

COMAC MARKET FORECAST

2020–2039

Contents

06

02 PREFACE

EXECUTIVE SUMMARY

08 DRIVING FACTORS OF AIR INDUSTRY

ECONOMY	08
OIL PRICE	10
NETWORK	11
RETIREMENT AND RECYCLING TREND	12

13

CHINA AIR TRAVEL INDUSTRY OVERVIEW

MARKET OVERVIEW	13
CHINA REGIONAL MARKET	19
CONNECTIVITY BETWEEN THE B&R AND CHINA AIR MARKET	20

22

TRAFFIC & FLEET FORECAST

GLOBAL TRAFFIC FORECAST	22
GLOBAL FLEET FORECAST	24
CHINA	33
ASIA PACIFIC	36
NORTH AMERICA	39
LATIN AMERICA	42
EUROPE	45
RUSSIA & CIS	48
MIDDLE EAST	51
AFRICA	54

57

FREIGHTER MARKET FORECAST

GLOBAL FREIGHTER MARKET	58
IMPACT OF COVID-19 ON FREIGHTER MARKET	60
FREIGHTER FLEET FORECAST	61

63

APPENDICIES & DATA TABLES

FORECASTING METHODOLOGY	63
AIRCRAFT SIZE CATEGORY DEFINITIONS	64
GLOBAL RPK TRAFFIC FORECAST SUMMARY	66



PREFACE

2009-2018 is the golden decade for the rapid developing global aviation industry. During the expansion of the industry, competition has intensified, and industry concentration has increased. During 2019, the weak global industrial growth, trade friction escalations, and other uncertain factors, such as geopolitical risks, reduced business confidence. The global economic growth rate fell to its lowest level since the financial crisis of 2008, and major economies have entered a cyclical and structural slowdown.

Despite the downward pressure on the macro economy, the global aviation industry has achieved profit for ten consecutive years till 2019; however, the aviation industry is now facing many challenges, such as the grounding of 737MAX, the bankruptcy of well-known airlines and the operational difficulties threatening small and medium-sized airlines. The passenger turnover has fallen below the long-term growth trend for the first time since the 2008 financial crisis (~5.5%, IATA), with aviation passenger turnover (RPK) increased by 4.2% and capacity (ASK) increased by 3.4%. The demand was still outstripping supply, but the gap

between the two has narrowed. The passenger load factor increased by 0.7%, reaching a record high of 82.6%. The Chinese aviation market has become one of the fastest-growing markets for many years worldwide. Despite the increase in external risks and challenges during 2019, the Chinese aviation market has made steady progress with its RPK increased by 9.3% and passenger volume increased by 7.9%.

At the beginning of 2020, the outbreak of COVID-19 has made unprecedented impact on the global aviation market, causing a large number of aircraft to be grounded and aircraft orders to be cancelled. Many airlines declared bankruptcy, manufacturers and suppliers reduced production and made layoffs to cope with the crisis. IATA predicts the global aviation industry will not be able to recover to the pre-epidemic level until 2024 and return to the rising interval around 2026. Therefore, the global aviation market will enter a long period of recovery for the next 4 to 6 years. In the second half of 2020, Chinese aviation market shows signs of recovery, bringing hope to the world aviation market. With the epidemic gradually

under control and the economy back on track, the global aviation industry is also expected to usher in recovery.

The Commercial Aircraft Corporation of China, Ltd. has paid close attention to the development of the aviation industry since establishment and has always been committed to making positive contributions to the industry. In the past decade, the COMAC marketing team has made forecasts to share our views of global aviation markets and air transportation development for the next 20 years.

In 2020, with in-depth research on global epidemic impact, future economic growth, fare levels, fuel prices, fleet growth, replacement demand, airline strategic planning and network evolution, we released the 2020-2039 COMAC Market Forecast (CMF). For the next 20 years, we estimate the global RPKs will grow at an average annual rate of 3.73%, and about 40,664 aircraft of each seat class will be delivered, with the total value reaching nearly 6 trillion US dollars. The impact of COVID-19 will lead to the reduction of global demand for approximately 4,000 to 6,000 passenger aircraft, mainly in the first five years. The Chinese market

is the first to recover and is likely to become the world's largest aviation market earlier than expected. Although trade protectionism, de-globalization tendency, and the oil price fluctuation restrict the development of the air transportation industry. China's deepening reforms and openness, as well as the "Belt and Road" initiative, will continue to drive the growth of aviation demand in China and even the world. New technologies, such as aircraft and engine manufacturing technology, improvement of airline operations, will motivate the global aviation market to develop more efficiently. In the post-epidemic period, the development of the global aviation market is bound to be full of challenges, COMAC wishes to explore together with all sectors of experts and scholars. In this report, we outline an objective view on the demand growth of the global and regional air passenger market, and conduct an in-depth analysis of the fastest-growing China domestic market, providing new perspectives for future aviation development.

2020-2039 Forecast Summary

	China*	Asia Pacific**	Europe	Latin America	Middle East	North America	Russia & CIS	Africa	Global
Global Fleet Forecast									
Average GDP Growth Rate	4.27%	2.92%	1.41%	2.48%	2.07%	1.90%	1.91%	2.70%	2.48%
Average RPK Growth Rate	5.98%	4.93%	2.00%	3.83%	3.92%	1.89%	3.95%	4.36%	3.73%
2039RPKs (trillion)	4.13	3.99	2.99	0.97	1.81	2.84	0.70	0.47	17.89
Deliveries									
Twin-Aisle	1,868	1,658	1,152	257	944	787	303	250	7,219
Single-Aisle	5,937	5,939	6,416	2,017	1,444	5,494	1,050	830	29,127
Regional Jet	920	596	339	562	53	1,261	201	386	4,318
Total	8,725	8,193	7,907	2,836	2,441	7,542	1,554	1,466	40,664
Market Value B\$									
Twin-Aisle	593	540	361	79	346	219	86	77	2,301
Single-Aisle	687	701	741	231	170	701	112	93	3,435
Regional Jet	45	31	17	28	3	74	10	19	226
Total	1,325	1,273	1,119	337	518	993	208	188	5,961
End 2019 Fleet									
Twin-Aisle	717	1,074	973	155	715	692	138	173	4,637
Single-Aisle	3,087	2,532	3,579	1,212	540	4,095	820	476	16,341
Regional Jet	59	167	291	79	48	1,902	193	139	2,878
Total	3,863	3,773	4,843	1,446	1,303	6,689	1,151	788	23,856
End 2039 Fleet									
Twin-Aisle	2,174	2,053	1,488	257	1,161	872	387	309	8,701
Single-Aisle	6,521	6,065	7,255	1,891	1,558	5,641	1,071	887	30,889
Regional Jet	946	598	379	620	87	1,571	202	408	4,811
Total	9,641	8,716	9,122	2,768	2,806	8,083	1,660	1,604	44,400
Global Freighter Forecast									
Total Deliveries									
Large Widebody Freighter	112	49	76	8	93	258	82	15	693
Medium Widebody Freighter	77	43	114	12	16	647	36	22	967
Small Narrowbody Freighter	419	131	190	103	15	288	71	48	1,265
Total	608	223	380	123	124	1,193	189	85	2,925
New Freighter Deliveries									
Large Widebody Freighter	97	46	71	8	92	173	82	14	583
Medium Widebody Freighter	20	11	19	0	5	315	5	0	375
Small Narrowbody Freighter	0	0	0	1	0	5	2	0	8
Total	117	57	90	9	97	493	89	14	966

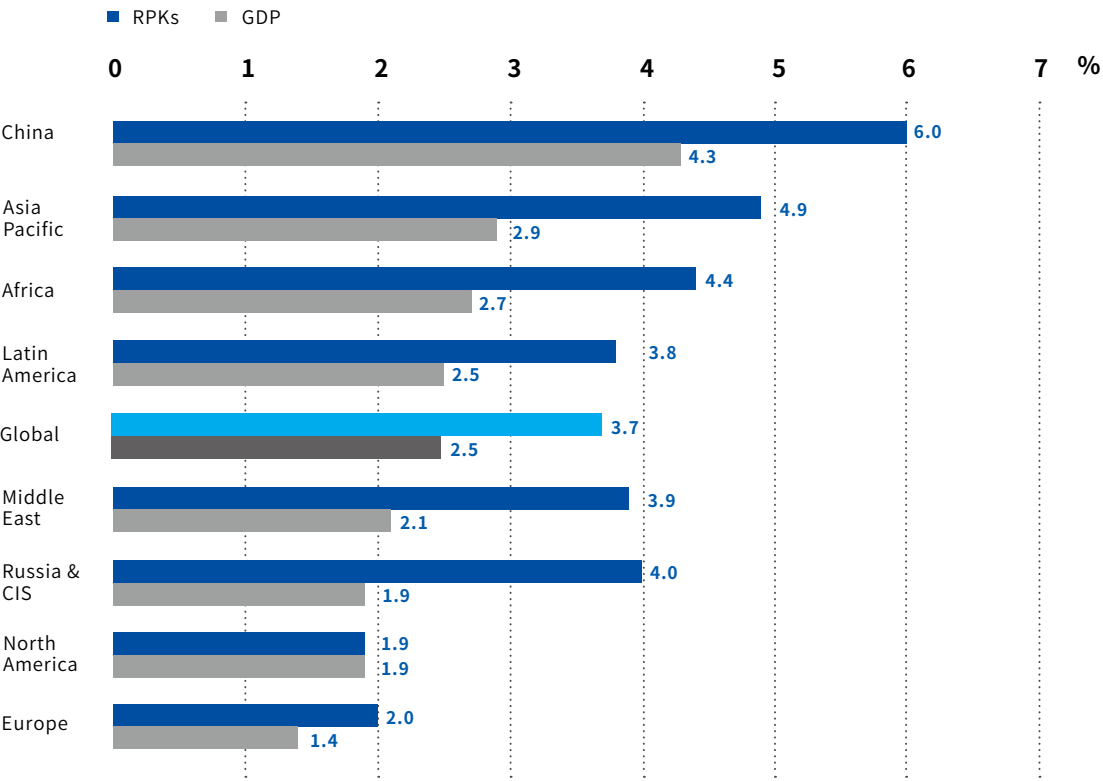
	China*	Asia Pacific**	Europe	Latin America	Middle East	North America	Russia & CIS	Africa	Global
Conversions									
Large Widebody Freighter	15	3	5	0	1	85	0	1	110
Medium Widebody Freighter	57	32	95	12	11	332	31	22	592
Small Narrowbody Freighter	419	131	190	102	15	283	69	48	1,257
Total	491	166	290	114	27	700	100	71	1,959
End 2019									
Large Widebody Freighter	83	53	85	0	55	258	56	12	602
Medium Widebody Freighter	29	20	75	29	23	412	62	15	665
Small Narrowbody Freighter	114	65	144	85	3	271	27	38	747
Total	226	138	304	114	81	941	145	65	2,014
End 2039									
Large Widebody Freighter	153	80	111	8	139	327	98	25	941
Medium Widebody Freighter	87	47	135	21	24	784	39	22	1,159
Small Narrowbody Freighter	419	130	190	103	15	291	73	48	1,269
Total	659	257	436	132	178	1,402	210	95	3,369

*China includes Hong Kong, Macau and Taiwan

** Asia-Pacific excludes China

Source: COMAC, Cirium, IHS

Global Forecast Outlook



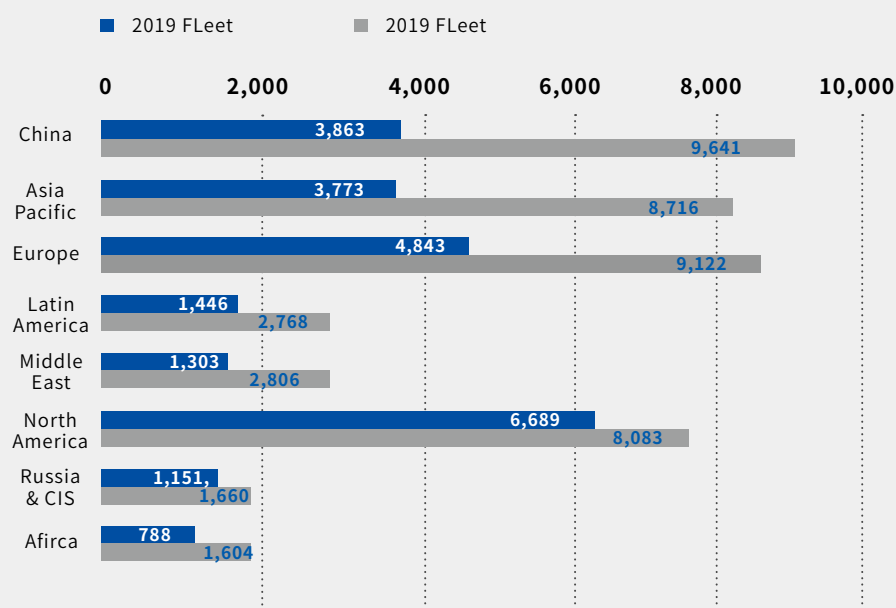
Source: COMAC、IHS

EXECUTIVE SUMMARY



Total passenger demand, as measured in RPKs, is forecast to increase over the next 2 decades at an average annual rate of 3.7%. We expect that RPKs in China related markets will grow at 6.0% per annum on average over the next two decades. This demand forecast is based on the projection of long-term growth in the global economy of 2.5% per year for the period to 2039.

Global Fleet Forecast



*China includes Hong Kong, Macau and Taiwan

** Asia-Pacific excludes China

Source: COMAC, Cirium

Passenger Jet Fleet and Traffic Forecast Summary

	Global Total		China		
	Fleet	RPKs (trillion)	Fleet	% of global total	RPKs (trillion)
2019	23,856	8.6	3,863	16.2%	1.3
2024F	24,894	8.9	4,810	19.3%	1.7
2029F	29,415	12.0	6,131	20.8%	2.3
2034F	35,480	14.7	7,613	21.5%	2.9
2039F	44,400	17.9	9,641	21.7%	4.1
2020-2039 CAGR	3.20%	3.73%	4.70%	--	5.98%

Source: COMAC, Cirium

It is expected that the total air passenger demand in 2039 to be 2.1 times the current level. However, the world's fleet size is expected to increase at a slower rate than demand. It is forecast that the fleet size will reach to 44,400 aircraft by 2039, which is more than 1.9 times of the current operating fleet of 23,856 aircraft.

It is expected that out of the current operating fleet, 20,120 aircraft (around 84.3%) will be retired from commercial passenger services in the next twenty years. They will be converted to business aircraft, freighters and other roles, or permanently scrapped and subsequently be replaced.

Additionally, there is a need of 20,544 new aircraft in the global fleet market. Therefore, we expect that there will be a need for the delivery of over 40,664 new aircraft worth \$5.9 trillion (based on 2019 dollar term and at list prices) over the next 2 decades for both replacement and growth, about 72% are single-aisle jets. It is estimated that China-based airlines will need to take delivery of 8,725 aircraft worth around \$1.3 trillion at 2019 list prices. By the end of forecast period, China's share of the world's operating passenger aircraft fleet will rise from 16% to 22% in 2039.

2020-2039 Passenger Jet Delivery Forecast Summary

		Global Total		China
		Deliveries	Market value hundred million \$	New deliveries
Regional Jets	50-seats	150	45	0
	70-seats	351	175	0
	90-seats	3,817	2,038	920
Single-Aisle	120-seats	1,432	1,374	113
	160-seats	20,016	23,025	4,620
	200-seats	7,679	9,947	1,204
Twin-Aisle	250-seats	5,555	16,664	1,406
	350-seats	1,164	4,000	427
	400-seats	500	2,348	35

Source: COMAC

DRIVING FACTORS OF AIR INDUSTRY

ECONOMY

Global Economic Trends

In 2019, as globalization stalled and trade protectionism spreading, multilateralism and the multilateral trading system encountered crises. Trade and investment growth slowed down, and global value chains have suffered damages. While economic growth remained sluggish, ongoing international issues such as the trade war between China and the U.S., and, Brexit, has been adding uncertainties to its prospects. Since April 2019, the global manufacturing PMI has remained below the line of prosperity, and the world has observed decrease in economic activities. The global economy has grown by 2.6% in 2019, representing a decrease of 0.6% from 2018. The U.S. economy has grown by 2.3% and the Eurozone economy by 1.2%, both rates were 0.6% lower than in 2018. Among the emerging economies, India has grown by 4.7%, a drop of 1.4% from 2018. Economic growth of Russia, Brazil, and five ASEAN countries except

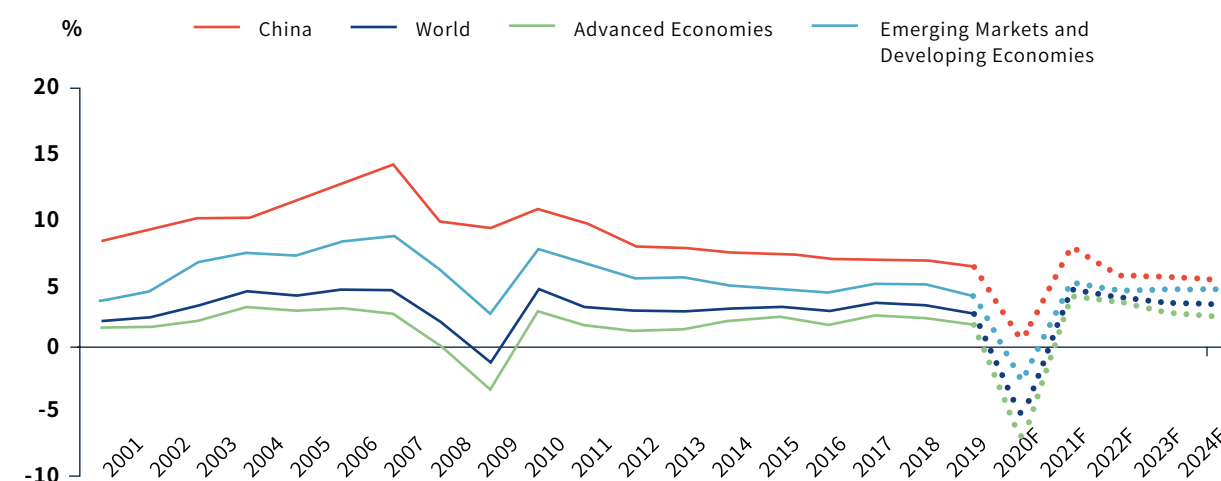
Malaysia all declined by varying degrees. The growth rate of international trade dropped to 1.2%, which was 1.6% lower than in 2018. China's economic growth rate in 2019 reached 6.1%, which although was lower compared with previous years, was still much higher than the global average.

Due to the impact of the COVID-19 pandemic, global economic growth in 2020 is predicted to decline by 5.6%. Industries and international trade will suffer huge losses due to the epidemic, with the global aviation industry losing approximately US\$350 million a week. However, if the epidemic can be contained in 2020, the global economic growth is thought to be able to surpass the average levels of the past few years.

An increasing trade tension level has also brought instability to business activities and reduced investment confidence. In addition, trends including a rise in global debt levels, a slowdown in international trade growth, and international direct investment downturn are expected

to affect the development of the global economy in the near future. Against this backdrop, emerging economies are expected to become the major force behind global economic growth.

Real GDP Growth (%YoY) & Projections for Major Country Groups



Source: COMAC, IHS

Oil Price

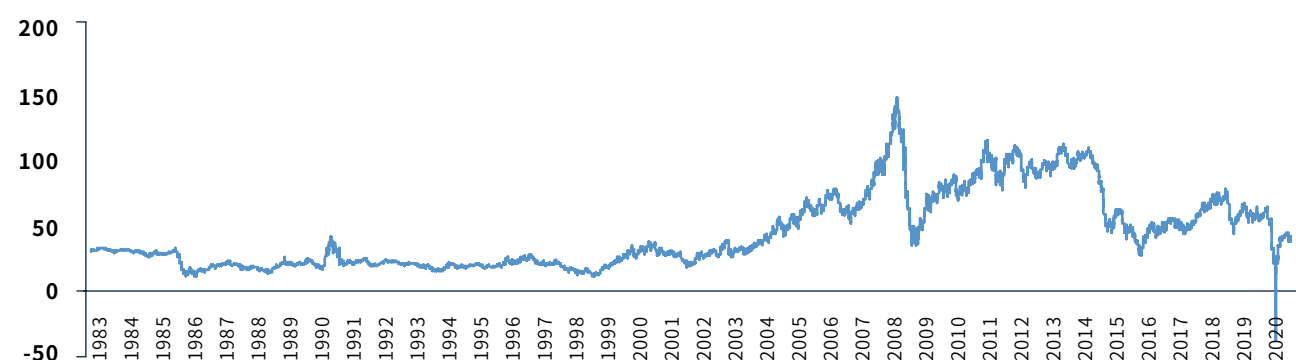
From the year 2013 to 2019, statistics showed that the average annual oil prices issued by Organization of Petroleum Exporting Countries (OPEC) has first showed a downward trend and then an upward trend. The highest average annual oil price occurred was US\$105.9/barrel in 2013, and the lowest was US\$40.8/barrel occurred in 2016, and in 2019 the average annual price was US\$65.4/ barrel. In 2019, with the combining forces of OPEC cutting production to support oil prices, and continued expansion of the US shale oil industry, the international crude oil market has seen high level fluctuations in oil prices.

In 2020, the crude oil market is expected to continue to fluctuate. Russia and OPEC failed to reach agreement on

production reduction. As an important member of OPEC, Saudi Arabia, a major oil-producing country in the Middle East, made price cut. In addition, due to COVID-19, price of crude oil futures nosedived and plunged below zero for the first time in May. In June, oil prices rebounded to a certain extent, with US crude oil prices approaching \$30/barrel. As global crude oil producers cut production rapidly, inventory pressure is easing. One month after oil prices became negative, countries gradually lifted travel restrictions caused by the epidemic. Crude oil demand is rebounding from a low point and is expected to usher in a period of rebounding in the short term.

