

**CHINA'S AIRPORTS:
RECENT DEVELOPMENT AND
FUTURE CHALLENGES**

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Executive Summary

1. The capacity of China's airports has expanded over the last two decades. By 2008, business volumes, measured by passenger and freight traffic, and aircraft movements had increased dramatically, reaching 192.5 million persons, 4.1 million tons and 4.2 million, respectively.
2. China was ranked the world's No. 2 for air transport traffic and passenger traffic in 2005. The air transport sector is the fastest developing sector among China's various transportation modes. China has also recorded the highest growth of air passenger traffic in the world.
3. The impressive improvements in China's airport industry since the early 1990s have been mainly due to various reforms. Airport reform has been a priority for the Chinese government since 1986.
4. Reform measures included the separation of domestic airport operations from airline operations; ownership restructuring and airport management reforms.
5. When the global economic crisis started to negatively affect China's economy in 2008, the Chinese government quickly responded with various measures including a 4-trillion *yuan* stimulus package. Most of the stimulus spending was allocated to airports and other infrastructure construction. This further supported the development of Chinese airports.
6. However, China's airport industry still faces three severe challenges to full modernization, namely, a very skewed development favoring a few large airports and uneven regional distribution, overall poor performance, and fierce competition within the transport industry.
7. There were 158 operational airports in China by 2008. The top 10 airports accounted for 55.5% of China's total passenger volumes. In contrast, the 56

airports which recorded less than 0.1 million passengers accounted for less than 1% of national passenger volume.

8. China's airport sector has shown persistent financial losses in recent years, after taking into account government subsidies.
9. Competition from other transportation modes is intensifying for the domestic airports. Particularly, the rapid development of high-speed railway is anticipated to strongly challenge airport and airline development.
10. It increasingly appears that 'cut-throat' competition is likely to occur among the various transportation providers.

CHINA'S AIRPORTS: RECENT DEVELOPMENT AND FUTURE CHALLENGES

YANG Xiuyun & YU Hong*

Airport Reform

- 1.1 Economic boom in China has boosted the rapid growth of air transport volume. In order to catch up with this fast development in air transport, airport reform has been a priority for the government since 1986. Reform measures could be generally grouped into three stages: separating domestic airport operations from airline operations and developing them into independent units, joint-equity reform, and localization reform.
- 1.2 Over the last two decades, the Chinese government has encouraged local governments to invest in and run local airports and, with their increasing involvement in airport operation and management, local governments have now become the largest investors in regional airports. New airport construction has also become an important source of local economic growth.
- 1.3 Compared to the semi-military style of airport management before 1980,¹ the reforms in airport functionality, service targets and scope have removed many restrictions on airports' operation. Local airport authorities have enjoyed more autonomy and power in providing airport services and running operation; China's airports have become more commercially oriented over the last decade.

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¹ Zhang, Anming. (1998) "Industrial Reform and Air Transport Development in China," *Journal of Air Transport Management*, 4, pp. 155-64.

Strong Government Support for Investment in Airports

- 2.1 Airport infrastructure has improved remarkably over the last two decades. In order to cater for the rapid increase in air transport demand and number of large aircraft landing and taking off, the capacity of China's airports has been expanded, and their facilities have been updated and modernized.
- 2.2 Between 1990 and 2005, the government had invested 120 billion *yuan* in the construction of 45 airports and rejuvenation of more than 90 airports. From 2006 to 2008, around a further 100 billion *yuan* was invested in constructing 18 new airports and renovating and upgrading of another 25 airports.²
- 2.3 To improve safety and service capability in line with the increasing demand for air transport, the central government plans to invest 140 billion *yuan* to upgrade the three key airport hubs of Beijing, Shanghai and Guangzhou, 24 medium hubs and 28 small airports, and to build another 42 new airports during the period of the 11th Five-Year Development Plan (2006-2010).
- 2.4 By the end of 2010, the total number of airports is expected to reach 186, and it is estimated that air transport services will cover 66% of the county-level cities, 72% of total population and 89% of the total national GDP. Furthermore, the Civil Aviation Administration of China (CAAC) issued "Civil Airport Distribution Plan of China"³ in February 2008.
- 2.5 As outlined in this ambitious development plan, by 2020, per capita flight is expected to increase by a proportion of 0.47, total passenger volume to reach 700 million and number of airports to increase to 244. Five airport clusters are planned in the northern (东北地区), eastern (华东地区), central (中南地区), southwest (西南地区) and northwest regions (西北地区) of China. It is

² "China will Increase Investment in Civil Airports" <http://content.caixun.com/NE/01/ej/NE01ejr5.shtm>

³ Source: the CAAC (2008) <全国民用机场布局规划>, http://www.caac.gov.cn/I1/I2/200808/t20080819_18371.html

anticipated that air transport services will cover 74% of county-level cities, 78% of total population and 93% of China's total GDP by 2010.

