by airport in multi-airport systems (Source: ALG)

Differentiation within multi-airport systems plays a critical role in maximizing their efficiency and effectiveness. Airports within a system often specialize in distinct functions such as international versus domestic flights, low-cost carrier services, cargo operations, or hub-and-spoke connectivity. Such strategic differentiation helps in distributing traffic more evenly, reducing

delays, and enhancing the passenger experience. Additionally, the development of MAS involves coordinated planning and investment in infrastructure, technology, and policy frameworks to ensure seamless integration and optimal performance.

This study aims to analyze the various differentiation strategies employed by multi-airport systems around the world and provide development recommendations based on best practices and successful case studies.

2. Literature Review

The concept of multi-airport systems (MAS) has gained significant attention in recent years as urban regions grapple with the increasing demands of air transportation. Researchers have explored various aspects of MAS, including their operational efficiencies, economic impacts, and differentiation strategies. This literature review examines recent studies within the past decade that contribute to understanding the development and optimization of global multi-airport systems.

2.1 Operational Efficiencies and Capacity Management

One critical area of research focuses on the operational efficiencies and capacity management of MAS. Bonnefoy et al. (2014) discuss the challenges and strategies related to capacity constraints in

major multi-airport regions. They highlight the importance of coordinated traffic management and infrastructural investments to enhance overall system efficiency. Similarly, de Neufville and Odoni (2013) emphasize the role of technological advancements and policy interventions in optimizing airport operations within multi-airport systems.

2.2 Economic Impacts and Regional Development

The economic implications of MAS are another significant area of study. Zhang et al. (2017) analyze the economic benefits derived from the development of multi-airport systems, noting that these systems can significantly boost regional economies by enhancing connectivity and attracting businesses. Their study underscores the positive correlation between MAS development and regional economic growth, providing evidence from various global case studies. Additionally, Yao and Yang (2020) examine the economic spillover effects of MAS on urban development, highlighting the role of airports as catalysts for economic activities and job creation.

2.3 Differentiation Strategies

Differentiation strategies within MAS are essential for their effective functioning. Graham (2018) explores how airports within a multi-airport system can specialize in different market segments, such as low-cost carriers, cargo operations, or international versus domestic flights. This specialization helps in balancing traffic loads and reducing congestion. In a similar vein, Alderighi et al. (2015) discuss the competitive dynamics among airports in a multi-airport system, emphasizing the need for strategic planning and coordination to avoid unnecessary competition and inefficiencies.

2.4 Governance and Policy Frameworks

Effective governance and policy frameworks are crucial for the successful operation of MAS. Button et al. (2019) review the governance structures of multi-airport systems in various countries, highlighting the importance of integrated planning and management. Their study suggests that coherent policy frameworks and collaborative governance models are vital for addressing the complexities associated with MAS. Furthermore, Tan (2021) examines regulatory policies that influence the development and operation of MAS, advocating for flexible and adaptive policies to accommodate the evolving needs of the aviation industry.

2.5 Technological Innovations

Technological innovations play a pivotal role in the advancement of MAS. Zografos et al. (2019) investigate the impact of emerging technologies such as digitalization, automation, and data analytics on airport operations. They argue that integrating these technologies can significantly enhance the efficiency and passenger experience in multi-airport systems. Additionally, the adoption of sustainable technologies and practices is explored by Budd and Ison (2020), who emphasize the need for environmentally sustainable development in the aviation sector.

Conclusion

The literature on global multi-airport systems highlights the complexity and multifaceted nature of their development and operation. Studies underscore the importance of strategic differentiation, robust governance frameworks, and technological innovations in enhancing the efficiency and economic impact of MAS. This review provides a foundation for further research aimed at optimizing the development and management of multi-airport systems to meet future challenges in the aviation industry.