Oil Spot price FOB (1983-2020)

Dollars per Barrel



Source: COMAC, U.S.EIA

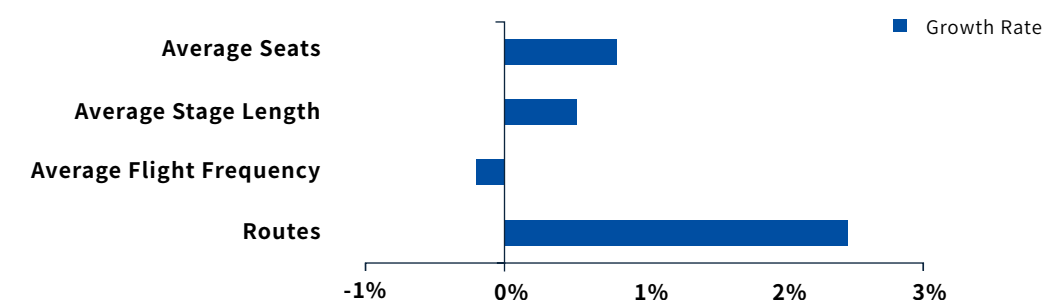


Network

In 2019, there were 32,770 routes in operation worldwide. The growth rate of new routes slowed down to 2.5% compared with 6.6% in 2018. The average number of seats

provided by each flight rose from 155 to 156, and the average route distance rose from 1,434 km to 1,441 km.

Global Network Growth in 2019 (compared with 2018)

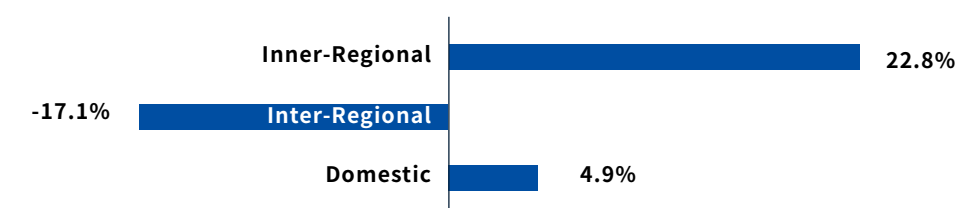


Source: COMAC, OAG

Despite the overall slowdown in route expansion in 2019, inter-continental routes have achieved breakthrough in the growth of their numbers. The total number of routes between the world continents has increased by 22.8%, representing a large increase from 2018's 10.1%. The European market has led the growth by large increases in the number of Europe -Africa routes and Europe -Middle

routes. Growth in domestic route number has however, slowed down to 4.9%, a figure lower than that of 7.4% achieved in 2018. One third of the newly added domestic routes were in China and another 20% were in North America. The number of international routes within each continent dropped by 17.1%, and more than 60% of newly added routes in this category were within Europe.

Network Growth in Each Market in 2019 (compared with 2018)



Source: COMAC, OAG

In 2020, as the COVID-19 pandemic is predicted to severely impact the international air travel market, the inter-continental market is likely to recover later than the domestic markets in each country and international markets within continents. Short-distance traffic is

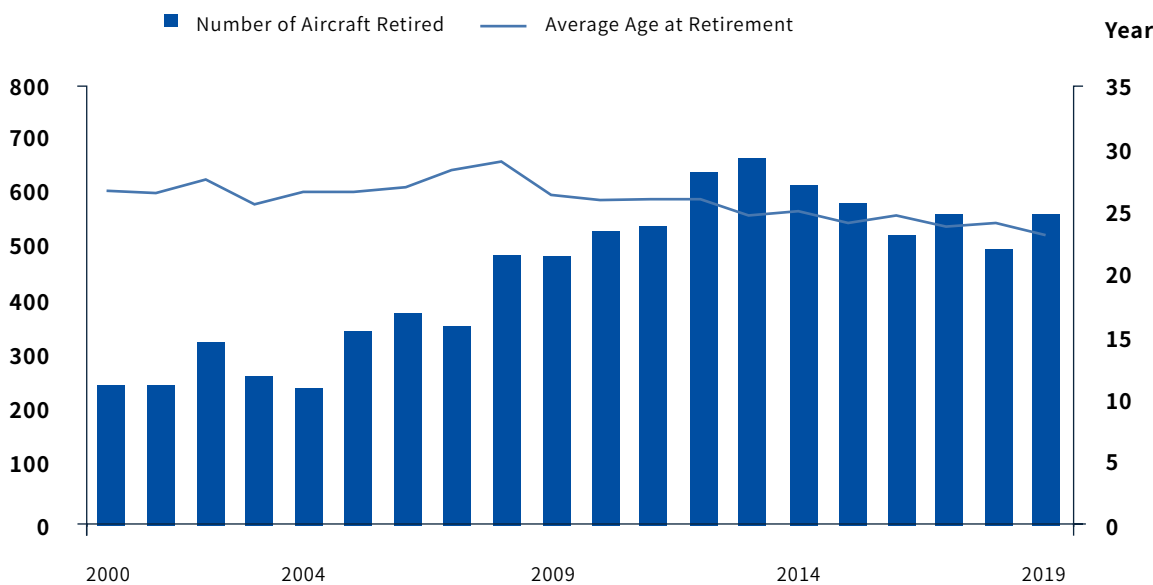
expected to recover faster than long-distance traffic. Some markets such as China are expected to recover earlier than the rest of the world. Restrictions in air travel such as border control measures will largely affect the speed of the industry's recovery.

Retirement

A total number of 567 passenger jets had retired in 2019, which represents a slight increase compared with the figure in 2018. The average aircraft age at retirement was 23- a slightly lower figure than that of 2018. The global average retirement age was around 25 to 26 since 1999. During 2006 to 2008, the average retirement age was relatively higher, climbing to 27 years. In 2008, the figure once reached a historically high point of 30 years, and since then, it has been on the decline.

From 1999 to 2007, the average number of passenger jets retired every year was usually less than 400. This annual figure then increased to the level of around 565 during the period between 2008 and 2019. This increase in retirement number reflected the trend of old aircraft types being replaced at ever earlier stage in their life cycles by new ones in major markets across the globe.

Historical Passenger Fleet Retirement Trends(2000-2019)



Source: Cirium

In the past 10 years, rise in fuel prices has served as a major factor in decision makings on fleet retirement by airlines. The pressure of increasing fuel-related costs on profit tended to force airlines to replace old and relatively inefficient aircraft with new ones with better performance.

The COVID-19 pandemic has been causing significant reduction in global air travel demand, which in turn is

enlarging surplus in many airlines’ supply capacity. It is expected that in the next 2 years the market could witness a large increase in airplane retirement as in-service time of some countries’ fleet are likely to be shortened due to the situation.

CHINA AIR TRAVEL INDUSTRY OVERVIEW



Market Overview (Mainland China)

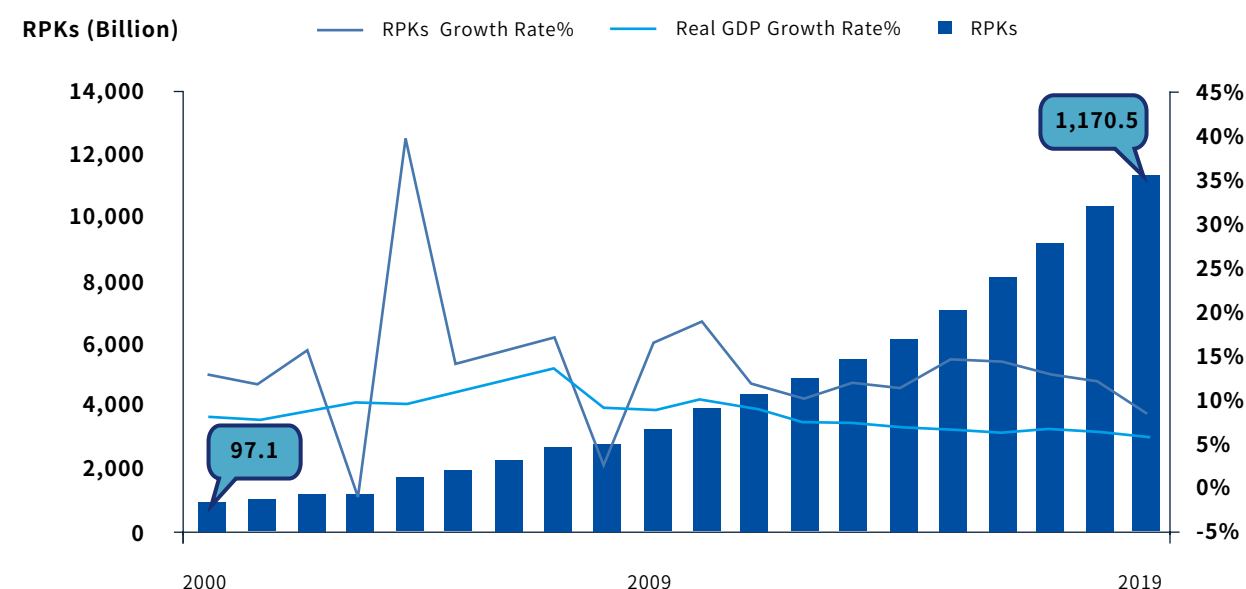
2019 was a key year for China’s implementation of the 13th Five-Year plan. Over the past year, the external risks and challenges that China faced have increased significantly, and the downward pressure on the domestic economy has continued to increase. Against this backdrop, the aviation

industry has been carrying out its own development plan, and many breakthroughs have been achieved. All these measure will promote the high quality development for Chinese civil aviation.

In 2019, total turnover for civil aviation transportation industry of China reached 129.3 billion ton-kilometers, with an increase of 7.2% over the previous year, and the growth rate was 4.6 percentage points lower than the previous year. The total passenger turnover of civil aviation transportation industry of China reached 1,170.5 billion person-kilometer, with a year-on-year increase of 9.3%. The volume of passenger traffic reached 660 million, with a year-on-year increase of 7.9%.

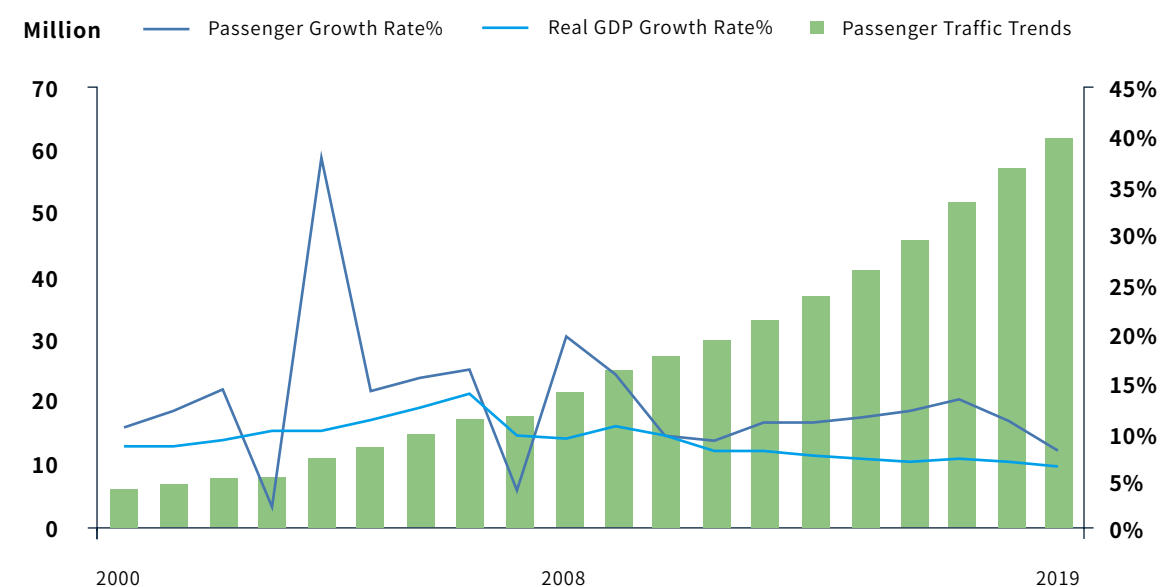
From 2000 to 2019, the passenger turnover for Chinese has an average annual growth rate of 14.0%, and passenger transportation volume has an average annual growth rate 12.8%. The passenger transportation for Chinese civil aviation has maintained a relatively high growth rate.

China RPKs Trends (2000-2019)



Source: COMAC, CAAC, IMF

China Real GDP and Passenger Traffic Trends(2000-2019)



Source: COMAC, CAAC, IMF

Steady Increase and Upgrading in the Economy

In 2019, China adhered to the supply-side organizational reform as the main line, focused on deepening reform and expanding opening up, continuously taking solid action in the three critical battles, coordinating and stabilizing growth, reform promotion, structure regulation, benefaction to people's livelihood, risk prevention, stability maintainance, and conducting a solid foundation of employment, finance, foreign trade, foreign capital, investment, and expectations stabilization. The overall economic operation was steady, and the developmental level has stepped up into a new phase. China's annual GDP reached 99.1 trillion RMB with an 6.1% increase over the previous year.

The industrial structure has been optimized continuously. The added value of the third industry accounted for 53.9%, about 1.7% increase over the previous year. New growth drivers have maintained rapid development. Among the industries above designated size, the added value of strategic emerging industries, high-tech manufacturing, and equipment manufacturing were increased by 8.4%, 8.8% and 6.7% respectively over the previous year.

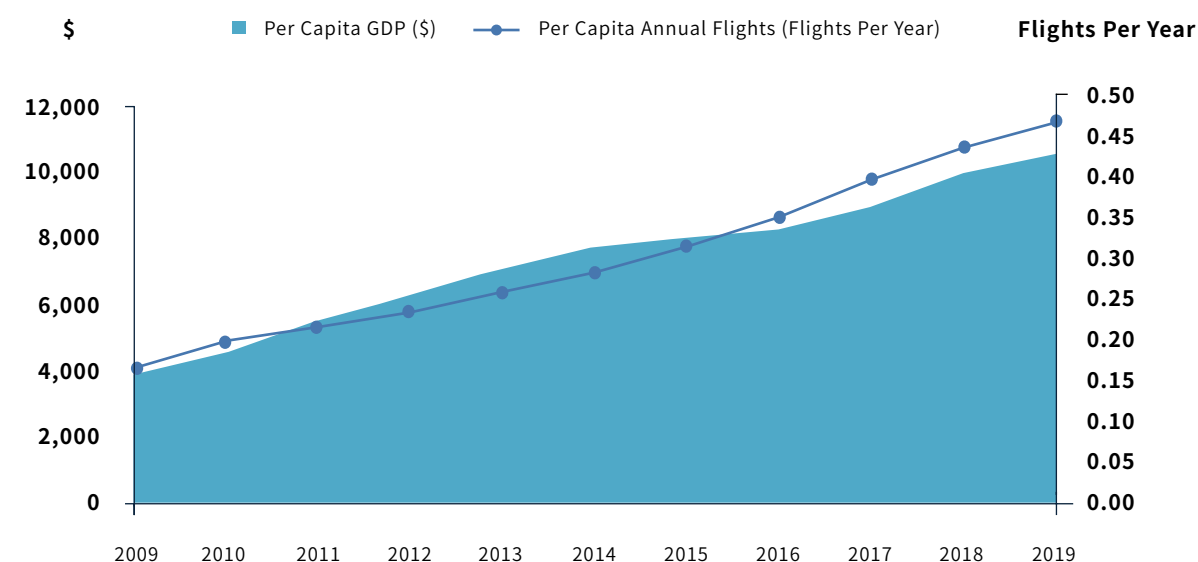
The resident income level keeps on increasing and the consumption structure continue on upgrading. The nationwide annual per capita disposable income was

30,733 RMB, about 8.9% increase over the previous year. Excluding price factors, the actual growth rate was 5.8%, which was slightly lower than the GDP growth rate, and the real growth rate was 0.7% lower than the previous year.

In 2019, China's economic structure and quality is steadily improving, and people's live standards continue to improve. Various social undertakings have developed prosperously, and the overall quality of the ecological environment has improved overall. The progress of the main indicators of the '13th Five-Year Plan' is in line with expectation, and new significant progress has been achieved in building a moderately prosperous society in all respects. Civil aviation transportation industry of China has developed continuously, with a slight slowdown in growth.

- In 2019, per capita GDP of China was 70,892 RMB, equivalent to 10,276 U.S. dollars, with a 5.7% increase over the previous year. Per capita GDP of China exceeded 10,000 U.S. dollars for the first time.
- In 2019, the annual per capita number of flights of China reached 0.47, which was 2.76 times that of 2009.

China Per Capita GDP and Per Capita Annual Flight (2009-2019)



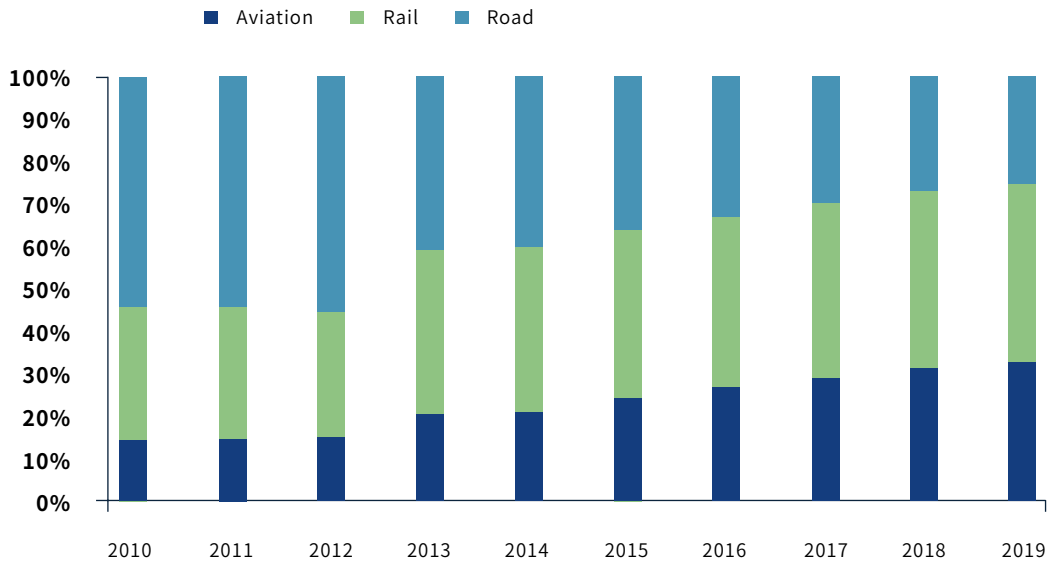
Source: COMAC, CAAC, IMF, STATS

Air Transport Market Demand

In last 20 years, with the rapid growth of Chinese economy, the transportation industry of China has kept a high level of growth, but the growth rate has slowed down in recent years. With the increasing resident income level of and the continuous upgrade of consumption structure,

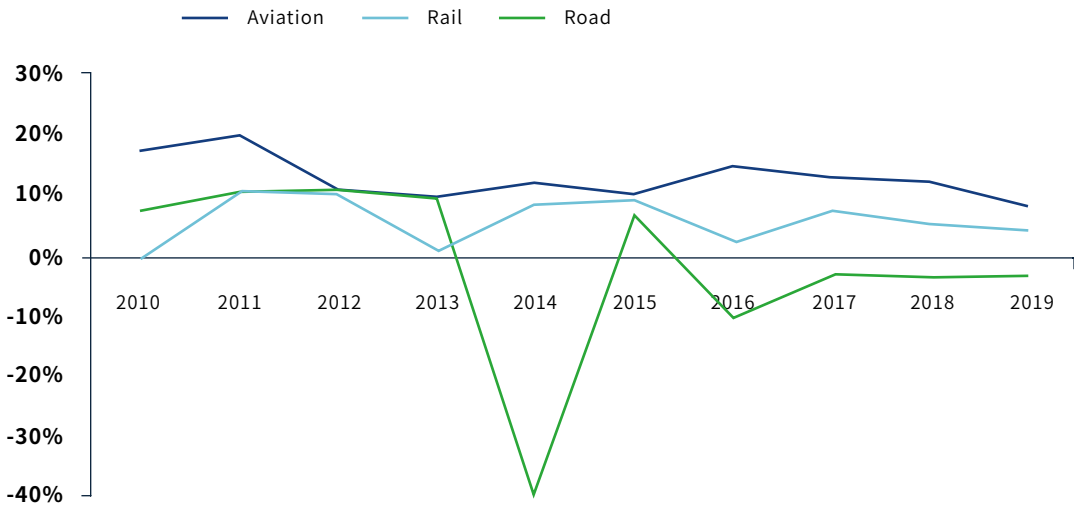
the proportion of air transportation keeps increasing in various modes of passenger transportation. The growth rate of turnover for civil aviation passenger transportation was also higher than that of other transportation modes.

Major Transport Modes RPKs Trends in Mainland China (2010-2019)



Source: COMAC, MOT

Comparison of the Growth Rate of Major Transport Modes in Mainland China (2010-2019)



Source: COMAC, MOT

The total volume of civil aviation cargo transportation has kept a steady growth. The growth rate was 2% in 2019, slightly lower than that of 2018. The growth rate of

FTK has only increased by 0.3%, which is higher than the speed of road transportation but a gap between railway transportaion.