- 2.6 In 2008, the global economic crisis had hit China and negatively affected its overall economic growth. The central government quickly responded and announced a 4-trillion *yuan* stimulus package in November 2008. Most of the stimulus spending was allocated to airports and other infrastructure construction. The investment on airport construction and upgrading during that year was 30 billion *yuan*.
- 2.7 In November 2008, the CAAC announced an airport investment plan of 450 billion *yuan* for the following two years. With a scale that is larger than that of the 11th Five-Year Development Plan, the plan is intended to speed up the implementation schedule of "Civil Airport Distribution Plan of China". With the coming to fruition of these plans, China should be able to develop an efficient airline network serving all its main population centres.

Rapid Development

- 3.1 There have been impressive improvements in China's airport industry over the last decade. Back in 1992, merely 16.6 million persons, 0.4 million tons of cargoes and 0.5 million aircraft movements passed through 104 airports. For a vast country of 9.6 million square kilometers and population of 1.3 billion, air transport capacity was obviously too low.
- 3.2 Nevertheless, by 2008, these three business volumes had increased dramatically, reaching 192.5 million persons, 4.1 million tons of cargoes and 4.2 million aircraft movements had passed through: with average annual growth rates of 12.9%, 18.1%, and 12.8% respectively between 1992 and 2008. Cargo traffic has grown faster than either passenger traffic volume or aircraft movement (see Figures 1, 2 and 3).

- 3.3 Events such as the Asian financial crisis of 1997-1998, the SARS in 2003 and the global financial crisis of 2008 have generated various effects on China's airport business. However, despite the negative effects brought about by these unforeseen events, China's airport industry has maintained an upward growth trend since the early 1990s (see Figure 3).
- 3.4 Passenger and freight traffic handled by China's airports surpassed those of the UK, the world's second or third largest civil aviation market in 1999 and 2004 respectively (Figure 4). The annual growth in passenger and cargo volume of 4.7% and 2.1% between 1996 and 2008 handled in Chinese airports was much higher than that of the UK.

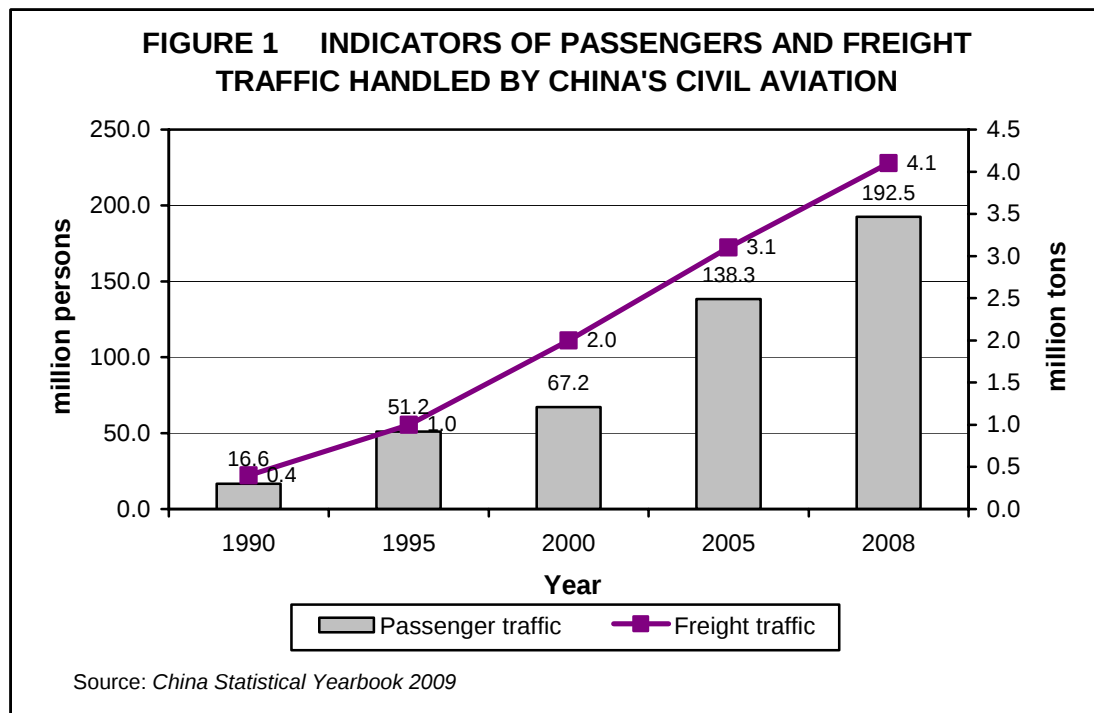
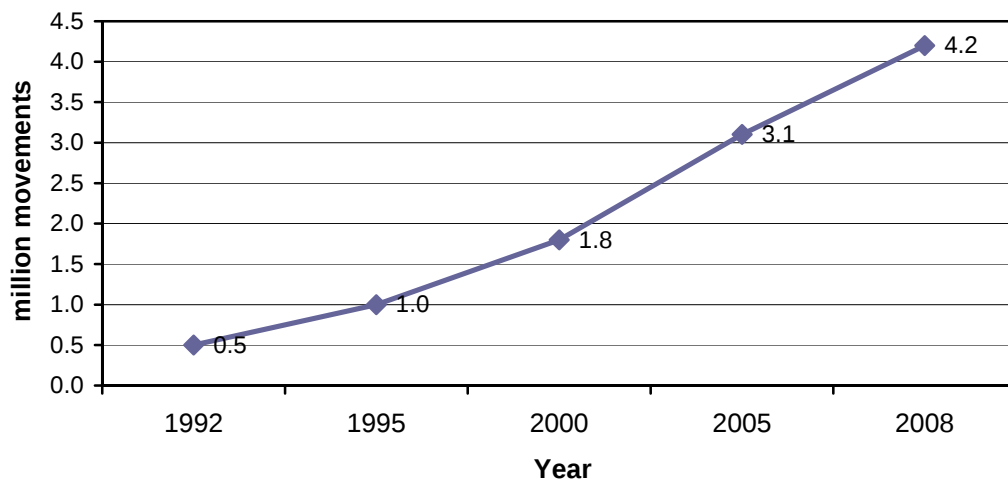
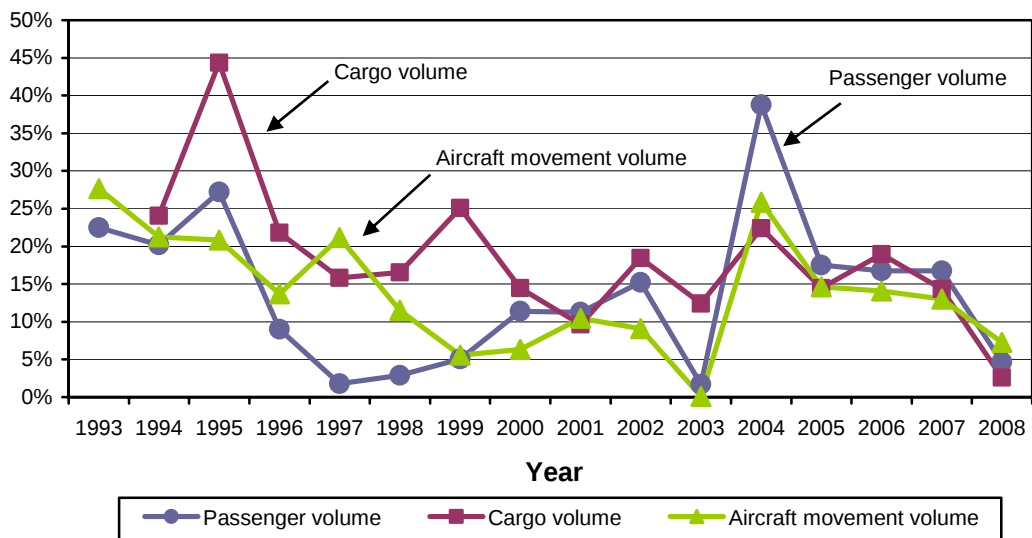