3. Development Models of the Global Multi-Airport System

3.1. Hub-and-Spoke Model

The hub-and-spoke model centers around a primary hub airport that handles the majority of international and long-haul flights, with secondary airports serving domestic and short-haul routes. This model optimizes connectivity and resource utilization by funneling traffic through a central hub. For instance, in the New York Metropolitan Area, John F. Kennedy International Airport (JFK)

serves as the main international hub, while LaGuardia Airport (LGA) and Newark Liberty International Airport (EWR) focus on domestic flights. This setup enhances network efficiency and economies of scale but can lead to congestion and over-reliance on the hub, necessitating careful traffic and schedule coordination.

3.2. Decentralized Model

In the decentralized model, multiple airports within a metropolitan region operate independently, each specializing in different types of traffic or services, thus reducing congestion at any single airport and distributing traffic more evenly. The London Metropolitan Area exemplifies this model, with Heathrow (LHR) as the primary international gateway, and Gatwick (LGW), Stansted (STN), and Luton (LTN) serving domestic, European, and low-cost carrier traffic. This approach provides flexibility and resilience but can result in higher operational and coordination costs, alongside potential competition between airports.

3.3. Integrated Model

The integrated model involves a high level of coordination and cooperation among multiple airports, often managed by a central authority to maximize efficiency and connectivity across the system. This is seen in the Paris Metropolitan Area, where Charles de Gaulle Airport (CDG) and Orly Airport (ORY) are managed by Groupe ADP, ensuring synchronized development and operations. Such integration allows for strategic planning and optimized resource use, improving passenger experiences through seamless connectivity, although it requires complex governance and significant initial investments.

3.4. Regional Hub Model

The regional hub model extends the concept of MAS beyond a single metropolitan area, integrating multiple airports within a broader regional context. This model is particularly effective in regions with several large cities in close proximity, like the San Francisco Bay Area, where San Francisco International Airport (SFO), Oakland International Airport (OAK), and San Jose International Airport (SJC) collectively serve the region. This approach facilitates efficient traffic distribution and regional connectivity, enhancing economic integration, but poses challenges in coordinating across different jurisdictions and aligning infrastructure planning.

4. Case Studies

Considering the comparability in terms of functional division, business scale, geographic location, management organization, ground transportation and other factors, this study selects multi-airport systems such as Dubai, Dallas, and Paris as research subjects after screening the global multi-airport system cases.

4.1 The Dubai multi-airport system

The Dubai multi-airport system is anchored by Dubai International Airport (DXB), which serves as the primary global hub for Emirates Airline and functions as the main gateway for passenger and cargo traffic. Complementing DXB is Al Maktoum International Airport (DWC), which was developed to handle the growing air transport demand and shift lower-cost and freight operations away from the congested DXB. This dual-hub structure allows Dubai to leverage the strengths of each airport - DXB focusing on premium passenger services and Emirates' extensive network, while DWC accommodates the expansion of low-cost carriers and freight activities. The coordinated development of these two major airports has been critical in solidifying Dubai's position as a leading international aviation center, catering to the diverse needs of airlines, passengers, and cargo operators across the region.

Airport	Dubai International Airport (DXB)	Al Maktoum International Airport (DWC)
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Geographic Location	Near the city center	In the southwest, part of Dubai World Central
Runway Capacity	2 runways	2 runways (4900m + 1838m), planned for 5 runways in the future
Functional Positioning	International aviation hub	International aviation hub
Operational Timeline	Opened in 1960	Started cargo operations in 2010, passenger operations in 2013
Operating Authority	Dubai Airports Company	Dubai Airports Company
Business Scale	Passengers: 86.4 million Cargo: 2.6 million tons	Passengers: 1.63 million Cargo: 0.91 million tons
Design Capacity	Passengers: 93 million Cargo: 3 million tons	Passengers: 160 million in the future Cargo: 200,000 tons currently, 12 million tons in the future
Key Airlines	Emirates Airlines flydubai	Emirates Airlines flydubai
Number of Destinations	300	160

Table 1, comparison of the Dubai dual-hub airport system:

Al Maktoum International Airport (DWC) commenced operations in 2010, initially only handling cargo flights. It wasn't until 2013 that DWC began accommodating passenger flights operated by foreign airlines. In 2014, when Dubai's two major carriers - Emirates Airlines and flydubai - commenced operations at DWC, the airport's business saw substantial growth.