Different Transport Modes' Freight Volume and Growth in 2019

	Freight Volume (Billion Ton)	Rail (Billion Ton)	Road (Billion Ton)	Aviation (Million Ton)	Freight Turnover (Billion Ton-Km)	Rail (Billion Ton)	Road (Billion Ton)	Aviation (Million Ton)
2018 年	51.4	4.0	39.6	7.4	20,545.1	2,882.1	7,120.3	26.2
2019 年	47.0	4.3	34.3	7.5	19,928.9	3,007.4	5,963.6	26.3
Growth Rate (%)	-8.6	7.2	-13.2	2	-3	4.3	-16.2	0.3

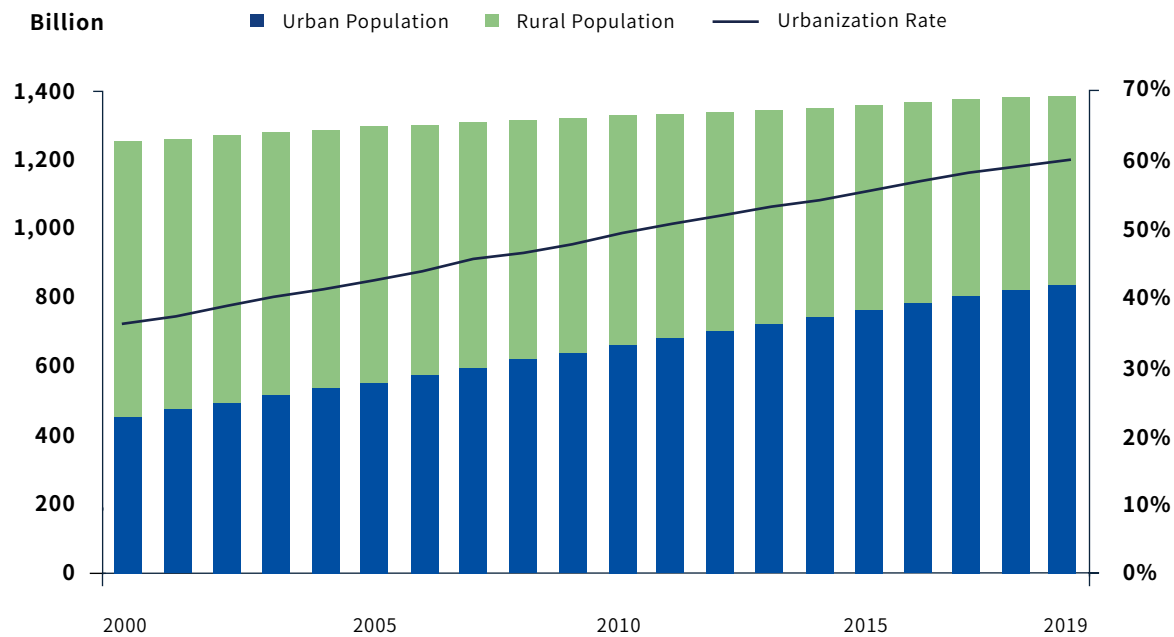
Source: STATS

Urbanization

By the end of 2019, the total population of mainland China was 140.0 million, with an increase of 4.7 million over the end of the previous year. The population of urban permanent residents was 84.8 million, and the

urbanization rate of the permanent residents population was 60.6%, with an increase of 1.0% over the end of the previous year.

Urbanization (2000-2019)



Source: STATS

With the advancement of the reform and opening up policy and the implementation of new urbanization construction, the urbanization level of China has improved continuously. The rise of small and medium-sized cities has raised the resident income level, which have drove the upgrade of consumption, improved the consumption structure, and increased the demand for air transportation. The upgrade of

Business Model Innovation of Airlines

Under the extensive application of internet technology and the pressure of market competition, airlines continue to push on the business model innovation with the experience learned from developed countries' airlines, and gradually realized the transformation of bussiness model from 'overall pricing, bundled services' to 'itemized pricing, free choice' of business model, and the transformation of

Supply Side Reform

In 2019, Chinese economy growth has transferred from rapid growth phase to high quality development phase, with its year-on-year GDP growth rate increased by 6.1%. Chinese economy is undergoing the structure transformation from the secondary industry to the tertiary industry. The added

the consumption structure of urban residents has caused air transportation, a relatively high-end transportation, being accepted by more residents as a regular travel option, and expanding from first-tier cities to second-and third-tire cities with increasing popularization.

airline network structure form point-to-point direct flight to transit connections. The continuous advancement of business model innovation reduces the cost of air travel, fuilfills the requirements of more social groups, and further enhances the demand for air transportation.

value of the tertiary industry was accounted for 53.9% of the total GDP, with an increase of 1.7% compared with the previous year, and the economic structure seems to be optimized further.

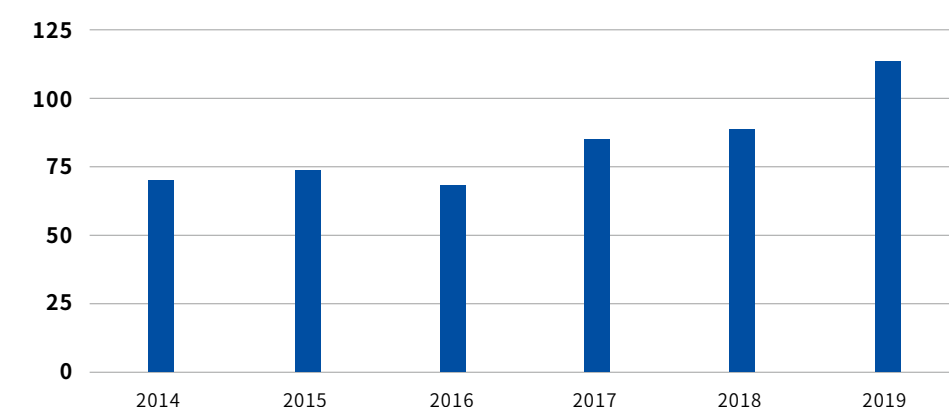


China Regional Market

By the end of 2019, China (excluding Hong Kong, Macao and Taiwan) operated a total of 59 regional jets. Over the past few years, China's regional fleet was basically stable, but due to the continuous growth of the entire fleet, the proportion of regional one in China is declining. With the gradual withdrawal of ERJ series and the entry of ARJ21-700, China's regional fleet has gradually formed a state in

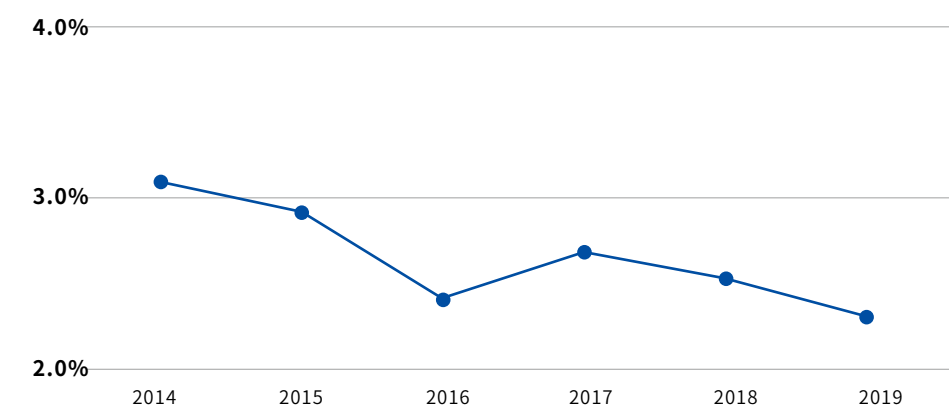
which ARJ21-700 and CRJ900 aircraft are the main turbo-fan type. With the signing purchase contract of ARJ21-700 aircraft by China's major three airlines and the delivery of the first one, as well as the improvement of the production capacity of COMAC regional aircraft, the proportion of ARJ21-700 aircraft in China's regional fleet continues to increase.

Trend of China Regional Jet Fleet (2014-2019)



Source: Cirium, COMAC

Trend of China Regional Jet Proportion (2014-2019)



Source: Cirium, COMAC

In 2019, China added three new regional airports, including Bazhong, Wushan (in Chongqing) and Ganzi. There are 238 certified airports from now on. A total of 164 airports handled less than 2 million

passengers in the whole year, of which 94 airports' throughput was less than 500,000 passengers, a decrease over the previous year.

Connectivity Between the B&R and China Air Market

By the end of 2019, the B&R initiative has covered 137 countries in the world, covering Asia, Europe, Eurasia, West Asia and North Africa, Africa, Latin America, North America and Oceania, of which 98 countries have signed International Air Transport Agreements with the mainland of China, and 53 countries (abbreviated as B&R countries) have realized air links with China (from OAG).

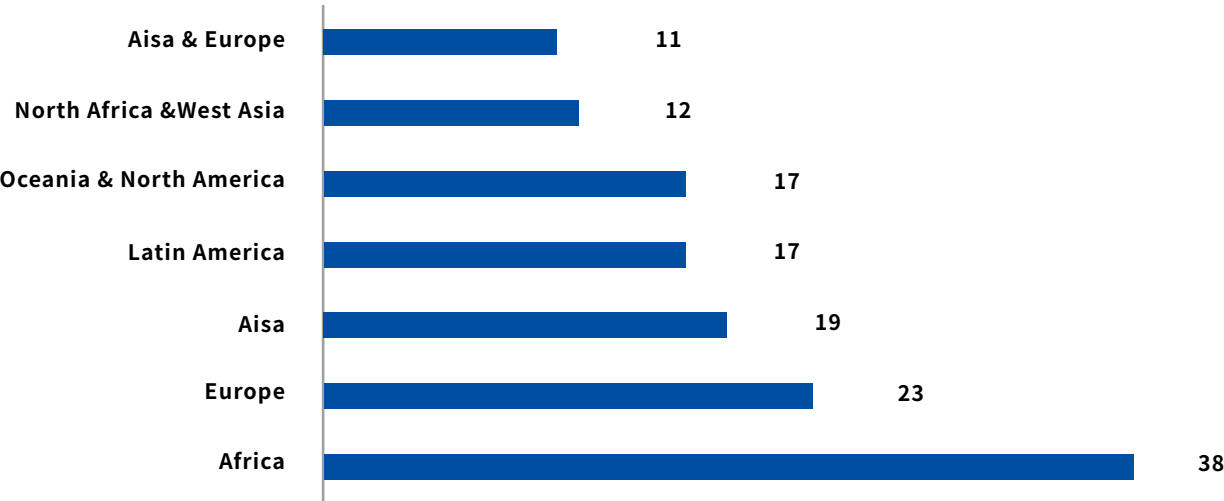
The GDP of B&R countries (dollars, 2018) accounts for more than 20% of the total global GDP, and the population

accounts for about 40% of the total global population. According to the World Bank’s data, more than half of the B&R countries are middle-income countries, more than 20% are high-income countries, and most of the high-income ones are in Europe, while most of the low-income and middle low-income groups are in Africa.

In the seven years since the B&R initiative was put forward, the market scale of China and B&R countries has gradually expanded. The annual compound growth rates of ASK, total flights and available seats between China and B&R countries from 2013 to 2019 were 8.41%, 8.61% and 8.56% respectively, and the annual compound growth rate of O&D passenger flow was about 9.7%, which exceeded 100

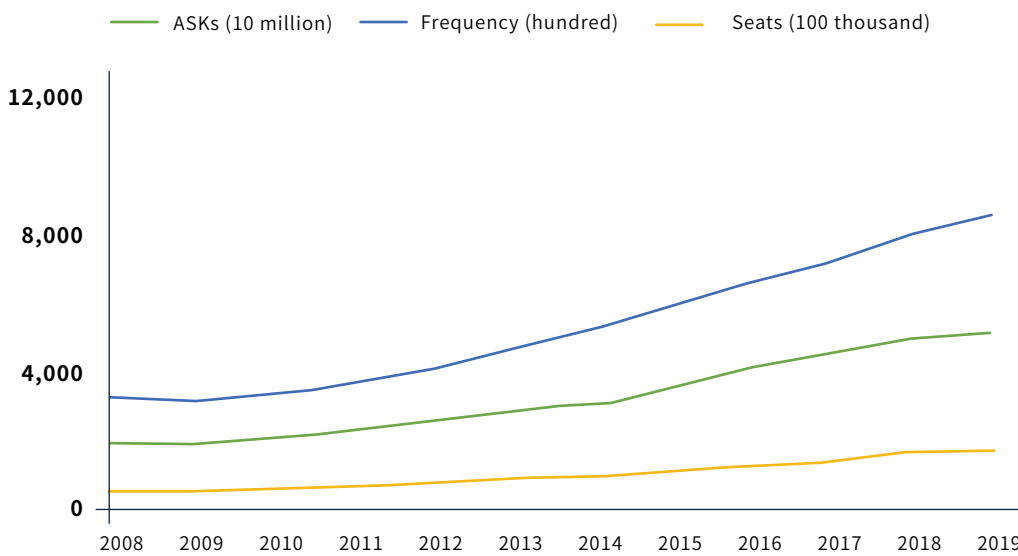
million for the first time in 2017. Thailand, South Korea, Singapore, Malaysia, Vietnam, the Philippines, Indonesia, Cambodia, Russia, Italy and the United Arab Emirates are the destinations of China’s international passengers in 2019, followed by Cambodia with the rate of 27.3% and Vietnam with a growth rate of 18.1%.

B&R Country Distribution



Source: World Bank

China and B&R Countries Capacity Trends

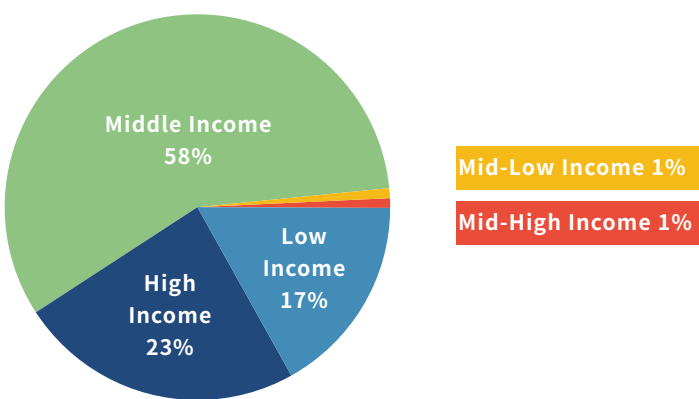


Source: OAG, COMAC

More and more provinces and cities in mainland China showed a great passion to participate in B&R aviation market. Influenced by the economic strength and geographical location, the effect of coastal cities is significantly higher than that of inland ones, and the first-tier cities are higher than the second and third tier cities. The number of cities opening flights to B&R countries has increased from 58 to 86, and the capacity average growth rate (CAGR) of available seats is 11.6%, flights is 11.0%, ASK is 11.9%.

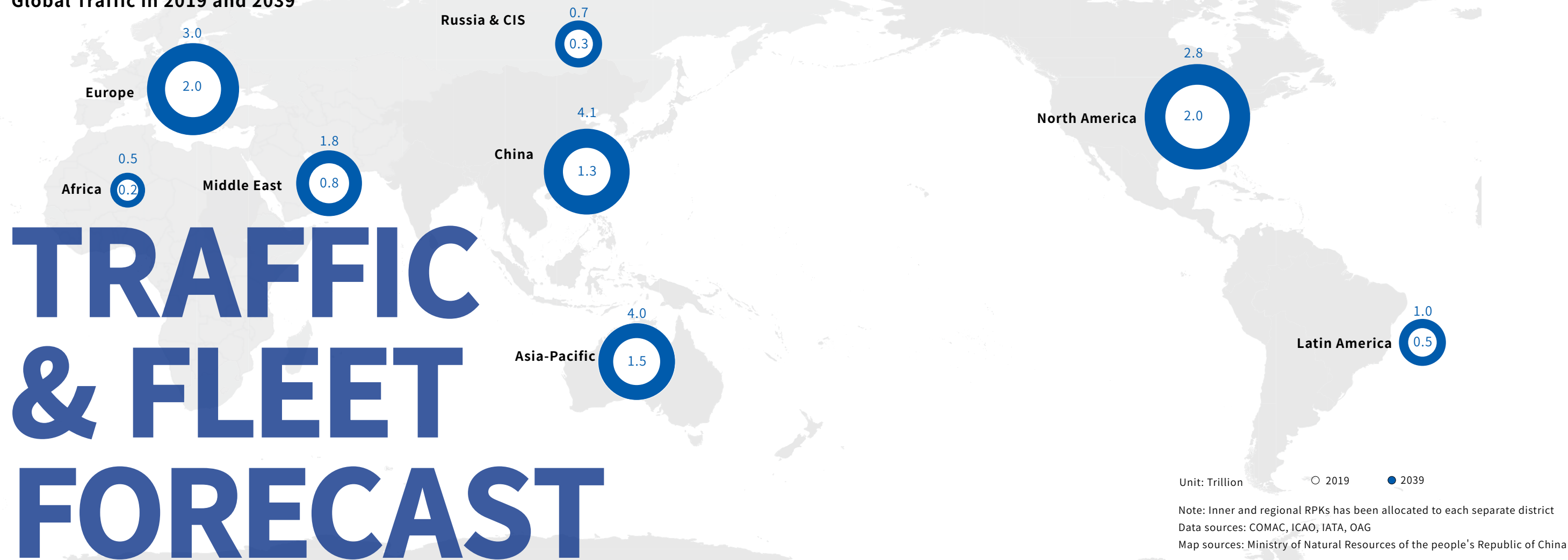
The number of carriers in mainland China increased from 13 in 2013 to 29 in 2019, with a compound annual growth rate of capacity (available seats) of about 14.4%. Chinese mainland carriers, represented by Air China, China Eastern Airlines and China Southern Airlines, provide nearly half of the capacity in China and B&R market. The Asia-Pacific market is still the main market.

B&R Country Composition By Income Level



Source: World Bank

Global Traffic in 2019 and 2039



TRAFFIC & FLEET FORECAST

Global Traffic Forecast

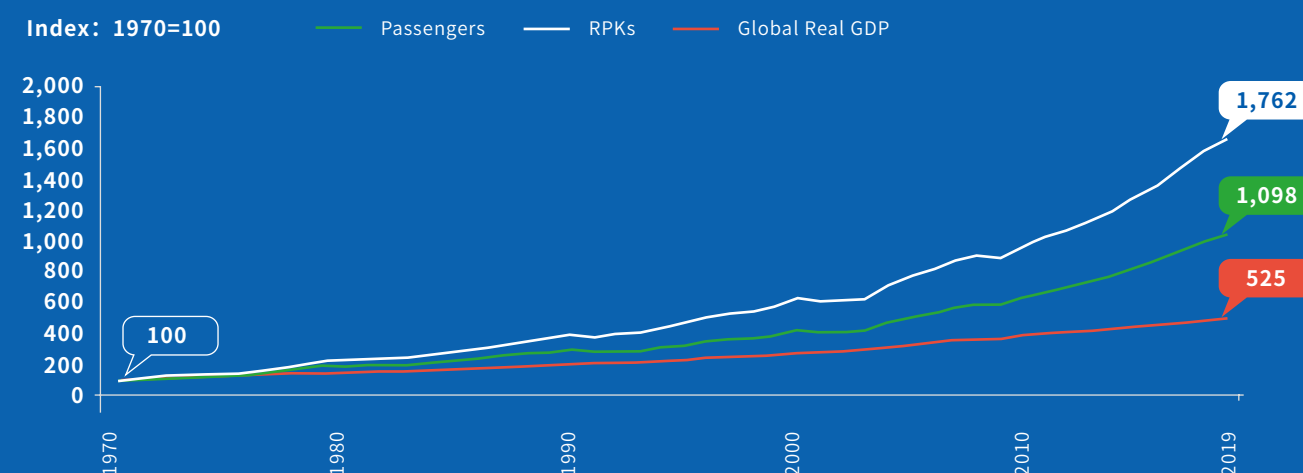
The year 2019 has seen lower growth rates of all the 3 major macro indicators of the air travel industry. While global GDP, RPKs and ASKs have grown by 2.9%, 4.2%, and 3.6% respectively, all 3 represented decline of varying degrees from their 2018 levels. Since the beginning of 2020, COVID-19 has swept across the world, and has significantly affected the global aviation industry. Airlines cut or even suspended all their capacity supply, and a large number of aircraft were grounded. As a result, air transport supply in all regions of the world showed cliff-like downward trends as the epidemic developed. However, when time approached the middle of the year, mainly driven by China and the Asia-Pacific region, the global transport capacity has slowly begun to recover.

Like some other Black Swan events in the recent decades, such as "911" and SARS, COVID-19 pandemic is expected to continue to contain the development of air transport markets around the world for some time, depending on its development in the near future, though with varying degrees of impact on the global regions. Yet as the fundamental momentum for the industry growth largely remains unchanged, the markets are expected to recover with economic reopening and development in areas where the epidemic gradually recedes, and eventually to restore on the global level.

In the next two decades, the global economy is forecasted to maintain an average annual growth rate of 2.5%, and

global RPKs will grow at an annual rate of 3.73%, reaching 17.9 trillion passenger kilometers by 2039.

Trends of Global Passengers, RPKs and Real GDP (1970-2019)



Source: COMAC, IATA, IHS

Global Fleet Forecast

Fleet Forecast Summary

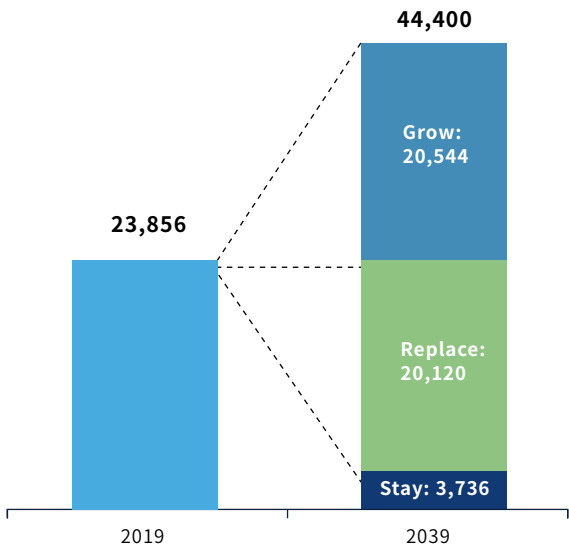
By the end of 2019, 23,856 passenger jets were in service across the globe, which represented a slightly decrease of 0.2% compared with 2018. Except North America, Asia-Pacific and China, the current fleet in other regions illustrate the trend of reduction of 180 aircraft. The fleet size in North America, Asia-Pacific and China increased by 41, 91 and 9 respectively.