FIGURE 2 AIRCRAFT MOVEMENT HANDLED IN CHINA'S AIRPORTS



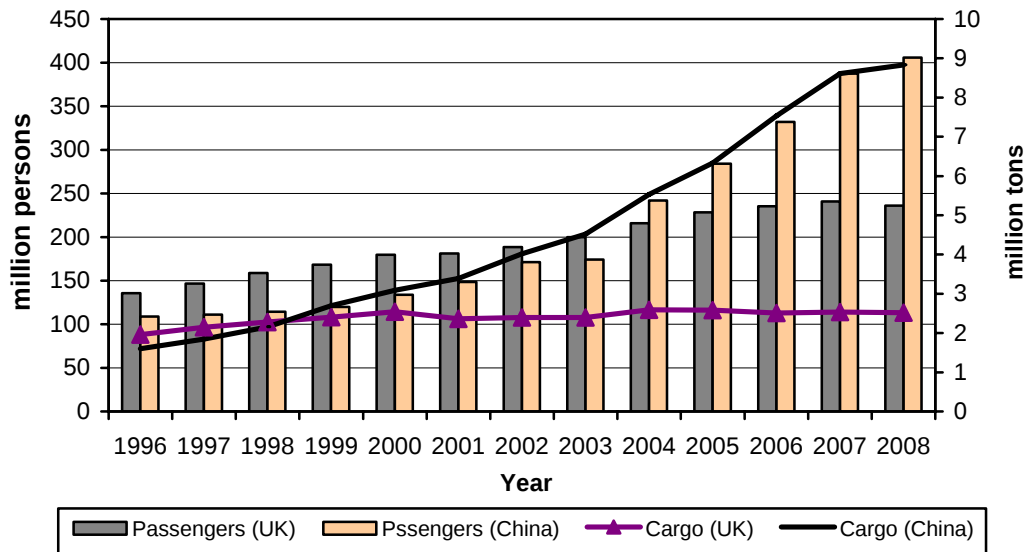
Source: China Statistical Yearbook 2009

FIGURE 3 GROWTH OF BUSINESS VOLUME HANDLED BY CHINA'S AIRPORT INDUSTRY



Sources: 1. Planning and Development Division of CAAC;
2. Statistical Data on Civil Aviation of China, 2009.