By 2019, the two Dubai airports had established the following division of functions:

DWC is responsible for international and domestic cargo operations, as well as international passenger services, primarily serving low-cost carriers and foreign airlines connecting to the European market.

Dubai International Airport (DXB) retains all domestic passenger traffic and the majority of international passenger operations, as well as a small portion of international cargo services. DXB's international passenger traffic is mainly focused on the Asian and European markets.

This coordinated development of the dual-hub system has allowed Dubai to leverage the strengths of each airport - DXB focusing on premium passenger services and Emirates' extensive network, while DWC accommodates the expansion of low-cost carriers and freight activities. The complementary roles of these two major airports have been critical in solidifying Dubai's position as a leading international aviation center.

Table 2: Comparison of Key Indicators between Dubai's Dual-Hub Airports - DWC and DXB

Indicator	DWC	DXB	Unit
Capacity Deployment			
Passenger	5,076	189,974	Flights
Cargo	7,672	626	Flights
Service Type			
Full-service	1,702	138,550	Flights
Low-cost	3,374	51,424	Flights
Passenger Flight Share			
Full-service	34%	73%	-
Low-cost	66%	27%	-
International Operations			
Passenger	5,076	189,007	Flights
Cargo	7,629	626	Flights
Domestic Operations			
Passenger	0	967	Flights
Cargo	43	0	Flights
Connectivity			
International (Passenger)	110	296	Destinations
Domestic (Passenger)	0	1	Destinations
International (Cargo)	49	2	Destinations
Domestic (Cargo)	1	0	Destinations
Number of Airlines			
International (Passenger)	31	90	Airlines
International (Cargo)	15	1	Airlines
Domestic (Passenger)	0	2	Airlines
Domestic (Cargo)	1	0	Airlines

Indicator	DWC	DXB	Unit
Airline Market Share			
International (Passenger)	flydubai (45%)	Emirates (49%)	Flights
International (Cargo)	Emirates (73%)	ASL Belgium (100%)	Flights
Domestic (Passenger)	-	Emirates (62%), flydubai (38%)	Flights
Domestic (Cargo)	Emirates (100%)	-	Flights

4.2 The Dallas Dual-Hub consists of Dallas/Fort Worth International Airport (IATA code: DFW) and Dallas Love Field Airport (IATA code: DAL), which are only 18 km apart.

Dallas-Fort Worth International Airport is located between the cities of Dallas and Fort Worth, and is jointly owned and operated by the two cities. It is the largest and busiest airport in the state of Texas, handling 75.07 million passengers in 2019.

Love Field Airport was originally planned to be closed after the Dallas/Fort Worth International Airport became operational, but due to historical reasons, it has been retained. It currently serves as the main base for Southwest Airlines, and handled 15.72 million passengers in 2019.

The two airports work together as a dual-hub system, providing comprehensive air transportation services to the Dallas-Fort Worth metroplex, one of the fastest growing regions in the United States. DFW's large size and extensive route network make it a major international gateway, while Love Field's proximity to downtown Dallas and focus on domestic, low-cost carriers complement DFW's offerings. This integrated system allows the Dallas area to effectively meet the growing demand for air travel across all market segments.