Struck by COVID-19 pandemic, global aviation industry has been adversely affected in 2020. By the end of 2039, global passenger jets is estimated to reach a total of 44,400. The



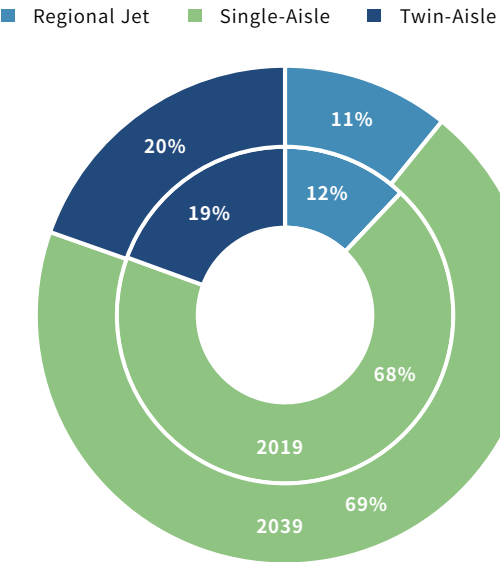
forecast number of total new passenger jet deliveries is 40,664, which was reduced by 4,795 than in 2019 forecast. Moreover, due to the impact of COVID-19, a large number of old passenger jets will be facing to retire earlier than expected. A small peak of aircraft retirement will occur in the next 5 years, especially in 2021 and 2022. It is estimated that 20,029 passenger jets are going to end service by 2039. For the next 20 years, COMAC forecasts a 3.2% global annual passenger jet fleet growth, 0.5% lower than 2019 forecast.

Global Forecast Outlook



Source: COMAC, Cirium

Current and Forecast Fleet by Category



Source: COMAC, Cirium

Global Fleet Forecast by Category

	Regional Jet	Single-Aisle	Twin-Aisle	Total
2019	2,878	16,341	4,637	23,856
2024 F	2,349	17,772	4,773	24,894
2029 F	2,767	20,968	5,680	29,415
2034 F	3,736	24,908	6,837	35,480
2039 F	4,811	30,889	8,701	44,400

Source: COMAC

The single-aisle category will continue to be the largest among the 3 passenger jet categories, accounting for 69.6% of the proportion in 2039. The share for twin-aisle fleet will rise from its current level of 19.4% to 19.6%, however the market share of regional jets will slightly decrease by 1.3%, going down to 10.8%.

Asia Pacific (including China) is the fastest growing market, and the share of its fleet size in the global total will rise from the current 32.0% to 41.3% by 2039. Fleet

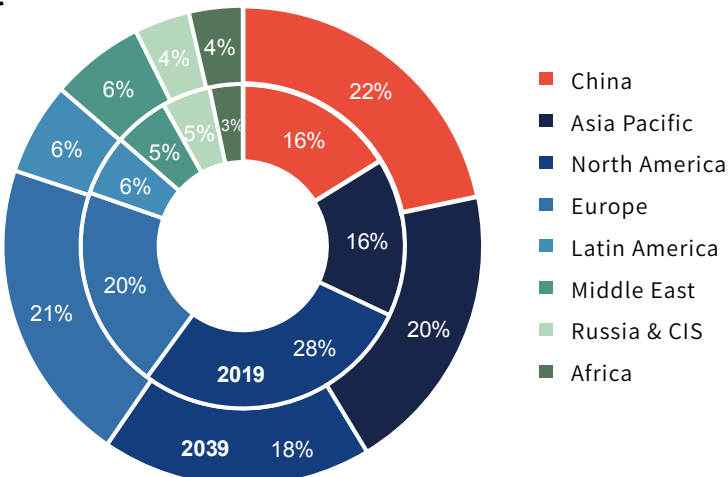
size in China alone is forecast to rise from 16.2% to 21.7%. With the development of the emerging markets, and the uncontrolled COVID-19 coronavirus spreading across North America, its current largest fleet size share will decline from 28.0% to about 18.2%. Russia & CIS's share will also decrease from the current level of 4.8% to around 3.7%. While Europe, Middle East and Africa's shares in global fleet are expected to slightly rise from their current levels.

Global Fleet Forecast by Region

	2019		2039F		2019-2039
	Fleet	% of global total	Fleet	% of global total	Annual growth rate
China*	3,863	16.2%	9,641	21.7%	4.68%
Asia-Pacific**	3,773	15.8%	8,716	19.6%	4.28%
North America	6,689	28.0%	8,083	18.2%	0.95%
Europe	4,843	20.3%	9,122	20.5%	3.22%
Latin America	1,446	6.1%	2,768	6.2%	3.30%
Middle East	1,303	5.5%	2,806	6.3%	3.91%
Russia & CIS	1,151	4.8%	1,660	3.7%	1.85%
Africa	788	3.3%	1,604	3.6%	3.62%
Global	23,856	100%	44,400	100%	3.15%

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China
Source: COMAC, Cirium

Current and Forecast Fleet by Region



Source: COMAC, Cirium

Delivery Forecast Summary

41,356 deliveries of new passenger jets are expected over the next 20 years due to the replacement and market demands. The total delivery value is predicted to be \$ 6 trillion (under 2019 aircraft list prices).

Single-aisle aircraft types will account for around 72% of the forecast deliveries, while around 18% will be twin-aisle types, and 11% will be regional jets. In terms of delivery value, twin-aisle deliveries will account for 39% of the total amount, whereas single-aisle deliveries will account for 58%.

In the next two decades, Asia Pacific including China will be the largest market in terms of aircraft deliveries, with 16,918 deliveries which account for 41% of the total amount. China is forecast to account for 21% of the world forecast deliveries. The two mature markets i.e. Europe and North America, are expected to receive 7,907 and 7,542 deliveries respectively. Latin American and Middle Eastern airlines will also enjoy great expansions in their fleets. It is estimated that the two regions' shares of new jet deliveries will reach 2,836 and 2,441 respectively.

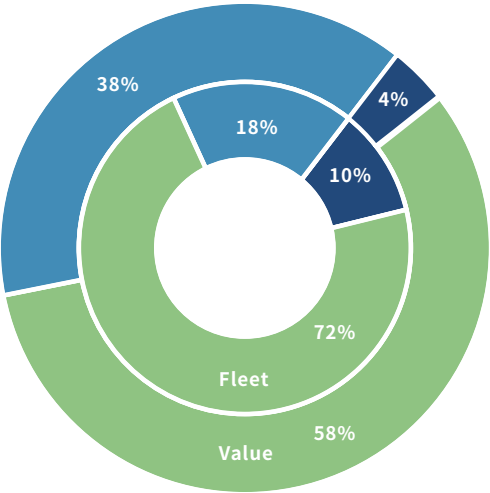
2020-2039 Global Delivery Forecast by Category

2020-2039	Regional Jet	Single-Aisle	Twin-Aisle	Total
Deliveries	4,318	29,127	7,219	40,664
Market Value Billion \$	226	3,435	2,301	5,961

Source: COMAC

2020-2039 Delivery Percentage by Volume and Value

■ Regional Jet ■ Single-Aisle ■ Twin-Aisle



Source: COMAC

Global Historical and Forecast Deliveries by Region

	2000-2019 historical delivery		2000-2039 forecast delivery	
China*	3,836	16.6%	8,725	21.5%
Asia-Pacific**	3,699	16.0%	8,193	20.1%
North America	6,461	28.0%	7,542	18.5%
Europe	4,680	20.3%	7,907	19.4%
Latin America	1,342	5.8%	2,836	7.0%
Middle East	1,244	5.4%	2,441	6.0%
Russia & CIS	1,051	4.6%	1,554	3.8%
Africa	770	3.3%	1,466	3.6%
Global	23,083	100.0%	40,664	100.0%

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China
Source: COMAC, Cirium

Regional Jet Forecast

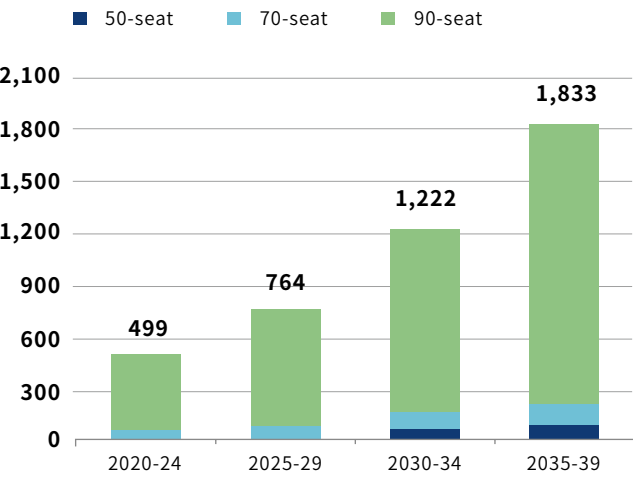
Within the next 20 years 87.0% of the currently in-service regional jets will gradually retire. 4,318 new regional jets will be delivered. The 90-seat class is expected to become the centre of gravity in this category, with 3,818 90-seat aircraft to be delivered in the next 20 years, accounting for 88.4% of the global total amount.

From 2020 to 2039, with the expansion of the RJ fleet size, the average annual growth rate of global regional fleet is approximately 2.6%, the fleet size will accordingly increase from 2,900 (approximately) to 4,811, while the market share of regional jet will shrink from 12.1% to 10.8%.

In the next 20 years, global regional jet ASKs will grow at an average annual rate of 3.7% and the category's average seat will reach to 88 in 2039. The fleet size of 90-seat aircraft will expand to 4,048 by 2039 from 800 in 2019, the percentage of total regional jet will increase to 84.1% from 27.6%.

As the fleet size of new types of large regional jet and small single-aisle jets continue to grow, the market boundary between regional jet and single-aisle jet has been weakened further, however it brings more opportunities for airlines to expand market.

2020-2039 Regional Jet Forecast Deliveries by Seat Size



Source: COMAC

North America will remain to be the largest market for regional jets, as 29% of the forecast regional jet deliveries will go to airlines in this region. Over 1,200 regional jets will be delivered to this region. China and Latin America are expected to enter a rapid growth of regional jets, with an average annual growth rate of 14.9% and 10.9% respectively. It is forecast the fleet size of China and Latin America will climb to 946 and 620 by 2039.

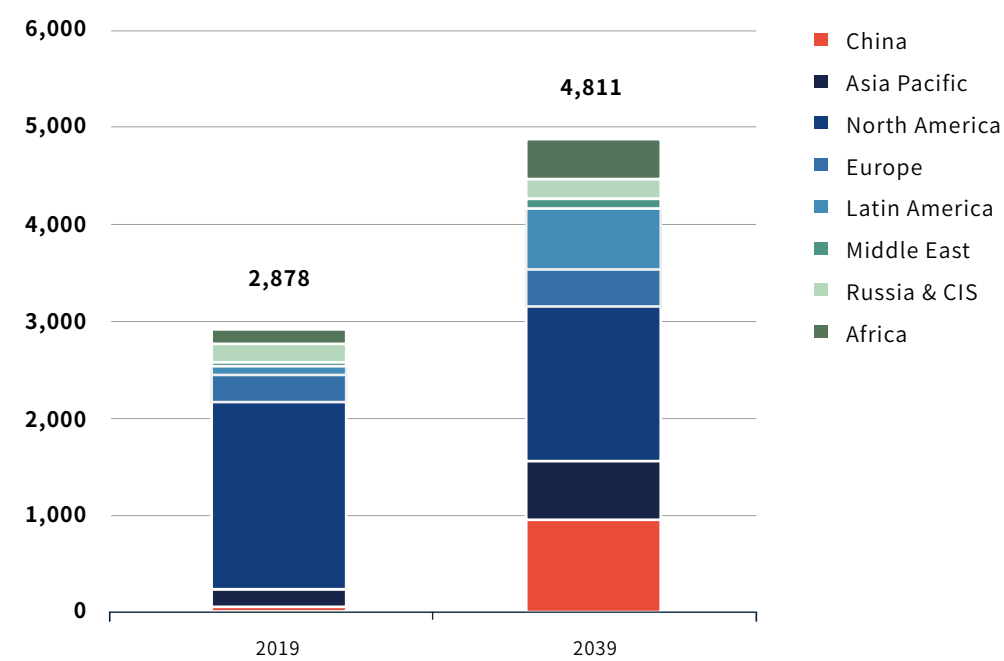
2020-2039 Regional Jet Forecast Delivery by Seat Size

	50-seat	70-seat	90-seat
2020-24	0	52	447
2025-29	0	83	681
2030-34	65	95	1,062
2035-39	85	121	1,627
2020-2039 deliveries	150	351	3,817
Market Value hundred million \$	45	175	2,038

Source: COMAC



Current and Forecast Regional Jet Fleet by Region



Source: COMAC, Cirium

2019 and 2039 Current and Forecast Regional Jet Fleet by Region

	End 2019 Fleet	End 2039 Fleet
China*	59	946
Asia-Pacific**	167	598
North America	1,902	1,571
Europe	291	379
Latin America	79	620
Middle East	48	87
Russia & CIS	193	202
Africa	139	408
Global	2,878	4,811

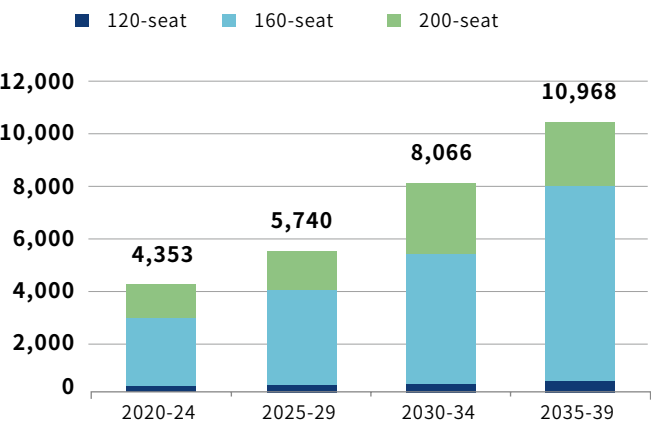
*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China
Source: COMAC, Cirium

Single-Aisle Jet Forecast

The single-aisle category will remain to be the largest among the 3 passenger jet categories. 87.6% of the category’s existing fleet (over 14,000 aircraft) are forecast to be replaced and nearly 30,000 single-aisle aircraft will enter the market in next 20 years. The market demand is focused on 160-seat class, 20,016 single-aisle aircraft of this type will be delivered by 2039, accounting for 68.7% of the total amount.

Average annual growth rate for the global fleet will be around 3.2% during 2020 to 2039, the fleet size will expand from 16,341 to 30,889 and the market share will enlarge to 69.6% from 68.5%.

2020-2039 Single-Aisle Jet Forecast Delivery by Seat Size



Source: COMAC

The fleet of Asia Pacific (including China) will expand from 5,619 in 2019 to 12,000 by the end of 2039. It is forecast to overtake North America and Europe, and will become the largest market of single-aisle aircraft. 11,876 new single-aisle aircraft will be delivered in next 20 years, accounting for 40.8% of global total deliveries of this type. Except China and India, Southeast-Asian countries also take up a noticeable proportion of market share, which makes it become the key development region of single-aisle aircraft.

In the next 20 years, the average annual ASKs will increase by 3.2%. The average seat number per single-aisle aircraft in the category will rise to 189. Fleet size of 160-seat class will expand from 10,040 in 2019 to 21,085 in 2039, and the market share will reach to 68.3% from 61.4%.

Airlines are willing to purchase more efficient and environment friendly single-aisle aircraft to satisfy their various operation demands.

2020-2039 Single-Aisle Jet Forecast Delivery by Seat Size

	120-seat	160-seat	200-seat
2020-24	241	2,774	1,338
2025-29	320	3,809	1,611
2030-34	388	5,565	2,113
2035-39	483	7,868	2,617
2020-2039 deliveries	1,432	20,016	7,679
Market Value hundred million \$	1,373	23,025	9,946

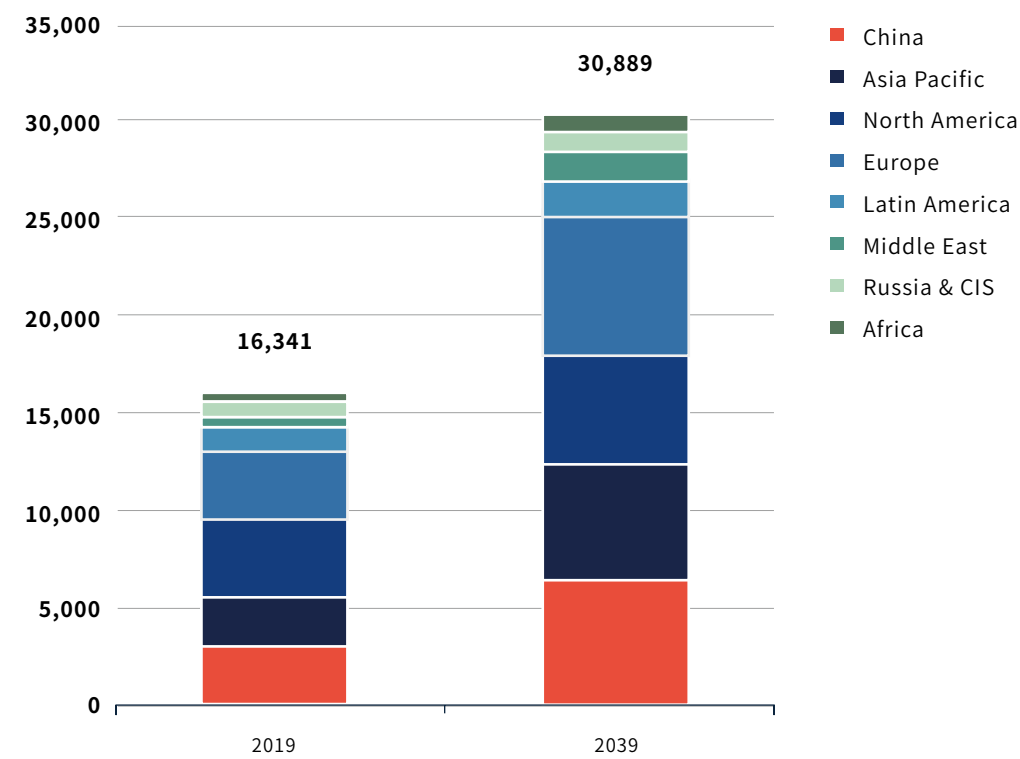
Source: COMAC

Traditional mature markets, such as Europe and North America will remain to be the dominant market of single-aisle aircraft, as it is estimated to account for around 22.0% and 18.9% of the total forecast deliveries in the next two decades. The replacement demand of old aircraft and expansion of LCCs will form the strong driving forces for the growing size of fleet of single-aisle aircraft.

Over 2,000 single-aisle aircraft will be delivered to Latin America in next 20 years, accounting for 6.9% of global

single-aisle jets deliveries. The fleet size will increase form 1,212 to 1,891 in next two decades.

Current and Forecast Single-Aisle Jet Fleet by Region



Source: COMAC, Cirium

2019 and 2039 Current and Forecast Single-Aisle Jet Fleet by Region

	End 2019 Fleet	End 2039 Fleet
China*	3,087	6,521
Asia-Pacific**	2,532	6,065
North America	4,095	5,641
Europe	3,579	7,255
Latin America	1,212	1,891
Middle East	540	1,558
Russia & CIS	820	1,071
Africa	476	887
Global	16,341	30,889

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China
Source: COMAC, Cirium

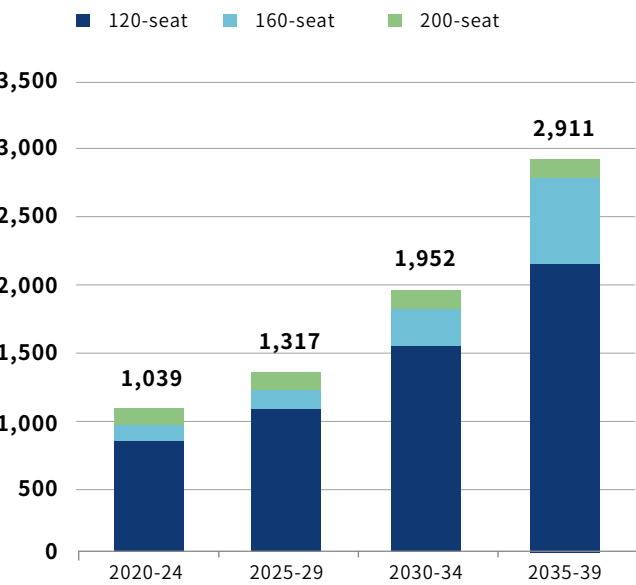
Twin-Aisle Jet Forecast

The ramping up in production of the existing twin-aisle aircraft types and the arrival of new types are encouraging airlines to renew their fleets. In addition, a number of old twin-aisle aircraft would retire under the influence of COVID-19 virus, and introduce aircraft with advanced technologies, more comfortable cabin and higher fuel efficiency.

In the next 20 years, a total of 7,219 twin-aisle passenger jets are forecast to be delivered, with a total value of 2.3 trillion U.S. dollars. Among those deliveries, 77% will

be 250-seat aircraft, including aircraft types of 200-300 seats. Those kinds of aircraft are believed to have high flexibility in operation and can be adapted to wider range of routes in different environments. Average annual growth rate for twin-aisle fleet is forecast to be 3.2%, with average seat number per aircraft rising from 299 to 311. In the next 20 years, 69% of the current in-service fleet are expected to be replaced.

2020-2039 Twin-Aisle Jet Forecast Delivery by Seat Size



Source: COMAC

Most of the twin-aisle fleet will be used to operate on long range routes, where aircraft weight reduction and improvements in fuel efficiency generate greater improvements on operating cost than on short routes. New generation of twin-aisle aircraft make more use of composite materials on aircraft structure parts, and are equipped with newly developed engines. Those features help lower the airlines costs and enable more load capacity increase.