FIGURE 4 AIRPORT INDUSTRY COMPARISON BETWEEN CHINA AND UK



Sources: 1. Planning and Development Division of CAAC;
 2. *Statistical Data on Civil Aviation of China, 2009*;
 3. UK Civil Aviation Authority, UK Airport Statistics: 2008 – annual;
<http://www.caa.co.uk/default.aspx?catid=80&pagetype=88&sglid=3&fld=2008Annual>

3.5 There are currently 42 international airports in China. Specifically, 31 4E⁴ airports are capable of handling B747 aircrafts, including three large hubs or gateways, namely Beijing International Airport, Shanghai Pudong International Airport and Guangzhou Baiyun International Airport, which have the capacity for A380 aircraft. Passenger volume of Beijing Airport reached 6.53 million in 2009 to become Asia's largest hub and the world's third largest.

3.6 Forty airports can support the landing and taking off of B767, B757 and MD82 aircraft, and about 142 airports can house B737 aircraft. Total terminal area for China's airports increased to 3.99 million square meters in 2007 from

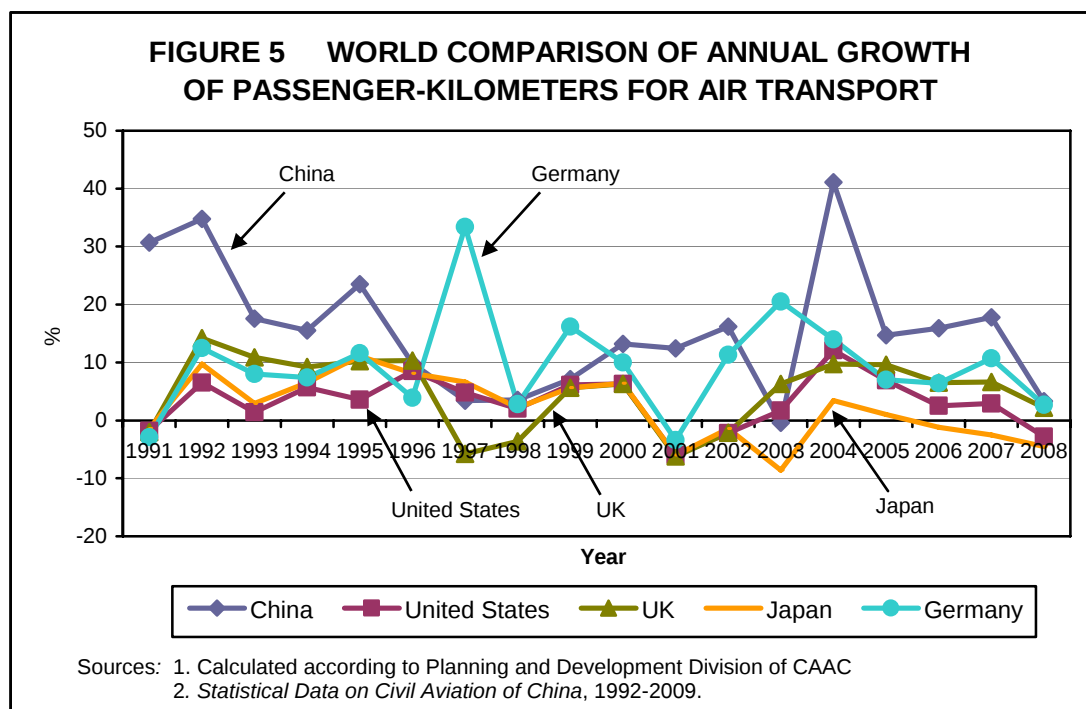
⁴ According to Yang, Tok and Su's research in 2008 (pp. 243-44), internationally, airports are primarily classified into 4 different groups, 4E, 4D, 4C and under 3C depending on the length of their runways, wingspan of planes taking off/landing, and space between fellows of undercarriage. Specifically, the usual classifications are 4E: a minimum 1,800m-long runway, and capacity of allowing a plane with wingspan of 52m-60m and space between fellows of 9m- 4m to takeoff/land; 4D: a runway of at least 1,800m, wingspan of taking off /landing plane is 36m-52m, space between fellows is 9m-14m; 4C: a minimum 1800m long runway, 24m-36m width wingspan and 6m-9m space between fellows; and under 3C: all airports with runway under 1800m, and wingspan under 36m and space between fellows under 9m.

merely 0.23 million square meters in 1991. By 2008, China had formed a relatively developed air transport network, as evident from the changing capacity structure of Chinese aviation airports between 1991 and 2008 (see Appendix 1).