Table 3, Comparison of Dallas/Fort Worth International Airport (DFW) and Dallas Love Field (DAL)

Indicator	Dallas/Fort Worth International Airport (DFW)	Dallas Love Field (DAL)
Geographic Location	Between the cities of Dallas and Fort Worth	Downtown Dallas
Number of Runways	7	2 (7,750 ft, 9,380 ft)
Functional Positioning	International passenger and cargo hub	Domestic passenger operations
Commenced Operations	1973	1917
Operator	Dallas-Fort Worth International Airport, Inc.	Dallas Aviation Department
Scale of Operations		
Passengers	75.07 million	15.72 million
Cargo	980,000 metric tons	-

Indicator	Dallas/Fort Worth International Airport (DFW)	Dallas Love Field (DAL)
Major Airlines	American Airlines	Southwest Airlines

Dallas/Fort Worth International Airport (DFW) plays a pivotal role in the air transportation network of the Dallas-Fort Worth-Arlington metropolitan area. It is also a key gateway hub for flights to Latin America from the United States.

American Airlines has a dominant presence at DFW, accounting for around 90% of the airport's domestic capacity and 80% of its international capacity. This underscores the importance of DFW as a major hub for the flagship American carrier.

In the realm of international cargo operations, the market share is more fragmented at DFW. Cathay Pacific holds the largest slice, with a 16% share of the airport's international cargo capacity. This indicates a diverse mix of cargo carriers serving the international freight market through DFW.

In contrast, Dallas Love Field (DAL) has a relatively smaller scale of operations, catering primarily to low-cost domestic carriers. Southwest Airlines is the dominant player at DAL, accounting for approximately 95% of the airport's capacity. This strategic focus on low-cost domestic routes has made Love Field a key hub for Southwest's network.

The Wright Amendment, passed in the United States in 1979, has restricted Love Field from operating international flights. As a result, Dallas Love Field currently only serves domestic destinations, allowing DFW to solidify its position as the primary international gateway serving the Dallas-Fort Worth metropolitan region.

Table 4, key performance indicators of Dallas/Fort Worth International Airport (DFW) and Dallas Love Field Airport (DAL) in 2019:

Indicator	DFW	DAL	Unit
Capacity Deployed			
Passengers	990,035	267,535	Flights
Flights	9,837	4,698	Flights
Cargo	-	-	Metric Tons
Passenger Flight Share			
Full-Service	97%	5%	-
Low-Cost	3%	95%	-
International Operations			
Passengers	72,623	-	Flights
Cargo	5,054	-	Flights
Domestic Operations			
Passengers	917,412	267,535	Flights

Indicator	DFW	DAL	Unit
Cargo	4,783	4,698	Flights
Destinations Served			
International (Pax)	75	0	
Domestic (Pax)	221	84	
International (Cargo)	19	0	
Domestic (Cargo)	11	8	
International Destinations (Pax)			
Africa	0	0	
Asia	5	0	
Europe	9	0	
Latin America	52	0	
Middle East	2	0	
North America	6	0	
Southwest Pacific	1	0	
International Destinations (Cargo)			
Africa	0	0	
Asia	7	0	
Europe	8	0	
Latin America	2	0	
Middle East	2	0	
North America	0	0	
Southwest Pacific	0	0	
Number of Airlines			
International (Pax)	20	0	
International (Cargo)	13	0	
Domestic (Pax)	11	5	

Indicator	DFW	DAL	Unit
Domestic (Cargo)	13	1	
Top Airline Share			
International (Pax)	American (80%)	-	Flights
International (Cargo)	Cathay Pacific (16%)	-	Flights
Domestic (Pax)	American (90%)	Southwest (95%)	Flights
Domestic (Cargo)	Korean Air (27%)	Quest Air (100%)	Flights

4.3 Charles de Gaulle Airport and Orly Airport

The two airports serving Paris are Charles de Gaulle Airport (IATA code: CDG) and Orly Airport (IATA code: ORY), located 34 km apart. Orly Airport is the second busiest airport in France, handling 31.9 million passengers in 2019. Charles de Gaulle Airport was developed to help relieve the operational pressure on Orly Airport, and has now become the second-busiest passenger airport in Europe, handling 76.15 million passengers in 2019.

Some additional details:

Charles de Gaulle Airport is the largest international airport in France and one of the busiest airports in the world. It serves as the principal hub for Air France and is a major European gateway. Orly Airport is the second-largest airport in France after Charles de Gaulle. It primarily handles domestic and European traffic, as well as some international flights.