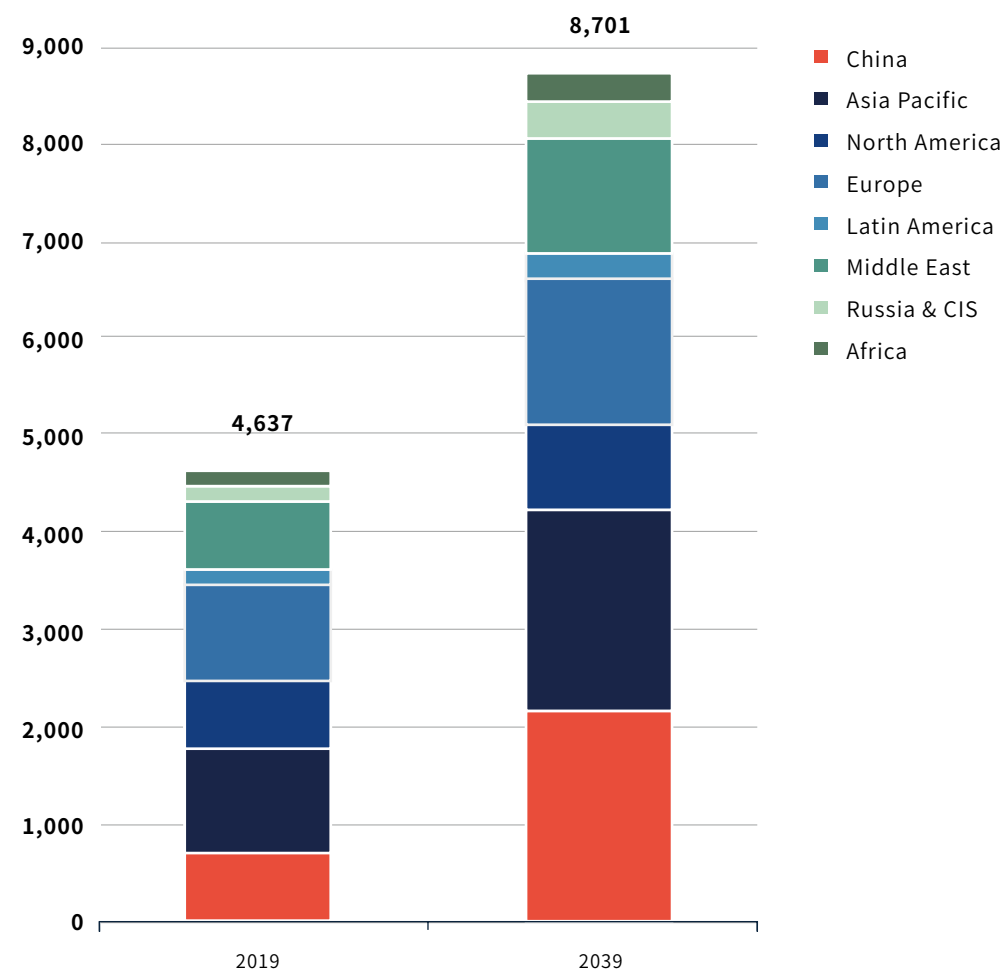
2020-2039 Twin-Aisle Jet Forecast Delivery by Seat Size

	250-seat	350-seat	400-seat
2020-24	819	110	110
2025-29	1,066	139	112
2030-34	1,534	280	138
2035-39	2,136	635	140
2020-2039 deliveries	5,555	1,164	500
Market Value hundred million \$	16,664	4,000	2,348

Source: COMAC

In the next 20 years, airlines based in Asia Pacific, including China, are estimated to account for 48.8% of the total twin-aisle deliveries, among which China will become the largest target market of twin-aisle aircraft across the globe, its market share will rise from 15.2% in 2019 to 25.9% by 2039. Meanwhile, the share of twin-aisle aircraft in North America will slide down by 5 percent, and the market share of Europe, Middle East and Africa will take a small drop.

Current and Forecast Twin-Aisle Jet Fleet by Region



Source: COMAC, Cirium

Current and Forecast Twin-Aisle Jet Fleet by Region

	End 2019 Flee	End 2039 Fleet
China*	717	2,174
Asia-Pacific**	1,074	2,053
North America	692	872
Europe	973	1,488
Latin America	155	257
Middle East	715	1,161
Russia & CIS	138	387
Africa	173	309
Global	4,637	8,701

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China
Source: COMAC, Cirium

China

Market

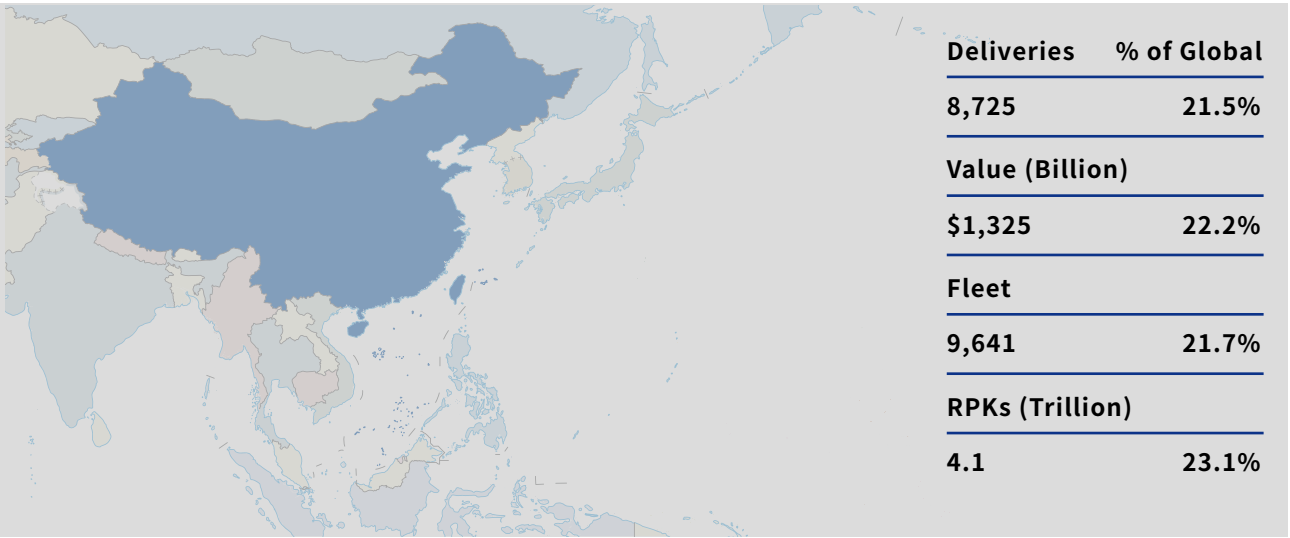
In 2019, with sluggish world economic growth as well as intensified international economic and trade frictions, China has undergone enormous downward pressure in domestic economic development. However, the overall performance of China’s economy was satisfying. In the past year, the GDP growth rate of China is 6.1%, reaching 99.1 trillion yuan. The economic structure optimization keeps up, and consumption remains the main driving force of economic growth. There is a rapid growth in advanced manufacturing and modern service industry. Besides, the urbanization rate of permanent residents exceeds 60% for the first time. Technology innovations and emerging industries provided strong supports for new momentum of development continuously. People’s living standards continue to get improved as per capita disposable income increased.

Since China ushers in a new era of mass tourism, both domestic and overseas travelling market are escalating steadily, among which inbound tourists were further multiplied. In 2019, more than 6 billion people went domestic travelling, showing an increase of 8.4% compared with the previous year. Besides, China received more than 145 million foreign arrivals, with a rise of 2.9%.

Among these foreign visitors, 113 million people were from Hong Kong, Macao and Taiwan, increasing by 2.5%. A total of 169 million of domestic residents were outbound travellers, increasing by 4.5%, with an increase of 4.6% of private trips that reached 162 million.

China (Excluding Hong Kong, Macao and Taiwan) carried around 660 million air passengers in 2019, with a year-on-year increase of 7.9%. Passenger traffic on domestic routes, international routes and Hong Kong, Macao and Taiwan were 575 million, with an increase of 7.0%, 74 million with an increase of 16.6%, and 11 million, a decrease of 1.7%, respectively. The freight volumes increased 2.0% to 7.5 million tons. Although the overall growth rate is further reduced compared with the case of the previous year, China still remains a steady and optimistic trend in aviation development.

The outbreak of COVID-19 has brought many challenges and impacts to China and the global economy. China’s air transport market has suffered a sharp decline under the impact of the epidemic. With the spread of the epidemic overseas, domestic epidemic was put under control. The recovery of work, production and business



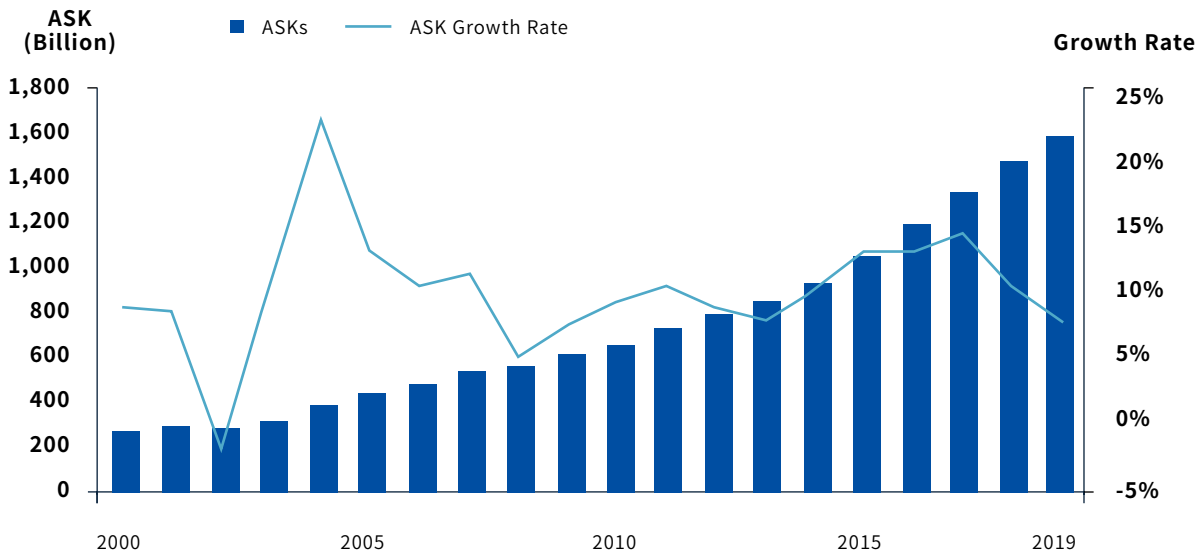
Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

has been under way step by step in China. The regional carriers have recovered faster than the mainline carriers, which basically resumed full capacity from May to June. It is expected that the Chinese domestic market can fully recover by the end of this year, but the recovery of the international market still needs to wait.

Overall, the long-term positive trend of China’s economy remains unchanged. In the next two decades, China’s

GDP is expected to grow at 4.3% CAGR. The fleet size will grow at 4.1% CAGR, and passenger turnover at 4.3% CAGR. 8,725 passenger aircrafts will be delivered in China. By 2039, RPKs will reach 4.1 trillion kilometers, accounting for about one-fifth of the world.

China Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Network

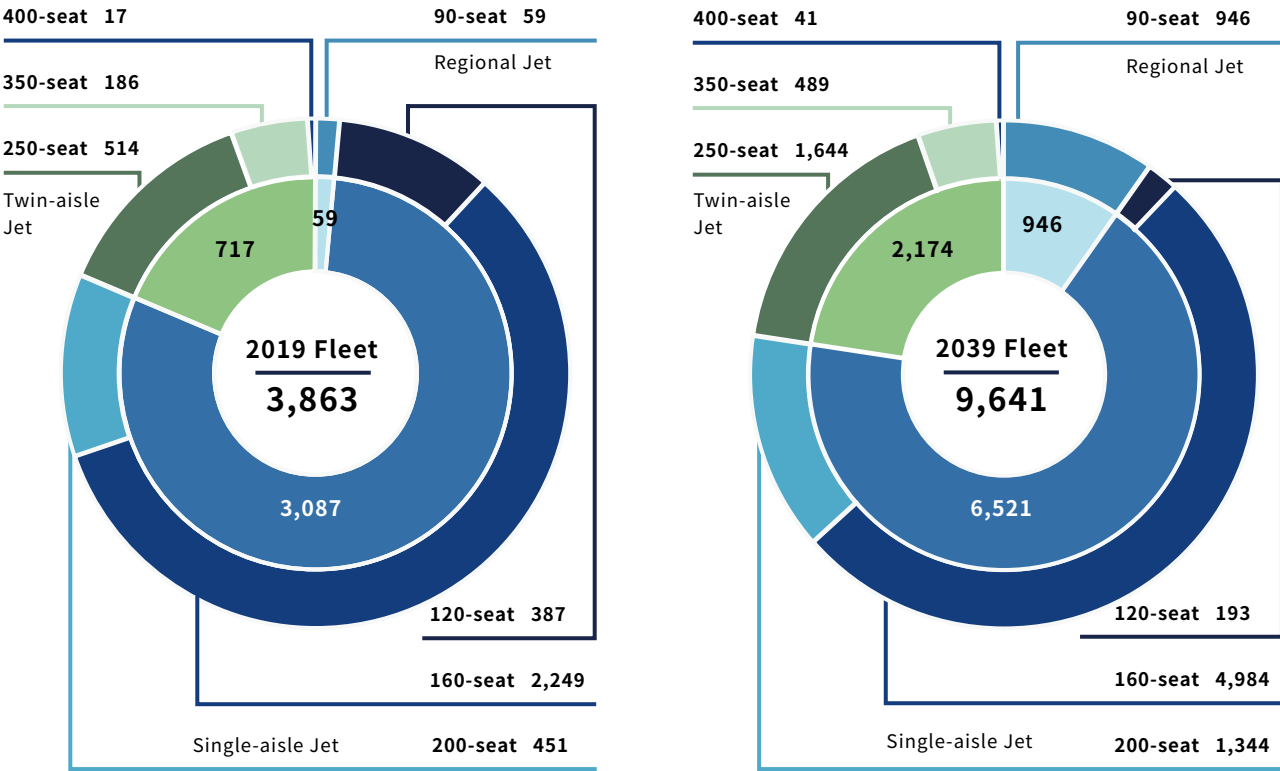
Compared with the previous year, the number of point-to-point routes operated by Chinese carriers increased 14.6% approximately, of which the domestic market increased by 15.6%. The number of seats available increased by 7.2%, of which the increase in the international market was slightly higher than the domestic market by 0.2%.

In the case of regional markets, the outbound capacity of Chinese Carriers is mainly distributed in the China-Asia-Pacific (excluding China) market, followed by China-North America market and China-Europe market.

Compared with the previous year, the growth rate of outbound capacity in China- Africa market was the highest, about 28.3%, followed by the China-Middle East and China-Europe, increasing by 22.0% and 17.8% respectively. The outbound capacity from China to Russia\CIS\Central Asia presented a declining trend, with a decrease of 5.3%.

Fleet

China Fleet Growth

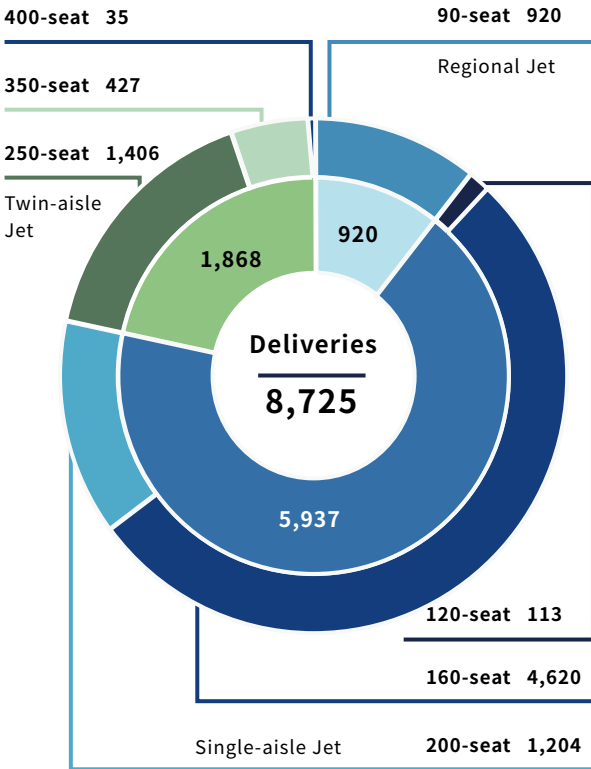


Source: COMAC, Cirium

The Chinese aviation market is experiencing shift from rapid growth to high-quality growth. By 2039, Chinese aviation market is expected to have 9,641 passenger jets, including 6,521 single-aisle jets, 2,174 twin-aisle jets, and 946 regional jets.

In the next two decades, it is estimated that 8,725 aircraft will be delivered to the Chinese market. Among them, nearly 6,000 are single-aisle jets, accounting for 68.0% of the total delivery of the next 20 years. Nearly 80% of the single-aisle jets will be 160-seat class. 1,868 twin-aisle jets will be delivered, accounting for 21.4% of the total delivery, of which 75.3% will be 250-seat class. Nearly 1,000 regional jets will be delivered in 20 years, all of which are 90-seat class.

China Deliveries by Category & Seat Size (2020-2039)



Source: COMAC

Asia-Pacific

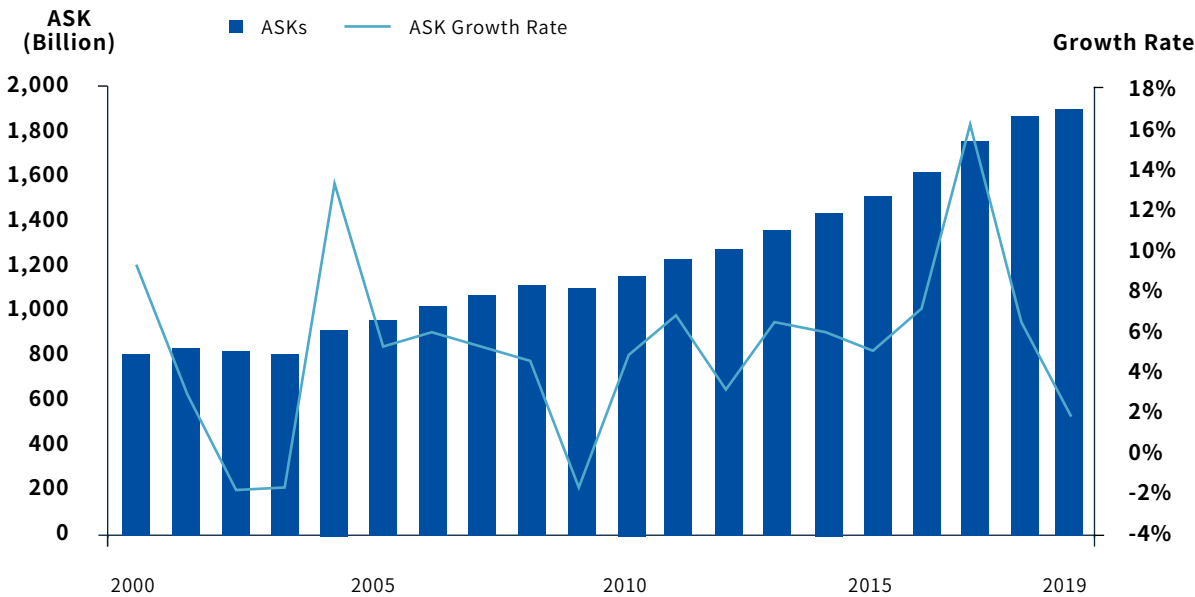
Market

In 2019, the world economy has experienced unprecedented challenges. Uncertain factors caused by trade frictions and geopolitical tensions have dragged the global economy into a synchronized slowdown. Numerous economic indicators have hit a new low since the 2008 global financial crisis. The pace of global economic recovery is more likely to be slowed down .

According to IHS public data, the actual growth rate of the global economy in 2019 was 2.9%. However, the economic growth rate of the Asia-Pacific region reached 5.4% in 2019, contributing more than 60% of the global growth, among which China contributed more than 30% of the global economic growth in 2019.

Although the economy of the Asia-Pacific seemed to be in a synchronized slightly growing trend in 2019, the economic activity was insufficient and the foreign trade was generally sluggish in the context of weak domestic and outside demand. Low growth and low inflation have become distinctive features of regional economic development. At the same time, the continuous accumulation of debt risks and the accelerated reconstruction of the value chain under the impact of protectionism posed great challenges to regional economies.

Asia-Pacific Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Network

In 2019, seats provided by the Asia-Pacific carriers illustrated an upward trend by slightly rising by 1.3% over the number in 2018. The Asia-Pacific region remains the largest market for the Asia-Pacific carriers, making up 86.1% of the total capacity provided by those carriers.

The Asia-Pacific carriers accounted for 61.5%, 45.9%, 41.8% and 37.6% respectively of total ASKs among cross-

regional routes connecting Asia-Pacific with North America, Europe, China and Latin America. The Asia-Pacific carriers only had relatively strong advantages in the Asia-Pacific region and routes to North America thus they would need to enhance competitiveness in other regions, especially in African regions, of which the proportion was only 17%.