- 3.7 The total number of air routes had dramatically increased to 1532 by 2008 from 437 in 1990 and domestic and international routes increased to 1235 and 297 in 2008 respectively (see Appendix 2). Weekly flight frequency rose from 5200 to 40000 flights while the number of civil aviation aircraft increased to 1259 in 2008 from 315 in 1992.
- 3.8 The new airline network has coped with the dramatic increasing demand for air travel on these air routes. China's civil airlines recorded 288.3 billion passenger-kilometers and 12 billion freight ton-kilometers in 2008. In the same year, passenger and cargo traffic figures were 192.5 million persons and 4.07 million tons respectively.⁵ China ranked No. 2 in the world for air transport traffic and passenger traffic by 2005.⁶ Significantly, not only has China's air transport sector been the fastest developing among various transportation modes in China, the country has also recorded the world's highest average growth of air passenger traffic between 1991 and 2008 (see Figure 5).

⁵ *China Statistical Yearbook 2009*

⁶ Planning and Development Division of CAAC, 2006; *Statistical Data on Civil Aviation of China*, 2007



- 3.9 In recent years the domestic airport sector has begun modernizing and diversifying its products to meet the changing needs of airlines and customers. Many airports have diversified into real estate, logistics and freighting, and advertising. For example, according to an estimate by Shenzhen Airport, its advertisement revenue will amount to 730 million *yuan* between 2008 and 2011. In 2008 it accounted for around 50% of its total revenue.⁷
- 3.10 With China's airports offering more commercialized services, airport services have flourished. The services provided by China's airports to passengers, airport workers, local farmers and local businessmen have expanded to cover technical support, ground services, ground transport, restaurants, banking, shopping, pharmacies, warehousing, parking, unaccompanied minor services, offices and conferencing, leisure and entertainment.

⁷ "Advertising Revenue of Shenzhen Airport Will be Rapid Growth", <http://www.p5w.net/stock/news/gsxw/200807/t1748632.htm>

Serious Challenges Ahead

- 4.1 In spite of all its achievements, China's airport industry still faces three severe challenges to its full modernization program, namely, unequal airport development, overall poor performance, and fierce competition from other modes of transportation.
- 4.2 Firstly, uneven development is reflected in two aspects. One is the unbalanced development among airports. There were 158 operational airports by 2008. The top 10 airports accounted for 55.5% of China's total passenger volumes (see Figure 6 and Table 1). The 47 airports which handled more than one million passengers in 2008 accounted for more than 95% of the total number of passengers. In contrast, the 56 airports which recorded poor figures of less than 0.1 million passengers accounted for less than 1% of national passenger volume.⁸

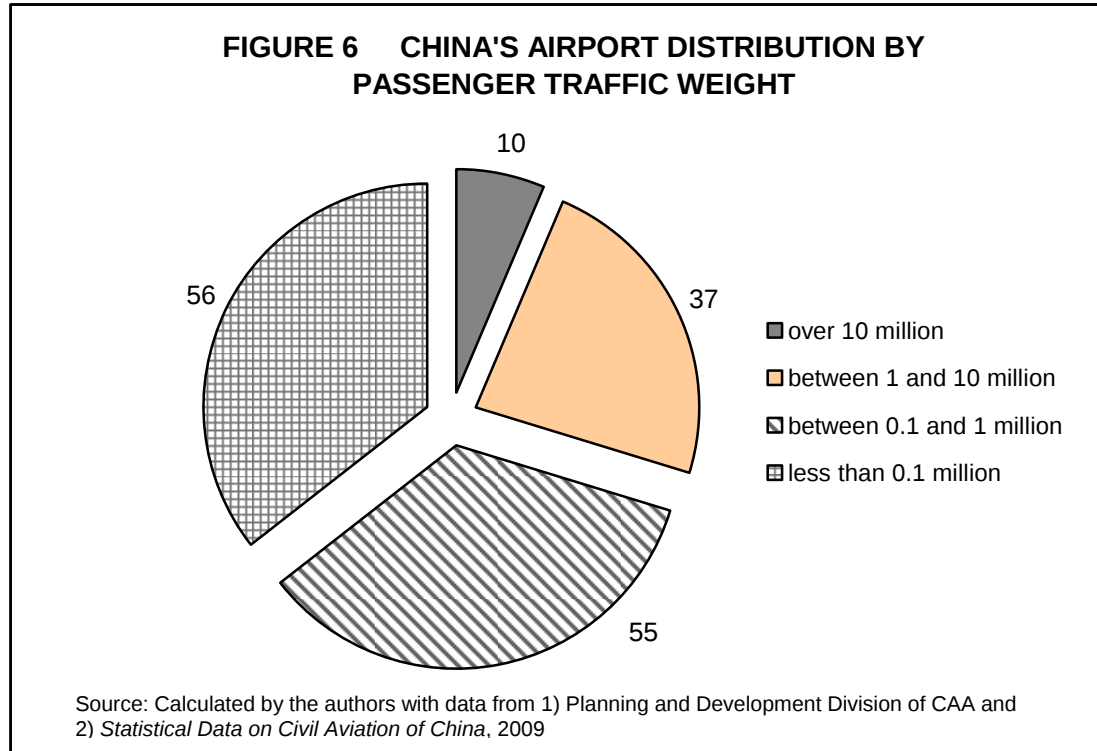
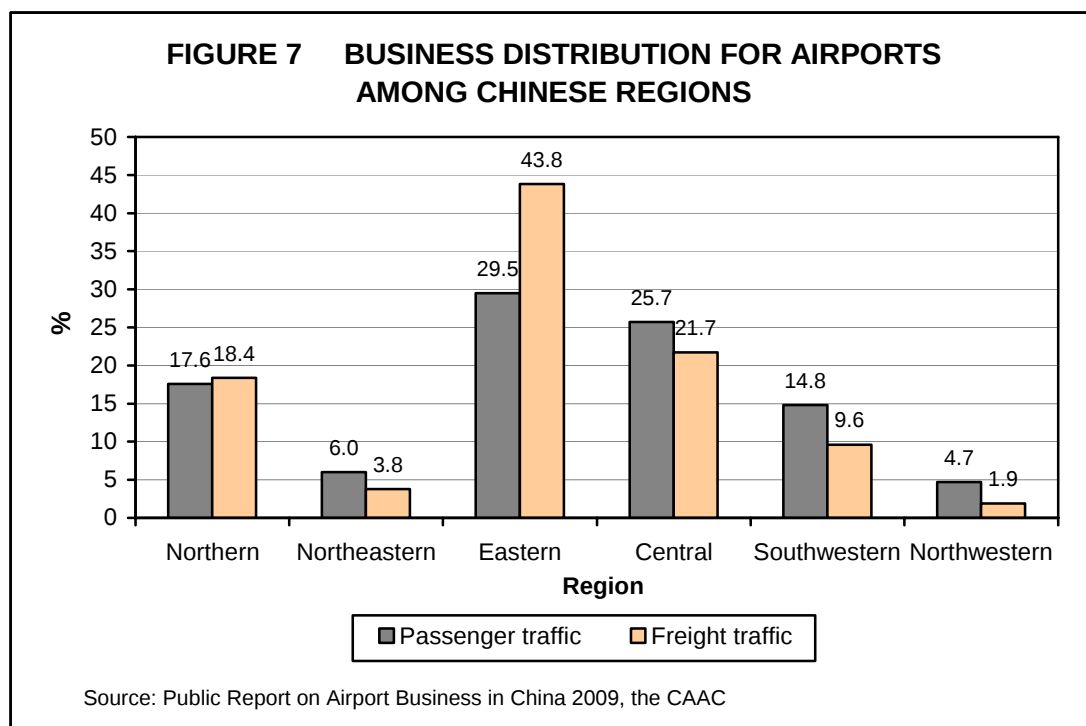