Together, the two airports make up the Paris airport system, which is one of the busiest and most important aviation hubs in Europe, connecting Paris to destinations around the world.

The expansion and development of Charles de Gaulle Airport has allowed it to surpass Orly Airport in terms of passenger traffic and cement its status as the primary international airport serving the Paris metropolitan area.

Table 5: Comparison of the Paris Dual Hub Airports

Airport	Paris Charles de Gaulle (CDG)	Paris Orly (ORY)
Location	Northeast of Paris	South of Paris
Runways	4	3
Functional Positioning	International Aviation Hub	Domestic and Intra-EU Passenger Operations
Commencement of Operations	1974	1932
Operator	Groupe ADP (Paris Airports Group)	Groupe ADP (Paris Airports Group)
Passenger Traffic	76.15 million passengers	31.9 million passengers
Cargo Volume	2.15 million tonnes	N/A (no recent data available)

Airport	Paris Charles de Gaulle (CDG)	Paris Orly (ORY)
Major Airlines	Air France, easyJet	Air France, Transavia
Number of Destinations	363	155

Table 6 : Key Performance Indicators of the Two Major Paris Airports in 2019

Indicator	Paris Charles de Gaulle (CDG)	Paris Orly (ORY)	Unit
Capacity Deployment			
Passenger Flights	237,734	112,032	Flights
Cargo Flights	4,238	0	Flights
Passenger Flight Mix			
Full-Service Carriers	87%	66%	-
Low-Cost Carriers	13%	34%	-
International Operations			
Passenger Flights	212,441	64,815	Flights
Cargo Flights	2,293	0	Flights
Domestic Operations			
Passenger Flights	25,293	47,217	Flights
Cargo Flights	1,945	0	Flights
Connectivity			
International Destinations	Passenger 298	125	Destinations
Domestic Destinations	Passenger 25	30	Destinations
International Destinations	Cargo 30	0	Destinations
Domestic Destinations	Cargo 10	0	Destinations
International Connectivity	Passenger		

Indicator	Paris Charles de Gaulle (CDG)	Paris Orly (ORY)	Unit
Africa	63	30	Destinations
Asia	31	1	Destinations
Europe	133	99	Destinations
Latin America	18	14	Destinations
Middle East	14	5	Destinations
North America	31	5	Destinations
Southwest Pacific	1	1	Destinations
International Cargo Connectivity			
Africa	13	0	Destinations
Asia	4	0	Destinations
Europe	18	0	Destinations
Latin America	1	0	Destinations
Middle East	3	0	Destinations
North America	1	0	Destinations
Southwest Pacific	0	0	Destinations
Airline Presence			
International Passenger Airlines	118	26	Airlines
International Cargo Airlines	9	0	Airlines
Domestic Passenger Airlines	10	13	Airlines
Domestic Cargo Airlines	2	0	Airlines
Airline Market Share (Top Carriers)			
International Passenger	Air France (48%), easyJet (7%)	Air France-KLM (25%), easyJet (10%), Air France (9%)	Flights

Indicator	Paris Charles de Gaulle (CDG)	Paris Orly (ORY)	Unit
International Cargo	Air France (37%)	0	Flights
Domestic Passenger	Air France (89%), easyJet (11%)	Air France (77%), easyJet (7%)	Flights
Domestic Cargo	ASL Airlines France (94%)	0	Flights

5. Discussion

The passenger development under the differentiated positioning of multi-hub airports can be summarized into three levels:

- 1) clear division of business categories and operating airlines between the two airports,
- 2) differentiated coverage of the aviation market between the two airports, and
- 3) differentiated types and levels of passenger service products between the two airports.

5.1 Differentiation in Business Categories and Airlines

The differentiation in business categories and airlines mainly occurs in the early stage of multi-airport system construction. At this stage, the new airport, due to its just-started operations, does not have the advantage of route connectivity and distance from the core market compared to the original airport, so it mainly undertakes the cargo business of the original airport. Meanwhile, under the coordination of the operating authorities and the guidance of policies such as air rights and land, some of the operating airlines at the original airport are transferred to the new airport.