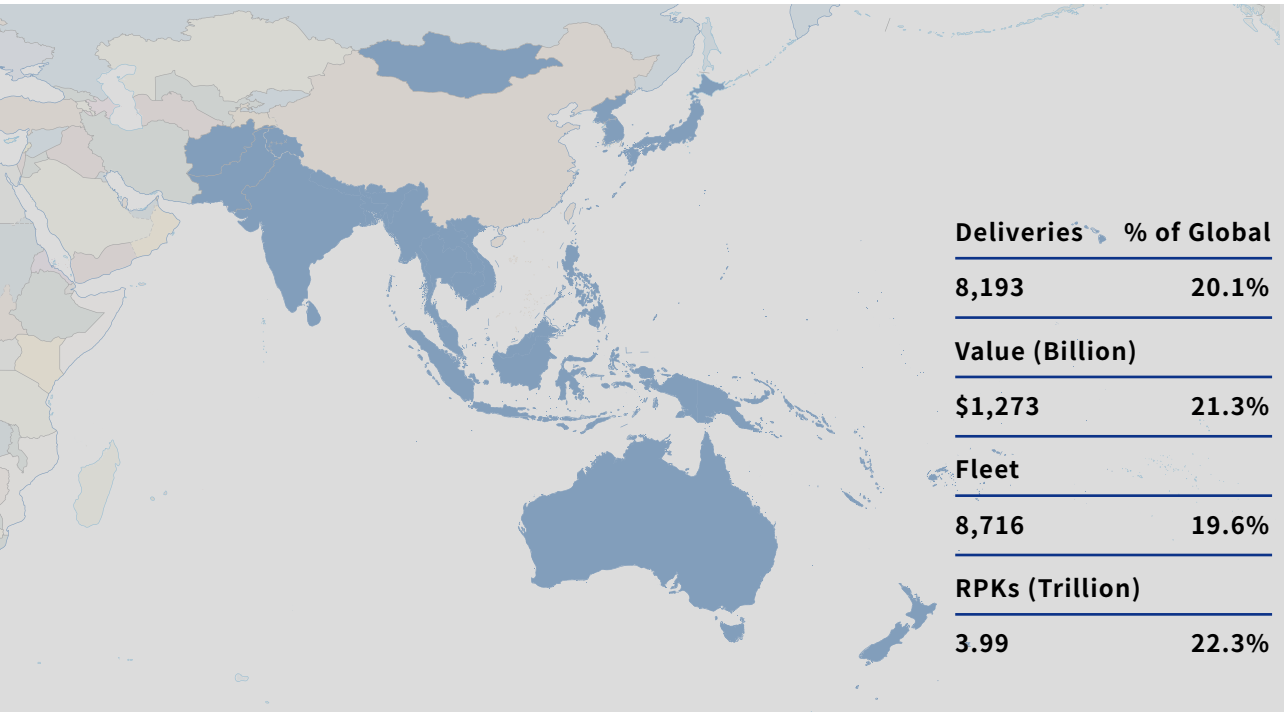
Fleet

Compared with 2018, in 2019, passenger jet fleet in the Asia-Pacific region has grown by 2.4% to 3,773, accounting for 15.8% of total world fleet. The fleet of the Asia-Pacific region is estimated to expand to 8,716, which will account for 19.6% of the world fleet by 2039. Due to the influence of COVID-19 pandemic, 8,193 new aircrafts will be delivered to Asia-Pacific, lessened by 10% (approximately 906 jets) compared with the number of 2019 forecast, with a total value of \$1.27 trillion.

In the following 20 years 5,939 new single-aisle deliveries will be made in the Asia-Pacific region, the fleet in this region is estimated to 6,065 by 2039. The amount of 160-

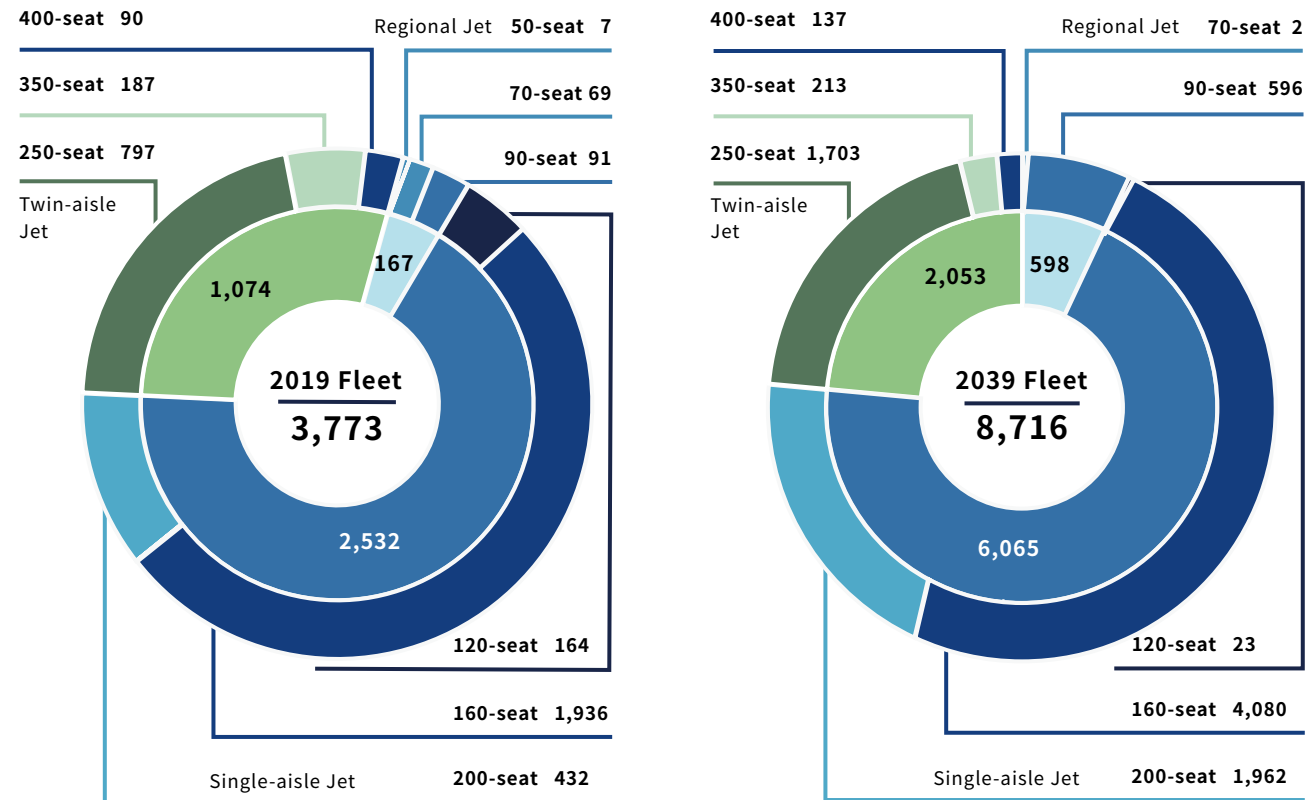
seat jets will account for 67.3% among total deliveries in this region. 1,658 new twin-aisle aircraft will be delivered in next 20 years among which 83.2% are forecast to be 250-seat category. The twin-aisle fleet is expected to 2,053 by 2039, which is lower by 284 aircraft of 2019 forecast.

The regional aviation market size of the Asia-Pacific region is fairly small, with a fleet of 167, accounting for 5.8% of global total in 2019, which remains almost the same level of the previous year. The fleet size of regional jet by the end of 2039 is expected to reach 598, with 596 new deliveries which will account for 13.8% of the global regional jet deliveries.



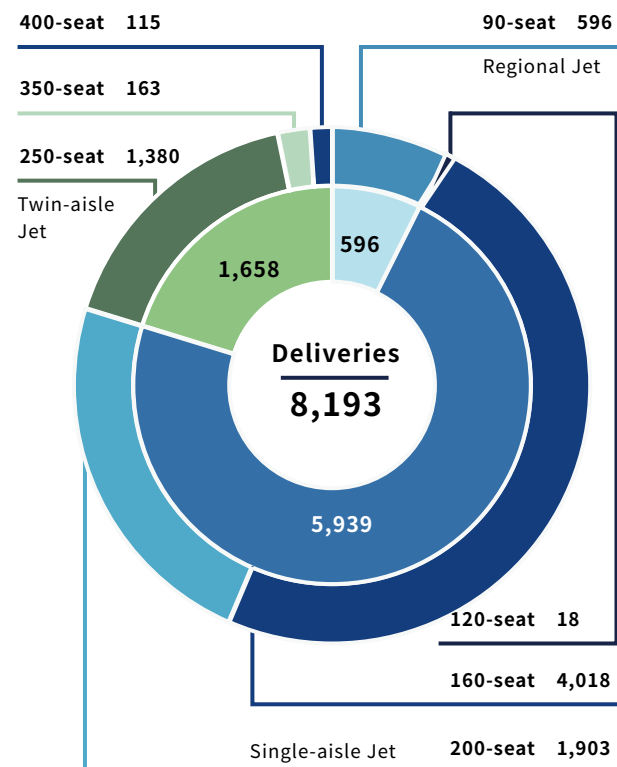
Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

Asia-Pacific Fleet Growth



Source: COMAC, Cirium

Asia-Pacific Deliveries by Category & Seat Size(2000-2039)



Source: COMAC

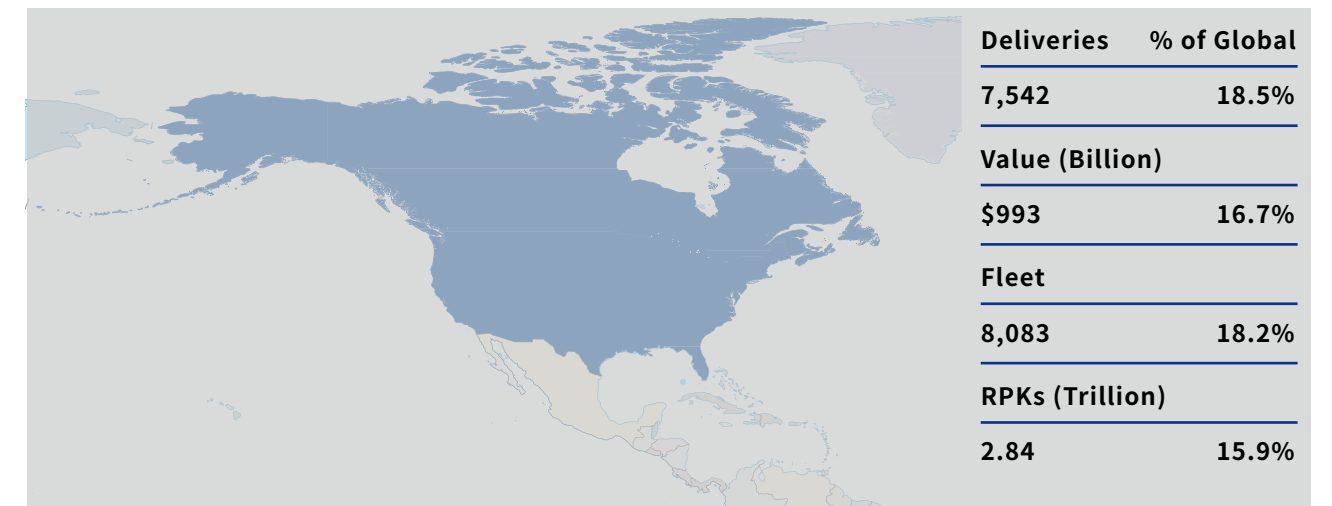
North America

Market

The U.S. economy had strong growth in 2019, with GDP reaching \$21.4 trillion and per capita GDP reaching \$65,000. Economic fundamentals continued to be strong, inflationary pressures fell slightly, the unemployment rate had remained the lowest since 1969, and trade continued to expand. However, the trade deficit hit a seven-month high, and the government debt remains high.

In 2019, the net profit of global airlines was approximately \$25.9 billion, and North American airlines accounted for \$16.9 billion of it, up from \$16.4 billion in 2018. The market continued to maintain strong growth, with capacity grew

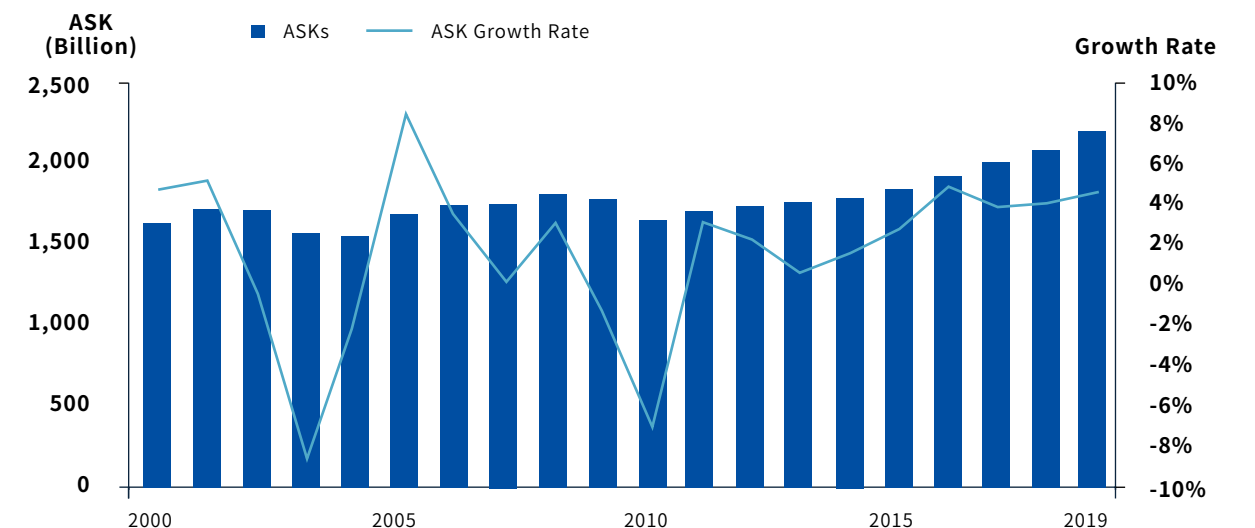
3.4%, slightly lower than the growth of passenger traffic 3.5%. In the past three years, North American airlines have contributed more than half of global industry profits, but the pressure of rising costs has also forced a slowdown in growth. In 2020, the unexpected COVID-19 spreads across the world, and the US economy has also suffered a huge impact. The US economy is expected to shrink by more than 6%. Related agencies predict that if the epidemic could be effectively controlled, North America is expected to begin to recover in the first half of 2021.



Source: COMAC

Map sources: Ministry of Natural Resources of the people's Republic of China

North America Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Netowrk

The number of ASKs in North America increased by 4.8% in 2019, basically the same as last year. North American airlines operate a total of 5,674 routes, covering approximately 17.3% of the global route network, and the number of routes increased by 1.1% compared with 2018. Of the routes operated by carriers in North America, 76.4% are operated within North America.

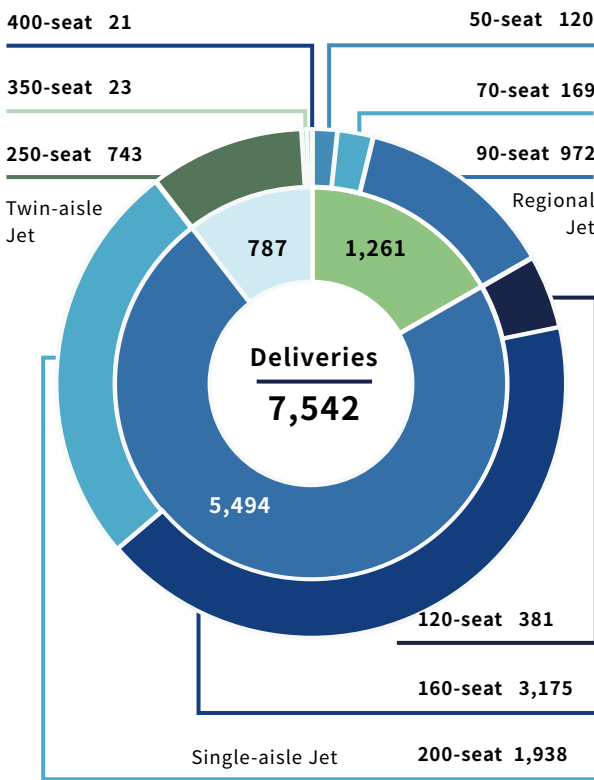
In 2019, the number of seats available for North American carriers in North America increased by 3.4%. In the inter-regional market, two major markets, North America-Latin America and North America-Europe, have maintained a steady increase in capacity, increasing by 3.3% and 4.2%

respectively. In the North America-China market, the share of North American carriers continued to shrink slightly, and the capacity dropped by 7.2%, which may suffer from a decline in demand due to trade frictions. Although the scale is small, the capacity of North America-Middle East and North America-Africa market increased significantly, increasing by 11.8% and 6.7% respectively in 2019. However, resulted from the impact of the COVID-19 in 2020, intercontinental routes will be severely impacted, bringing considerable obstacle to the development of the two emerging markets.

In 2019, there were 6,689 passenger aircraft in service in North America, of which single-aisle jets accounted for 61.2%, and regional jets accounted for 28.4%. By 2039, the fleet size in this region will reach 8,083, accounting for 17.9% of the global fleet.

In the next two decades, 7,542 new aircraft will be delivered in the region, valued at approximately \$993.2 billion. Single-aisle jets will still be the key drivers for fleet growth, with deliveries reaching 5,494, accounting for 18.6% of global single-aisle deliveries; 1,261 regional jets will be delivered, accounting for 28.9% of global regional jet deliveries. 787 twin-aisle jets will be delivered, accounting for 10.6% of the world total.

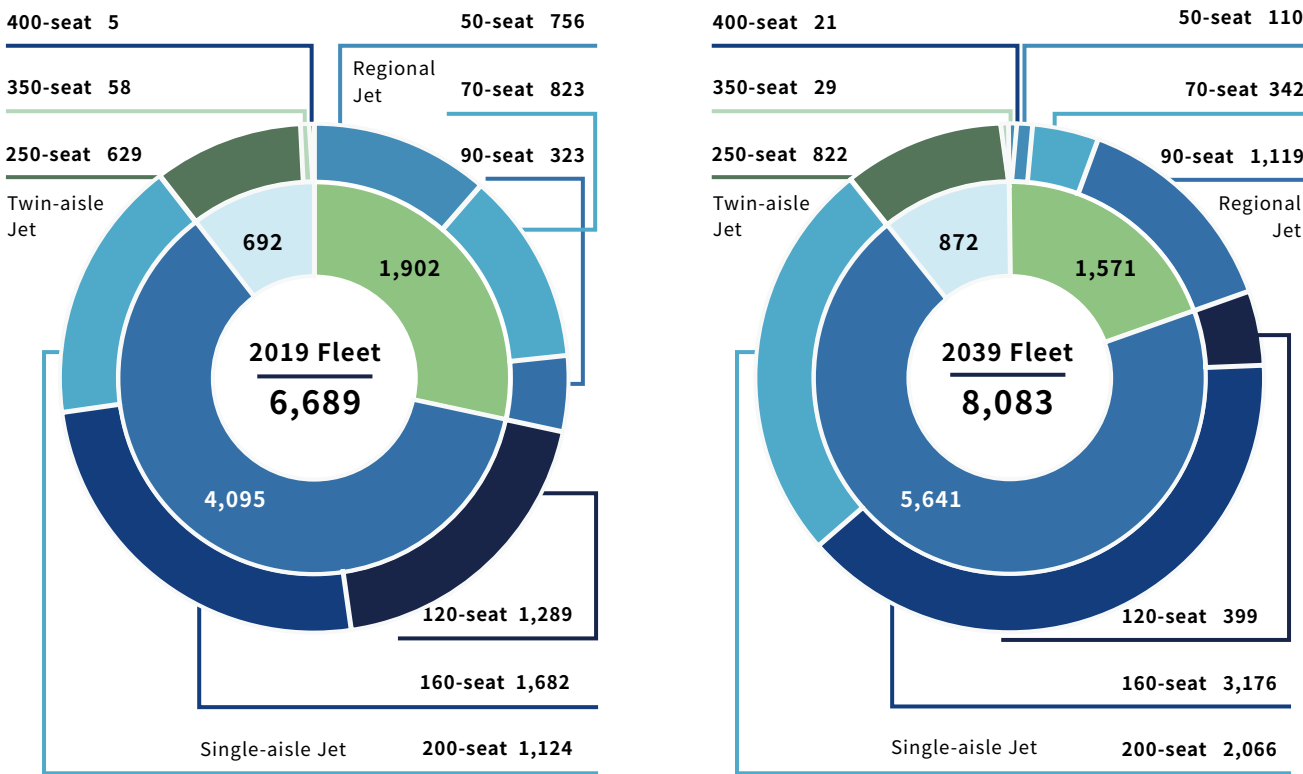
North America Deliveries by Category & Seat Size



Source: COMAC, Cirium

Fleet

North America Fleet Growth



Source: COMAC, Cirium



Latin America

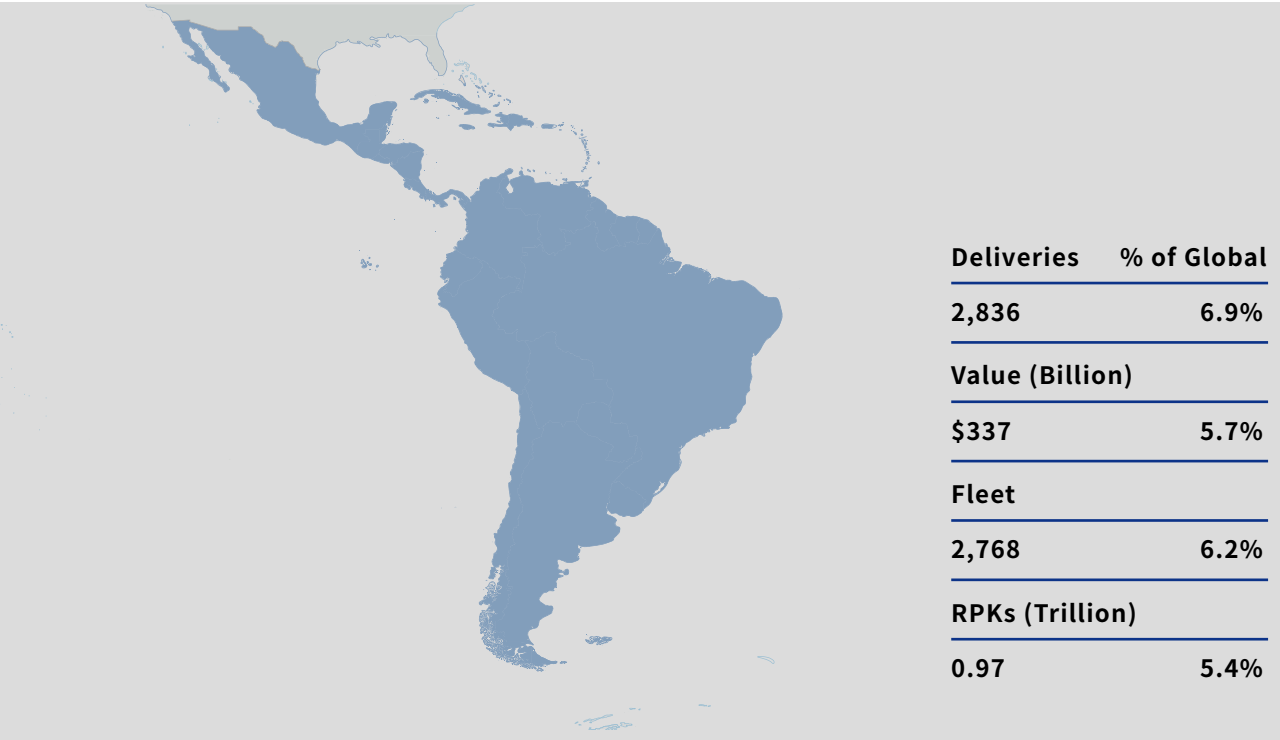
Market

According to the IHS data, the GDP growth rate of Latin America in 2019 was only 0.98%. The economy of Latin America region was keeping at a low level for six years continuously, and even tended to stagnate. The virus outbreak in Latin America was relatively later than otherregions. However, with the spread of COVID-19, countries in Latin America adopted the measure of blocking the border. At the same time, the decline of global market demand, the drop in commodity price, and the large-scale outflow of funds have caused a serious economic impact on this region. Countries in Latin America have suffered a great loss. Therefore, the unemployment rate has risen sharply and a large population will be trapped into poverty.