TABLE 1 CHINA'S TOP 10 AIRPORTS 2009

Airport	Passenger Traffic Handled (million persons)	Cargo Traffic Handled (million tons)
Beijing (Capital)	65.4	1.5
Guangzhou (Baiyun)	37.0	1.0
Shanghai (Pudong)	31.9	2.5
Shanghai (Hongqiao)	25.1	0.4
Shenzhen (Baoan)	24.5	0.6
Chengdu (Shuangliu)	22.6	0.4
Kunming (Wujiaba)	18.9	0.3
Xi'an (Xianyang)	15.3	0.1
Hangzhou (Xiaoshan)	14.9	0.2
Chongqing (Jiangbei)	14.0	0.2
China's Airports Total	486.1	9.5
Share of the top 10 in China (%)	55.5%	75.8%

Source: The CAAC, 2010

- 4.3 Air traffic has been highly concentrated in the airports located in provincial capitals, coastal or hot tourism regions. This puts enormous pressure on these heavily occupied airports' infrastructures, leading to increasingly acute slot shortage, with flight delays and congestion becoming common occurrences. In contrast, the facilities and capacities of airports located in the remote, undeveloped and rural areas have been far from fully utilized.
- 4.4 Uneven development among different regions is another burning problem. Compared to the corresponding figures of 29.5% and 43.8% for airports located in the eastern region, the northwest region accounted for only 4.7% and 1.9% respectively of China's total passenger and freight traffic in 2008. The northeast region and southwest region together accounted for only 20.8% and 13.4% of total volume (Figure 7).



4.5 In comparison to China, the uneven regional development of airports in the United States is not so serious. Its 29 large hubs, distributed in 21 states, account for around 30% of total terminal passengers traffic, whilst another 37 mid-hubs located in 25 states account for less than 37% of national terminal passenger traffic.⁹

4.6 Secondly, the overall performance of China's airport industry is far from satisfactory. Many of the airports with passenger business of less than 0.1 million remain financially unprofitable to date. For example, in 2004, there were only 43 profitable airports in China. In 2005, 85 airports, which handled less than 0.5 million passengers, faced operational difficulties. In 2006, all profitable airports were located in provincial cities or hot tourism cities. In general, 75% of Chinese airports are unprofitable.¹⁰