Table 7: International and Domestic Operations at Sample Airports

Airport Name	International Operations	Domestic Operations	International Passenger Hubs	Domestic Passenger Hubs
Dubai International Airport	International and Domestic Passenger, Limited International Cargo	296	Emirates (49%)	Emirates (62%)
Al Maktoum International Airport	International Passenger, International Cargo, Low-Cost	110	Emirates (45%)	N/A
Dallas/Fort Worth International Airport	International and Domestic Passenger and Cargo Hub	75	American Airlines (80%)	American Airlines (90%)
Dallas Love Field Airport	Domestic Passenger	0	N/A	Southwest Airlines (95%)
Paris Charles de Gaulle Airport	International Aviation Hub	298	Air France (48%)	Air France (89%)

Airport Name	International Operations	Domestic Operations	International Passenger Hubs	Domestic Passenger Hubs
Paris Orly Airport	Domestic and European Routes, Medium-Short Haul, Low-Cost	125 (Primarily European Union)	Transavia France (25%)	Air France (77%)

The orientation of the operating authorities and air rights policies is an important factor influencing the initial functional division between the airports. Taking the two airports in Dallas as an example, the Dallas/Fort Worth Airport is mainly invested by the federal government, and under the mandatory intervention of the federal government, the cities of Dallas and Fort Worth reached a consensus on the construction of the Dallas/Fort Worth Airport and jointly formed a management committee to manage it. Therefore, with the adjustment of airline strategies and changes in the aviation market, the development models of the two airports are constantly evolving. In this process, the establishment of a unified operating authority and the active promotion of strategic consensus among various stakeholders are of great importance to the development of the multi-airport system.

5.2 Differentiation in Market Coverage

In the early stage of multi-airport system development, the two airports generally have fewer overlapping destinations. As the business scale increases, the competition between the two airports for high-demand markets will intensify. The two airports in Dubai are in the early stage of development, with clear market division and a relatively high proportion of exclusive flights, and the newly opened Al Maktoum International Airport also has 44% of exclusive flights after 8 years of operation. The two airports in Paris are more mature, with a relatively low proportion of exclusive flights, less than 60% at Charles de Gaulle Airport, and a more competitive relationship. Love Field Airport in Dallas only serves the domestic market, with routes largely overlapping with Dallas/Fort Worth Airport, and the two airports are more focused on differentiating their service products.

Table8 : Percentage of Exclusive Flights at Sample Airports

Airport Name	Percentage of Exclusive Flights
Dubai International Airport	70%
Al Maktoum International Airport	44%
Dallas/Fort Worth International Airport	82.46%
Dallas Love Field Airport	5.43%
Paris Charles de Gaulle Airport	59%
Paris Orly Airport	19%

In the case of partial overlap in the hinterland market, there must be overlapping routes between the two airports. In order to better serve the travel needs of regional passengers and form a healthy competitive development pattern, it is necessary to actively guide the airlines in their capacity allocation between the airports, and for each airport to form key and advantageous markets based

on infrastructure capabilities and passenger travel characteristics.

5.3 Differentiation in Product and Service

As the two airports gradually enter a mature stage of development, where they have both achieved coverage of key international and domestic markets, and the gap in route connectivity has narrowed, the differentiated development between the two airports will be more reflected in differences in ticket prices, flight schedules, and ground transportation services.

In terms of ground transportation, the original airport has the locational advantage of being closer to the consumer market, while the newly built airport needs to improve its ground transportation, especially rail transport, to enhance its ability to attract passengers.