Due to the political turbulation and economic downturn in numerous countries in Latin America, the demand of aviation passenger transportation market (in terms of ASK) increased by only 3.0% in 2019, which was

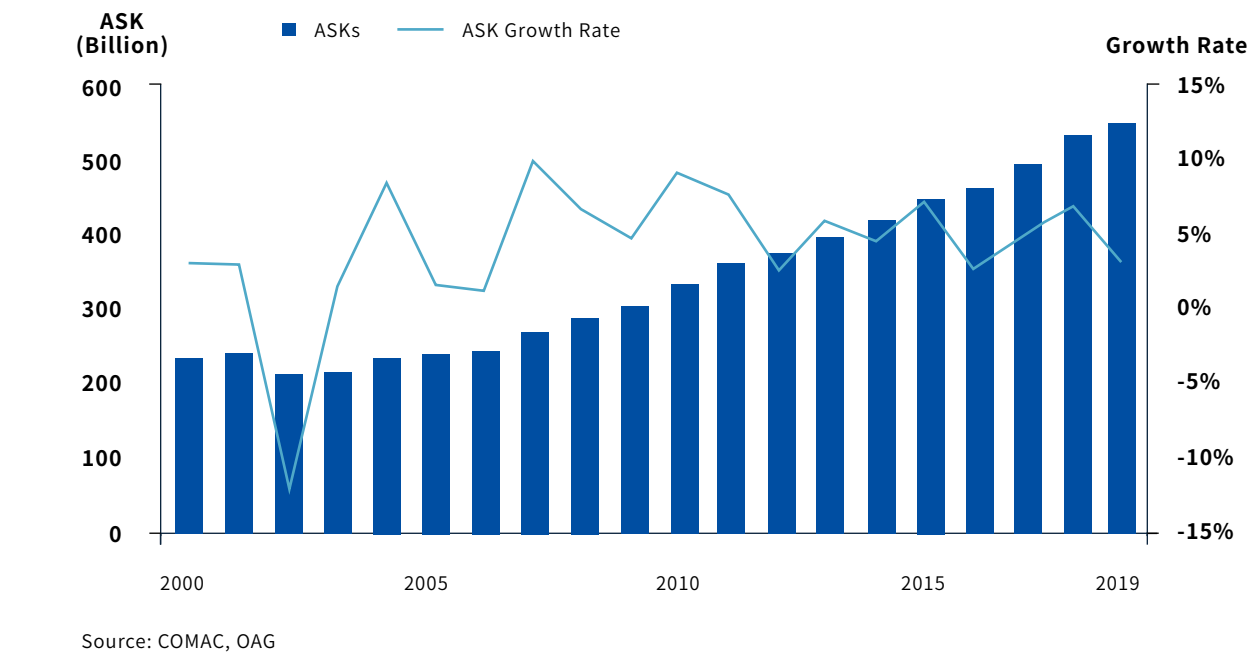
significantly lower than 7.5% increase by last year. The capacity increased by 1.6% and the load factor rose to 82.9%. In terms of freight, the FTK has increased by only 0.4%, which was considered to be the lowest record since 2015. According to IATA forecast, the RPK growth rate of Latin America will decrease by 49% in 2020 compared with the previous year, while the passenger revenue will decrease by 18 billion dollars.

Overall, the Latin America region will continue to remain in downturn. In the next two decades, the average annual growth rate of GDP in Latin America is expected to be 2.5%, the average annual growth rate of the fleet will be 3.3%,and the average annual growth rate of RPK is forecast to be 3.6%, 2,836 aircraft will be delivered in the next 20 years. The RPK of Latin America is estimated to reach 0.97 trillion by 2039, which will account for 5.4% of world total.



Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

Latin America Historical ASKs Trends (2000-2039)



Network

The number of point-to-point routes opened by carriers in Latin America increased by about 14.6% compared with last year, among which the growth of domestic market is about 18%, while there is only 0.8% increase of international market. The growth rate of available seats was about 3.6%, however the domestic market has taken the primary contribution, illustrating a 5% increase of available seats. As to international side, it has declined slightly by 0.4%.

In terms of regional distribution of the international market, the outflow capacity of Latin America mainly distributed in North America, followed by Europe, in

which the former one accounts for 47.8% of the total capacity, which has shrank compared with last year. While the latter accounts for about 20%, which has increased by 7.6%.

The impact of COVID-19 on Latin America was relatively later than other regions, but it has resulted in the disastrous consequences. The number of coronovarious infection have increased relatively fast in Brazil, Peru and Chile. Carriers in Latin America began to reduce capacity sharply from March in 2020, and the significant uncertainty could furtherly extend in the future .

Fleet

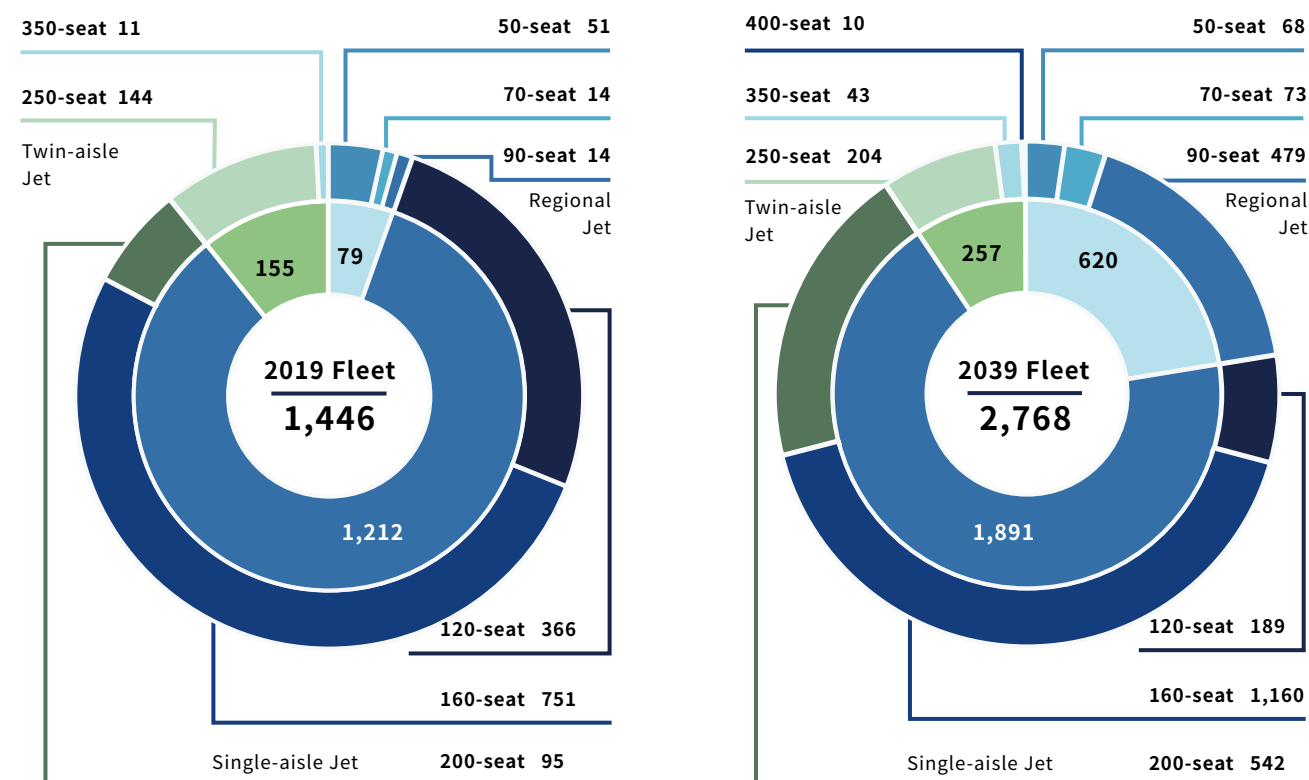
The fleet size of Latin America in 2019 was slightly lower than last year, while the forecast deliveries of 70-seat class jets will increased a little. 2,836 aircraft will be delivered to this region in next 20 years. Among which, 562 are regional jets, accounting for 82.9% of total jets in this region. With the growth of regional and international routes, the number of regional aircraft in this region is estimated to be 620 in 2039.

With the development of the aviation market of Latin

America, over 2,000 new single-aisle jets will be delivered to this region, 160-seat class jets will take the major position. It is forecast the fleet size will increase from 751 in 2019 to 1,160 in 2039.

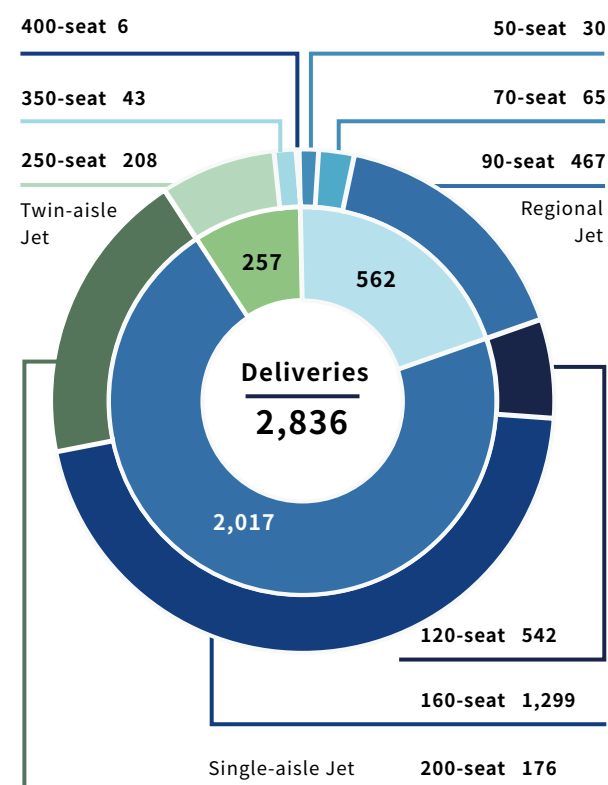
In terms of twin-aisle jets, the demand of 250-seat class jets continued to increase, the fleet size will climb from 144 in 2019 to 204 in 2039. The fleet size of 350-seat class jets will expand as well, and its share will increase from 7% to 16.4%.

Latin America Fleet Growth



Source: COMAC, Cirium

Latin America Deliveries by Category & Seat Size (2020-2039)



Source: COMAC

Europe

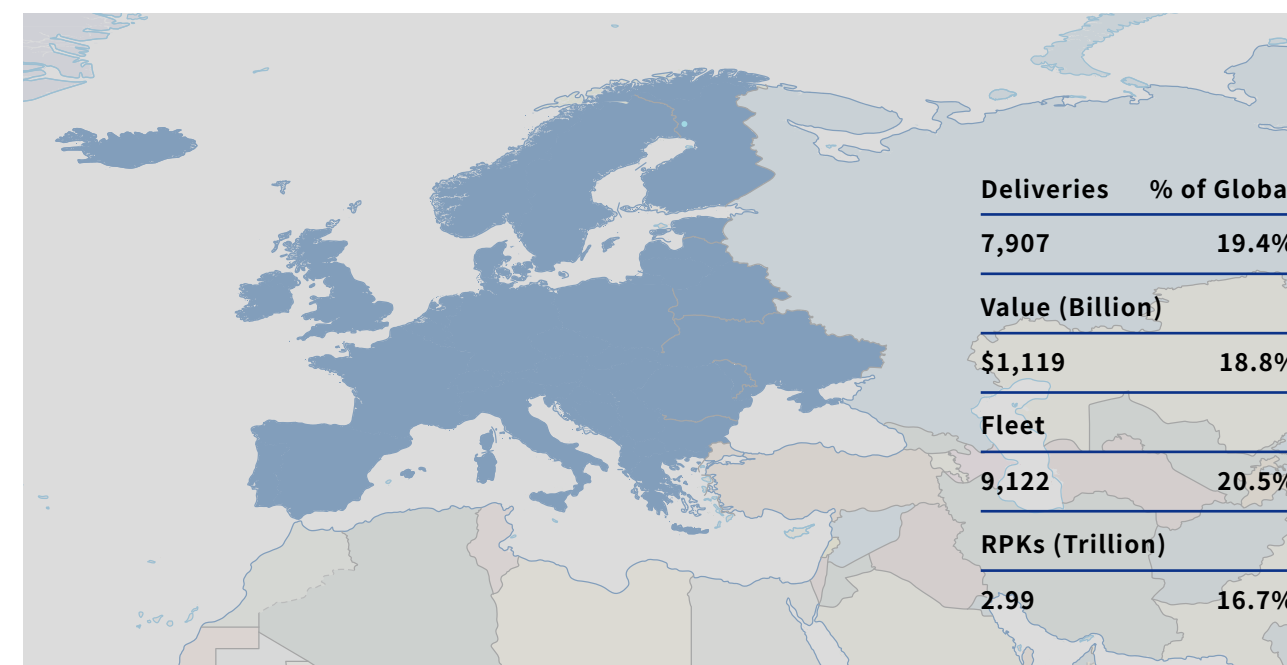
Market

In 2019, the European economy, affected by Britain's formal separation from EU, international trade frictions and political fragmentation, showed a trend of decline, with GDP growth falling from 2.0% in 2018 to 1.4%, only half the level in 2017, barely achieving a growth. Meantime, since the first case of COVID-19 was confirmed on January 24, 2020, the European economy has been hit hard again, and it is difficult to restore normal growth level in the short term. With the epidemic situation under control, the European economy began to recover well in the third quarter. July 1, the EU re-opened due to the epidemic closed nearly four months of external borders, conditional access to allow passengers from 15 countries; Europe's largest Low Cost Airline, Irish Ryanair, also resumed 40% of its flights on July 1, and 90% of routes covering Europe and North Africa resumed operations, but some countries still face the challenge of the epidemic rebound.

In 2019, Ryanair Group regained the first place of European largest airline group from Lufthansa Group in RPKs, with RPKs increasing by 9.5% to 152 million. Lufthansa Group

fell to second place, with 145 million passengers, an increase of only 4.7%. International Airlines Group (IAG) remained third with a 4.7% increase to 118.3 million passengers. Air France-KLM was fourth with a 2.7% increase to 104 million.

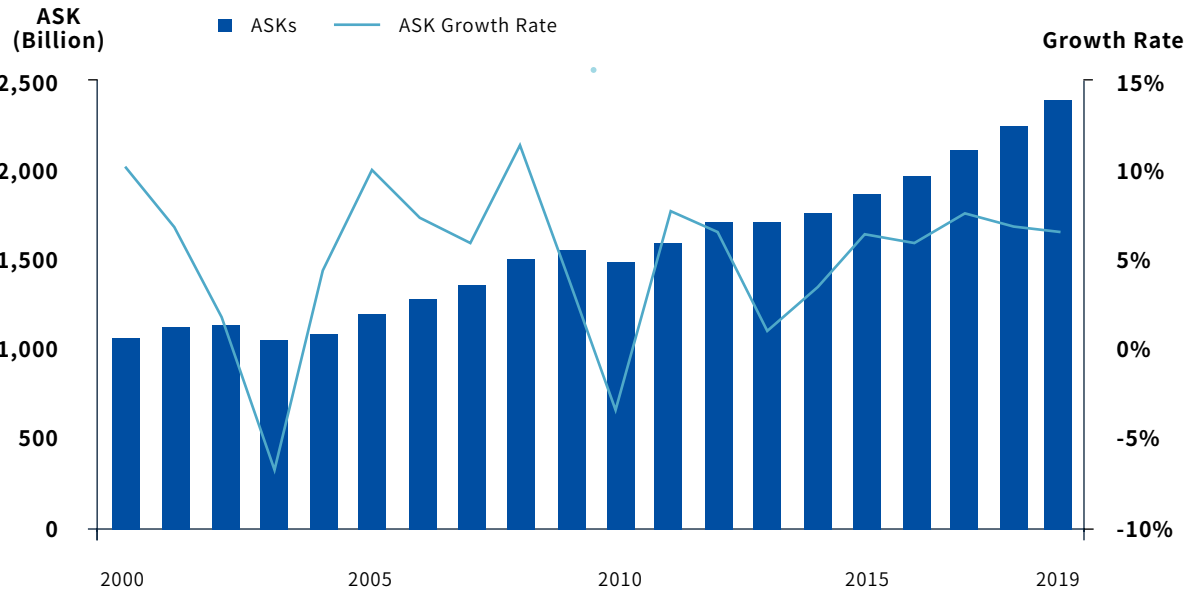
In addition, due to the impact of COVID-19, compared with 2019, the annual revenue of the European airlines decreased by 55.3% to 89 billion US dollars all over the whole market. The passenger volume in European airports declined by 106 million due to COVID-19. Affected by the spread of the epidemic in Europe, the European aviation market has been severely hit. As a result, European airlines have been forced to temporarily ground some aircraft or speed up the retirement of them. Since mid-February 2020, more than 5,000 aircraft have been grounded in Europe, including 3000 narrow-body, 500 medium wide-body and nearly 200 wide-body aircraft. In terms of the number of flights, compared with April 2019, European airports have reduced flights by 90%.



Source: COMAC

Map sources: Ministry of Natural Resources of the people's Republic of China

Europe Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Network

In 2019, the number of routes in the region accounted for 83.4% of the total of European carriers, and the number of available seats accounted for 83.5%, an increase of 2.2% over 2018, but the growth rate slowed down.

In the cross-regional market, the growth rate of capacity has slowed down, and the European-American market is still the largest market, accounting for 18% of the

total capacity. The proportion of capacity in European-African and Europe-Asia Pacific market occupied the second and third places respectively, of which the growth of distributing capacity in Africa increased by 6.3% compared with 2018. Europe-Middle East market increased 861 routes, ranking first among all cross-regional markets.

Fleet

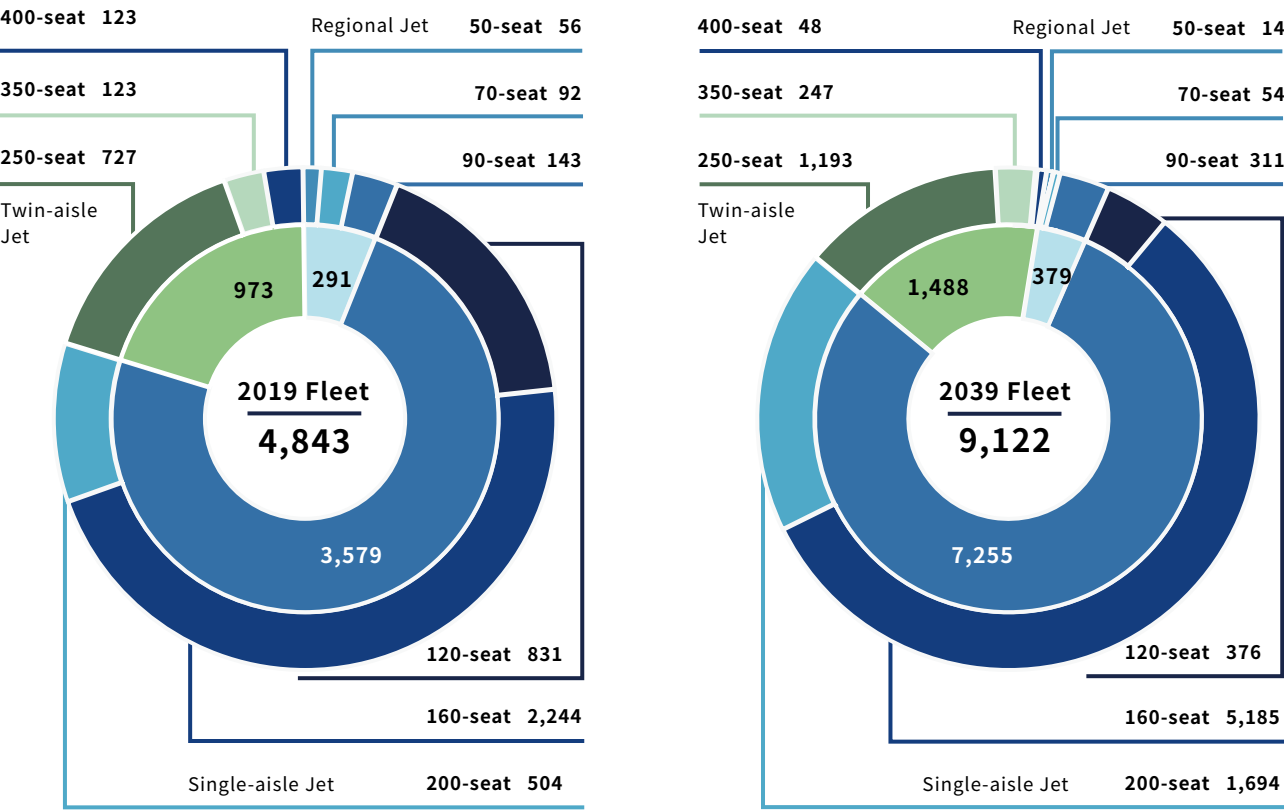
In 2019, the European fleet was 4,843, decreased by 29 compared with 2018, accounting for 20.3% of the global fleet, with an average age of approximately 11.5 years. In the next 2 decades, deliveries will be 7,907 in Europe, and the flee will reach 9,122 by 2039, accounting for 20.5% of the world's total, with a value of \$1.12 trillion.