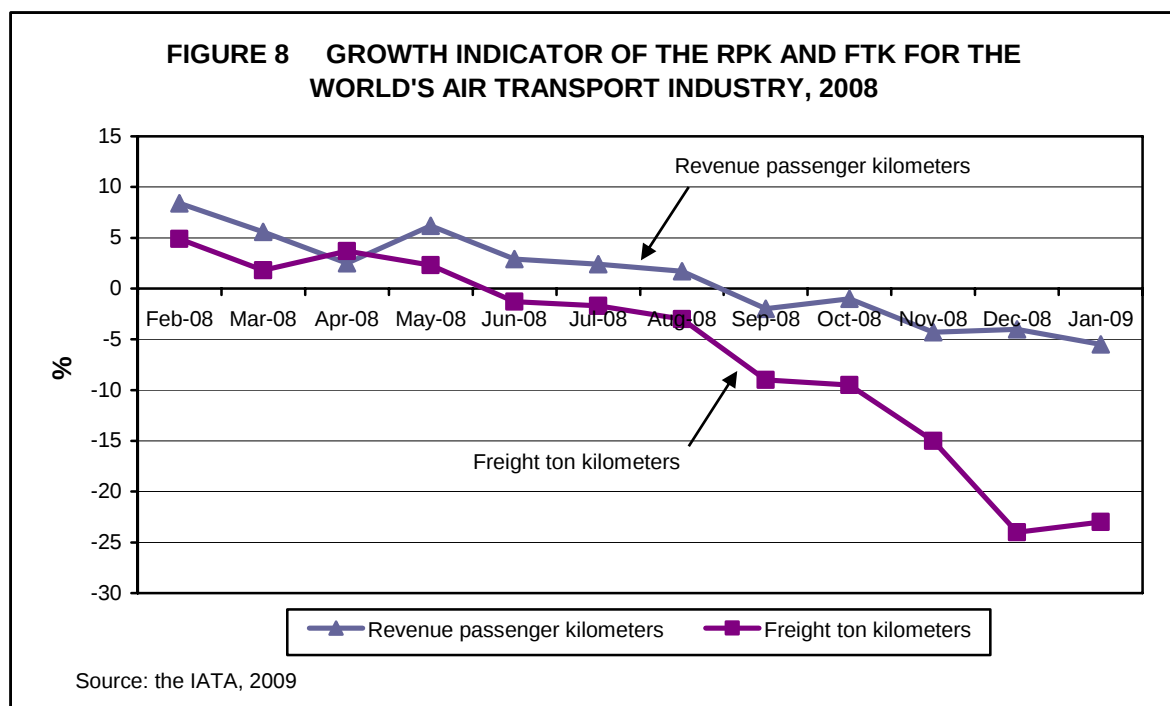
⁹ "Administrator's Fact Book", the FAA, 2008. <http://www.faa.gov/about/officeorg/headquartersoffices/aba/adminfactbook/>

¹⁰ Yang, X. Y. Tok, S. K and Su, F (2008) "The privatization and commercialization of China's airports," *Journal of Air Transport Management*, 14, pp. 243– 251

- 4.7 China's airport sector has registered persistent financial losses in recent years, after taking into account of government subsidies. In 2007, 70% of the 90 airports which handled less than 0.5 million passengers were in financial deficit. As released in the CAAC report, 114 airports which handled less than 1.2 million passengers faced operational difficulties in 2008. In fact, a total of 123 small- and medium-sized domestic airports received government subsidies in 2007.
- 4.8 Overall, high growth in air transportation demand failed to bring financial gain to airports. Consequently, local governments have to bear the heavy burden of increasing airport subsidies. China's airport industry badly needs further reforms in order to modernize and upgrade its infrastructure facilities, improve efficiency and reduce operational and management costs.
- 4.9 Moreover, the sharp fall in both air passenger and freight volumes, brought about by the global economic crisis, has had further negative effects on many Chinese airlines' profitability. However, China's airlines did not suffer alone. According to the latest data released by the International Air Transport Association (IATA), airlines worldwide have suffered heavily in terms of both revenue passenger kilometers (RPK) and freight ton kilometers (FTK) since 2008 mainly due to the global economic downturn (Figure 8).¹¹
- 4.10 Thirdly, competition from other transportation modes is intensifying for the domestic airports. With the exception of Tibet, provinces had built expressways connecting their capital city with prefecture-level cities by 2009. Furthermore, starting from November 2008, a government plan of "7918" expressways network has been launched.¹² The plan is expected to further boost the development of the highways system.

¹¹ "Monthly Traffic Analysis," the IATA, 2009

¹² 7918 refers to 7 radically organized expressways around Beijing hub, 9 vertical expressways and 18 horizontal expressways by 2020.



4.11 Significantly, the rapid development of high-speed railway is anticipated to strongly challenge airport and airline development. The government's stimulus package is designed to further boost the development of high-speed railway. The Wuhan-Guangzhou¹³ and Zhengzhou-Xi'an¹⁴ passenger-dedicated high-speed railways were put into operation in December 2009 and February 2010 respectively.

4.12 China plans to construct 42 new high-speed rail lines, and 13,000 km of high-speed rail line is expected to be completed and put into operation by 2012.¹⁵ The high-speed railway network will consist of four north-south and four west-east rail lines (Four Verticals and Four Horizontals).