Table 9: Airport Rail Connectivity at Sample Airports

Airport Name	Urban Rail	Railway
Dubai International Airport	2 Metro Lines	None
Al Maktoum International Airport	Planned	None
Dallas/Fort Worth International Airport	2 Metro Lines, 1 Light Rail	None
Dallas Love Field Airport	2 Metro Lines	None
Paris Charles de Gaulle Airport	1 Commuter Rail Line	High-Speed Rail
Paris Orly Airport	1 Commuter Rail Line	None

In terms of ticket prices, the smaller-scale airport tends to focus on introducing low-cost carriers, differentiating itself in terms of pricing and services, and creating more conditions suitable for low-cost carrier operations in terms of infrastructure and service guarantees. Currently, both Dubai and Paris airports have dedicated low-cost terminals. Love Field Airport in Dallas is largely occupied by low-cost carriers, and Southwest Airlines, when facing tight fleet resources, has collaborated with the airport to create a "10-minute connection" development model, which has also ensured the implementation of its short-haul, high-frequency route strategy.

Key Route	Dallas/Fort Worth Airport	Dallas Love Field Airport
Airline	Profitability	Airline
Houston	American Airlines	0.43
Chicago	American Airlines	0.08
Denver	American Airlines	0.10
Atlanta	American Airlines	0.09
Las Vegas	American Airlines	0.07
Phoenix	American Airlines	0.11

Table 10 : Key Route Profitability at Dallas Airports

6. Recommendations

As multi-airport systems mature and the airports within them face increasing competition, it will be important for each airport to differentiate itself through targeted strategies. Service quality differentiation

will be crucial. Airports can enhance ground transportation options, especially convenient rail links, to improve accessibility for passengers at the newer, more remote airports. They can also develop specialized facilities and services catered to the needs of low-cost carriers at airports targeting that market segment. Investing in passenger amenities, technology, and operational efficiency can provide a superior overall travel experience.

Airports can also differentiate through their pricing and fee structures. Smaller or newer airports may want to focus on attracting low-cost carriers by offering more competitive rates and incentives. Larger, established airports can position themselves as premium options, justifying higher prices through enhanced services and facilities.

Furthermore, different airports within a multi-airport system can further differentiate by targeting specific passenger segments or air travel purposes. For example, one airport may specialize in business travel, with convenient access, ample lounges and meeting spaces. Another could position itself as a hub for leisure and tourism, with a focus on seamless connections to regional attractions. To maximize the benefits of a multi-airport system, the individual airports should work closely with local authorities, airlines, and other stakeholders to coordinate their differentiation strategies. This holistic, collaborative approach can help ensure each airport fulfills a complementary role within the broader transportation network.

7. Conclusion

As multi-airport systems continue to evolve and mature, the need for strategic differentiation among the constituent airports becomes increasingly important. The analysis presented in this study has highlighted several key areas where airports can differentiate themselves to better serve the needs of passengers and airlines. Firstly, airports should focus on enhancing their service quality through targeted investments. This includes improving ground transportation connectivity, particularly through convenient rail links, to enhance accessibility for passengers. Airports can also develop specialized facilities and services catered to the needs of low-cost carriers, as well as invest in passenger amenities and operational efficiency to provide a superior travel experience.

Secondly, airports can differentiate through their pricing and fee structures. Smaller or newer airports may find success by targeting low-cost carriers with competitive rates and incentives, while larger, established airports can position themselves as premium options justified by enhanced services and facilities. Moreover, airports within a multi-airport system can further specialize by targeting specific passenger segments or air travel purposes. This market segmentation strategy can allow each airport to fulfill a complementary role in serving the diverse needs of air travelers, whether it is business travelers, leisure tourists, or others. Ultimately, the key to successful differentiation lies in the collaborative efforts of the airports, local authorities, airlines, and other stakeholders. By working together to coordinate their strategies, multi-airport systems can optimize their collective capacity, enhance the overall passenger experience, and establish a sustainable competitive advantage in the dynamic aviation landscape. As the industry continues to evolve, the insights and recommendations provided in this study will serve as a valuable reference for airports seeking to navigate the complexities of multi-airport system development and deliver an exceptional travel experience for their customers.

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