¹³ "The top speed of the Wuhan-Guangzhou passenger-dedicated line is up to 394 km/h", *Xinhua*, http://news.southcn.com/z/2009-12/09/content_6957117.htm

¹⁴ "The first high-speed rail for the central and western regions was put into operation: it only took two hours from Zhengzhou to Xi'an", *Yahoo*, <http://hk.news.yahoo.com/article/100206/4/ghk4.html>

¹⁵ "China unveils high-speed railways", *BBC News*, <http://news.bbc.co.uk/2/hi/asia-pacific/8246600.stm>

- 4.13 Since the Wuhan-Guangzhou railway was put into operation, large airline companies have announced cuts in air fares to attract customers. For example, the lowest air fare from Wuhan to Shenzhen was 260 *yuan*. According to the marketing data of China Southern Airlines, its passenger volume decreased by 70% and 35% on Wuhan-Nanjing and Wuhan-Shanghai routes respectively after the Wuhan-Hefei high-speed railway came into operation on 1 April 2009.¹⁶
- 4.14 Furthermore, the Chengdu-Chongqing high-speed railway was put into operation in September 2008. Air traffic on the Chengdu-Chongqing route dropped quickly: Sichuan Airlines, Air China and China Eastern Airlines exited this market one after another. On the second operational day of Shijiazhuang-Taiyuan high-speed railway, the average load factor of China Eastern Airlines on the Beijing-Taiyuan route declined from 85% to 49%, and several scheduled flights had to be cancelled as a result.¹⁷
- 4.15 The experiences of high-speed railway operation in Japan, France and South Korea have shown that when the speed of a train reaches 200-250 km per hour or 300-350 km per hour, air transport passenger traffic will go down 30%-60% on inter-city routes with a distance of less than 1000 km or 2000 km respectively.¹⁸ The severe competition among different transport modes will reduce flight number on related airline routes or lead to cancellation of some routes. Therefore, such effects are expected to hit the Chinese airport industry in the future.
- 4.16 The airline sector would have to struggle to maintain market share and increase profitability. With perceived certainty, it would face fierce competition from the high-speed railway and road transportation sectors.

¹⁶ Competition among Variety Transport Modes Has Brought Convenience and Benefits to People, http://news.xinhuanet.com/fortune/2010-01/07/content_12768535.htm

¹⁷ “Air transportation will be connected with Railway Transportation after Two Years”, http://news.airtofly.com/Html/zhuguo/2009-12/19/11364409121911364481339647_2.htm

¹⁸ “Civil Aviation of China Should Look Ahead to Meet The Challenges”, <http://www.bizteller.cn/trade/news/newsSearch/newsContent/tradenews/67925876.html>

‘Cut-throat’ competition is likely to occur among the various transportation providers. Considering the backwardness of the existing domestic airports, the modernization of the entire airport industry is a momentous undertaking for the government.

**APPENDIX 1 THE CAPACITY STRUCTURE OF CHINESE
AIRPORTS, 1991-2008**

Year	Total	4E	4D	4C	Under 3C
1991	97	11	26	17	43
1992	98	11	28	18	51
1993	104	11	22	25	46
1994	109	13	27	25	44
1995	118	14	29	29	46
1996	122	14	35	37	36
1997	121	17	38	35	31
1998	121	19	35	35	32
1999	119	22	35	40	22
2000	121	23	34	43	21
2001	126	23	36	40	27
2002	125	25	34	47	19
2003	132	25	34	50	23
2004	137	25	34	52	26
2005	142	25	35	53	29
2006	147	26	38	57	26
2007	152	29	37	61	25
2008	160	31	40	71	18

Note: the military airports used by China United Airlines are not included

Sources: 1. Planning and Development Division of CAAC.

2. *Statistical Data on Civil Aviation of China*, 1992-2009.

**APPENDIX 2 NUMBER OF AIR ROUTES, COUNTRIES AND CITIES
FLOWN FROM 1990-2008**

Year	Total air routes	Domestic Air Routes		International Air Routes		
		Air routes	Cities	Air routes	Countries	Cities
1990	437	385	94	44	24	32
1991	452	395	96	49	29	44
1992	563	492	109	58	38	53
1993	647	563	113	71	38	53
1994	727	630	121	84	39	56
1995	797	694	133	85	31	51
1996	876	757	134	98	33	58
1997	967	851	135	109	31	57
1998	1122	983	135	131	34	64
1999	1115	987	132	128	33	60
2000	1165	1032	133	133	33	60
2001	1143	1009	130	134	33	62
2002	1176	1015	130	161	32	67
2003	1155	961	125	194	32	72
2004	1279	1035	132	244	33	75
2005	1257	1024	133	233	33	75
2006	1336	1068	140	268	42	91
2007	1506	1216	146	290	43	96
2008	1532	1235	150	297	46	104

Sources: 1. Planning and Development Division of CAAC.
2. *Statistical Data on Civil Aviation of China*, 1992-2009.