In the next two decades, there will be a retirement peak of regional jet in Europe, demand from 50-seat and 70-seat is becoming less, 90 seats will be the main demand of the market, it is expected that by 2039, the European 90 seats fleet size will reach 311.

By 2039, the number of single-aisle jet in Europe will double, accounting for 83.4% of the total increase. Among them, the 120-seat type will be gradually replaced, and the proportion will decrease by more than 15%. In the future, the market demand for 160-seat and 200-seat will increase, and the number of 160 seats single-aisle jet will reach 5,185, accounting for 71.5%.

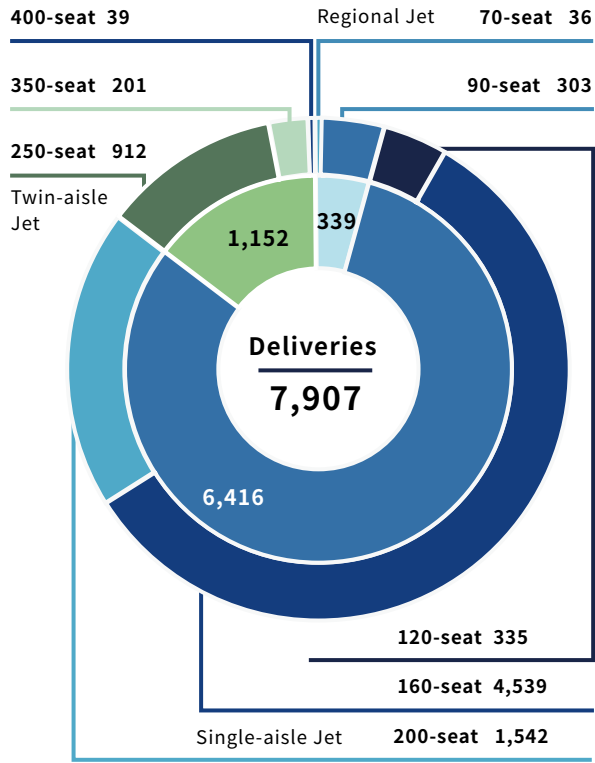
A total of 973 twin-aisle jet are currently in service in Europe, and the number will reach 1,488 by 2039. The growth comes from the 250-seat twin-aisle jet, which will account for 80.2% of the total twin-aisle.

Europe Fleet Growth



Source: COMAC, Cirium

Europe Deliveries by Category & Seat Size (2020-2039)



Source: COMAC, Cirium

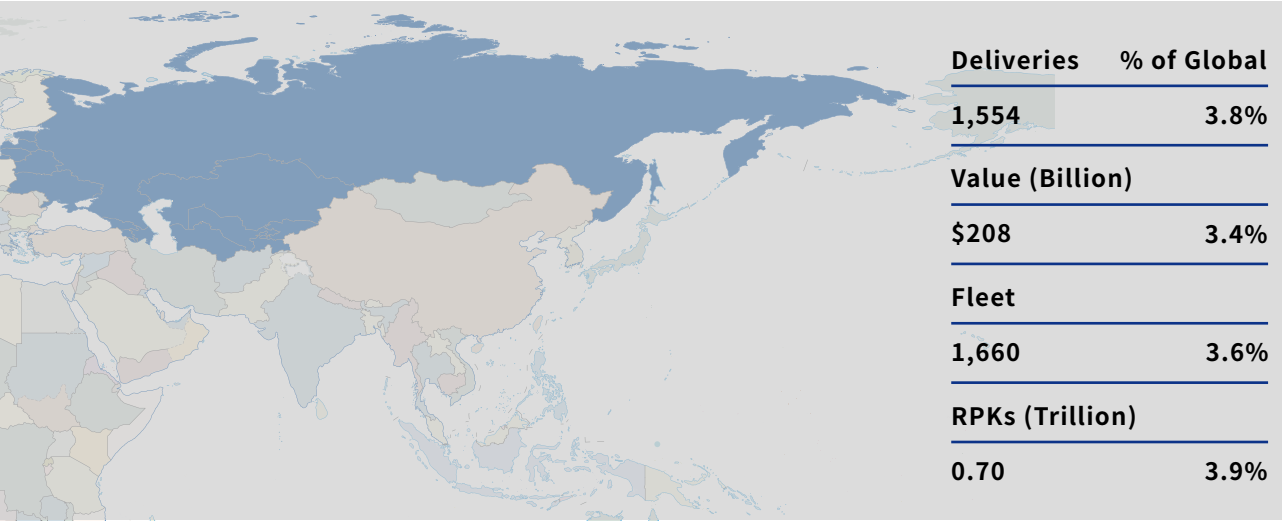
Russia & CIS

Market

Although the rise in oil and other commodity prices in 2018 promoted economic growth in Russia & CIS areas, favorable factors of trade conditions decreased in 2019. As a result of this, some economies in this region failed to maintain the significant economic growth achieved in 2018. In 2019, Russian economic growth rate was weak, growing by only 1.3% year-on-year.

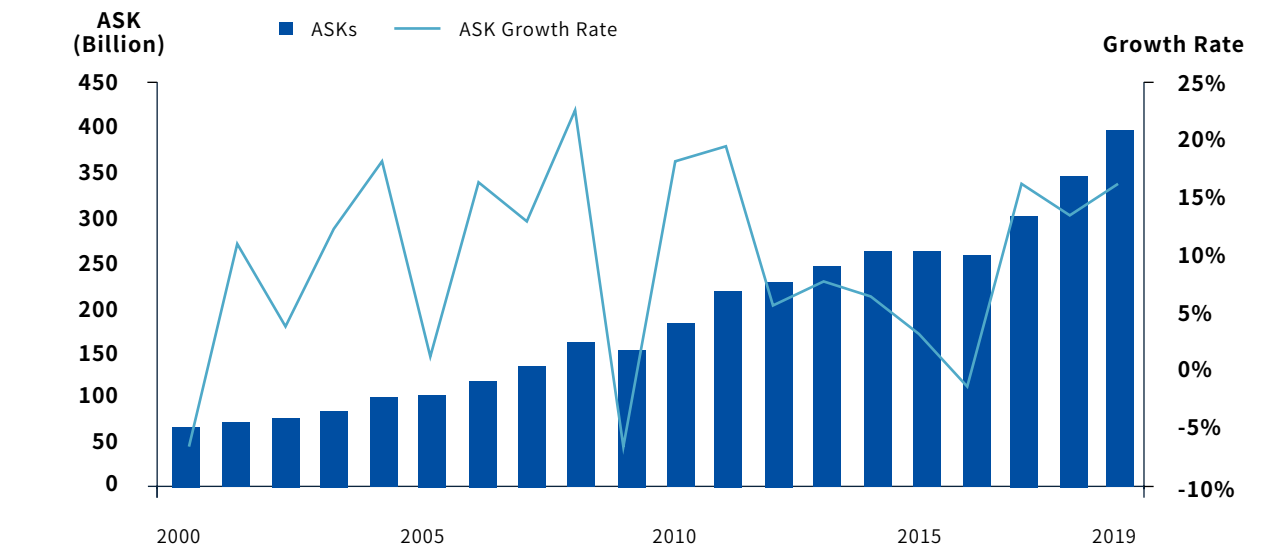
In 2020, COVID-19 resulted in a profound impact on the

global economy. The World Bank predicts that Russian economy will decline by 5%-6% in 2020, which was the greatest decline in last 11 years. With the control of the epidemic, the regional economy is expected to recover since the second half of 2020. However, if the epidemic recurs and time of regional blocking extends, the expected economic recovery will probably be postponed to 2021.



Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

Russia&CIS Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Network

In 2019, the capacity of Russian carriers (available seats) increased dramatically by 16.2%. Except for seats in Russian domestic route market increased by 7.0%, the capacity of Russia-Europe Russia-Asia Pacific, Russia-China markets increased by 18.4%, 38.8%,11.6% respectively. Additionally, among these markets, the market share of Russian carriers' capacity is rising.

From the frequency of various aircraft categories, the single-aisle and regional jets are the main types in

domestic market. In the Russia-Europe market, the market with the greatest capacity, the 160-seat single-aisle is the main type. In the long-haul routes, Russia-Asia Pacific and Russia-Middle East markets take the 250-seat as the main type, while the 350-seat is the main type operated in Russia-China market.

Fleet

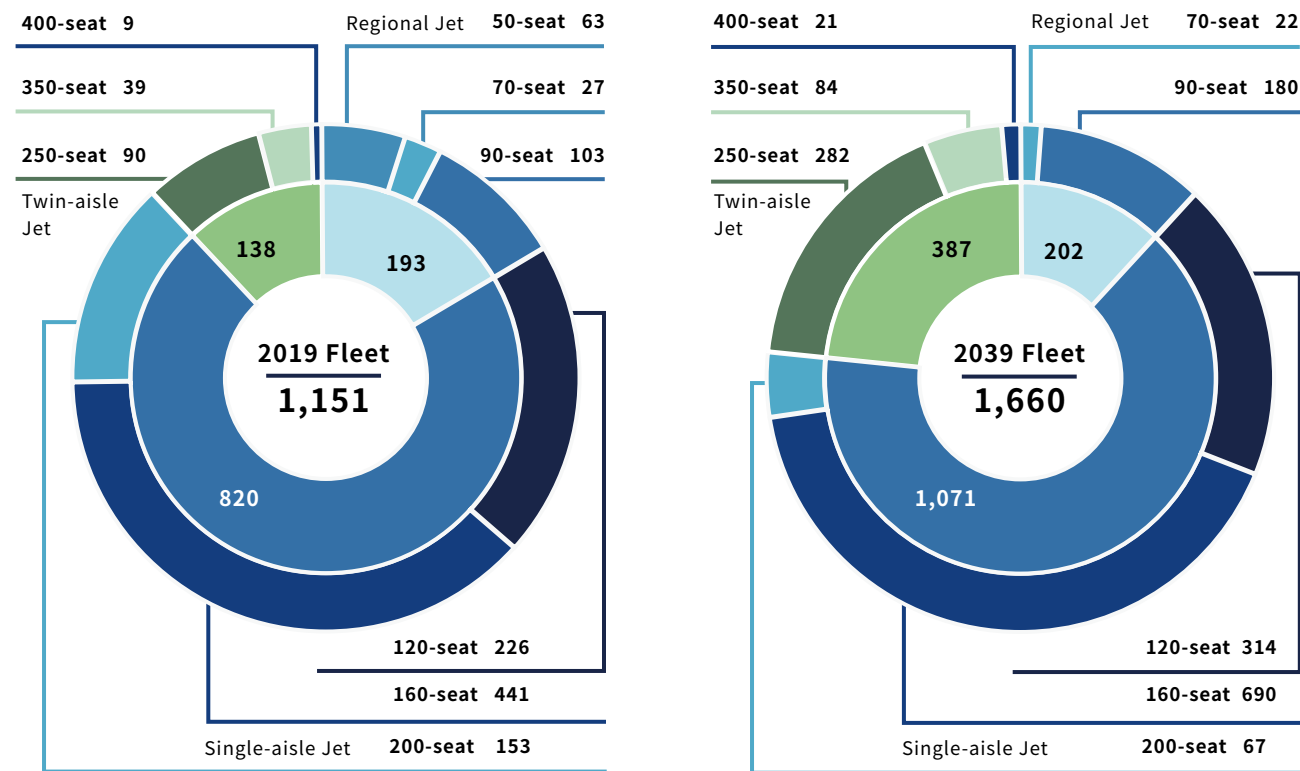
In 2019, the number of fleets decreased by 44, accounting for 3.7% of total fleet compared with 2018, of which most were regional jets and 120-seat (single-aisle) jets. It is predicted that a 50-100 aircraft decrease might be witnessed in demand in Russia due to the influence of the epidemic. Despite the preschedule retirement of passenger aircraft, cancellation of orders and shrinking demand caused by the epidemic, Russia may actively promote the delivery of self-developed regional and single-aisle types.

In the next 20 years, Russia and the CIS region is expected to witness 1,554 aircraft deliveries, of which 67.6% are single-aisle aircraft, concentrated in the 160-seat class; 201 regional jets are expected to be delivered, with

Russian self-developed 90-seat jet taking up the greatest proportion. The demand for 160-seat single-aisle and regional aircraft will increase correspondingly as the growth of internal demand of this region. 303 wide-body aircraft are expected to be delivered. As the recovery after the epidemic, the travel demand between Asia Pacific, China, Latin America and Africa and other emerging markets will bring growth opportunities to the demand of new aircraft. By 2038, the fleet size in Russia and the CIS is expected to reach 1,660.

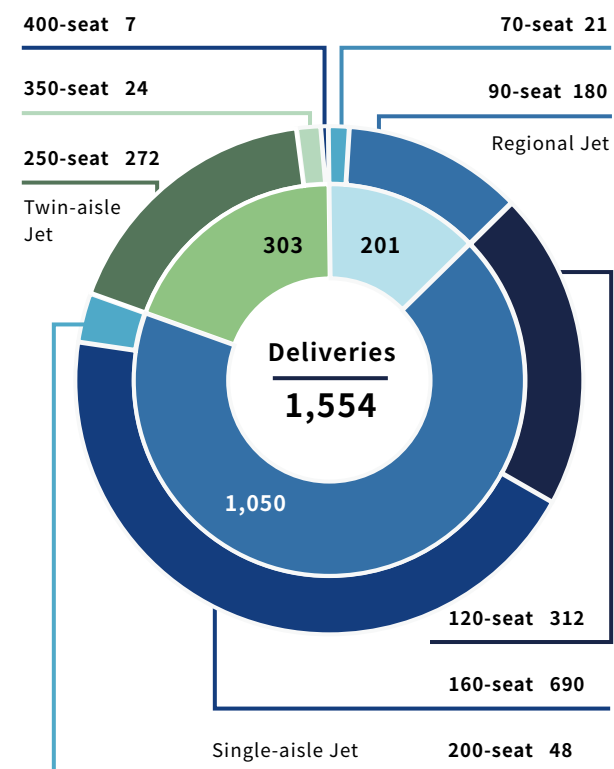


Russia & CIS Fleet Growth



Source: COMAC, Cirium

Russia & CIS Deliveries by Category & Seat Size (2020-2039)



Source: COMAC

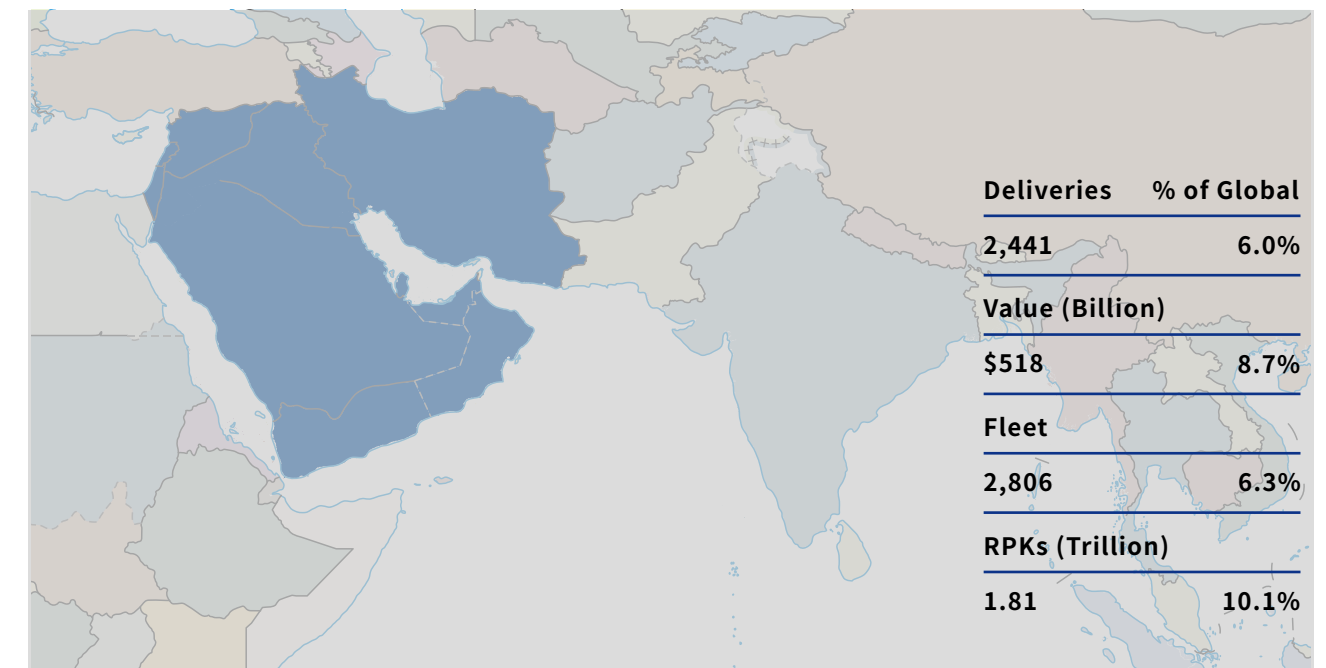
Middle East

Market

In 2019, political tensions and turbulent situations in the Middle East, have caused a great impact on the air transport market. Global oil prices continued to fluctuate, resulting in limited growth in demand. Business of the international hubs in the Middle East was seriously damaged by the epidemic, and is difficult to recover in short term.

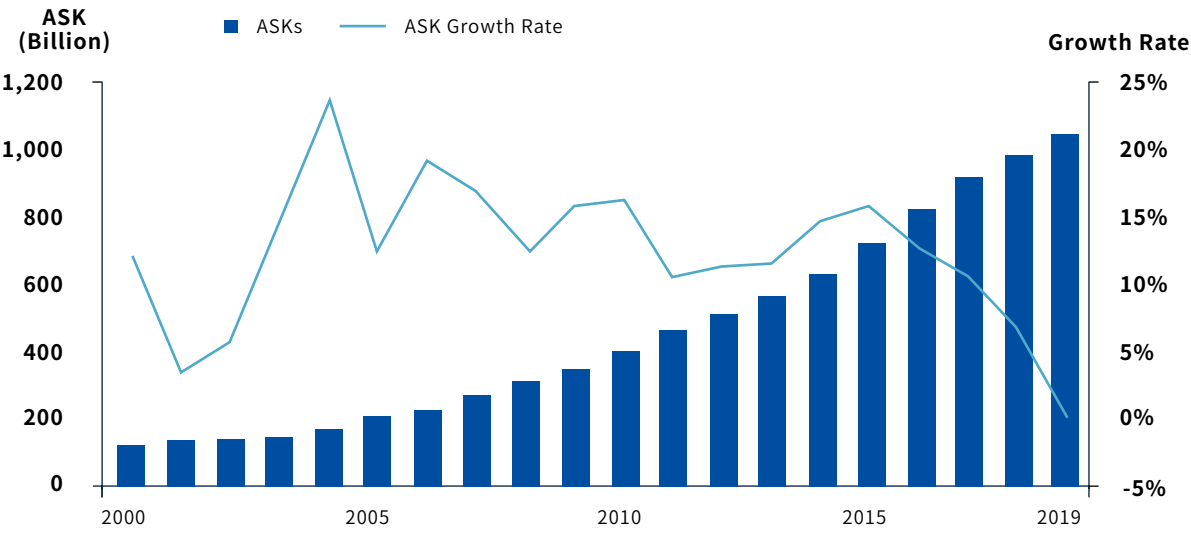
On July 13, 2020, the International Monetary Fund (IMF) published a revised economic development prospect of the Middle East and North Africa region, in which the institution adjusted the region's already negative predicted GDP growth rate further down to -7.3%. Behind the negative growth of the economy is a predicted income loss of around 270 billion U.S. dollar worth of oil export, which could make the region's post COVID-19 economic recovery more difficult than the rest of the emerging economies. Meanwhile however, the IMF predicted that the region's economy will restore positive growth in 2021 at an annual rate of 3%.

Overall, air traffic demand in the Middle East measured in RPKs has grown by 2.6% in 2019, representing a decline from 2018 (4.9%), and was the lowest growth rate among the world regions. However, growth did pick up by some degree in the 4th quarter, when December has seen the region's demand grow by 6.4%, being the highest among all the regions in that month. Airlines' annual capacity has increased by 0.1%, and average load factor has increased by 1.8% to 76.3%. According to information from IATA, major airlines in the Middle East plan to carry on reconstruction into the next year, aiming to cut total loss from 1.5 billion to 1 billion. U.S. dollar. A stronger growth prospect are expected to boost the aviation market performance, structural weaknesses in the Middle East economies can still prolong the recovery cycle and thus cause the airlines industry as a whole to remain in the red for a third consecutive year in 2020.



Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

Middle East Historical ASKs Trends (2000-2019)



Source: COMAC, OAG

Netowrk

Intercontinental markets between the Middle East and Asia-Pacific, Europe, North America and Africa remained to be the main markets for the region’s airlines, however in 2019, capacity growth has stalled in most of them. Airlines’ capacity measured in ASKs has declined by 1.2% and 0.9% respectively in the Middle East-Asia Pacific and the Middle East-North America markets, and has grown only by a slight 0.6% in the Middle East- Africa market. The Middle East-Europe market alone has shown the fastest development with a growth rate of 6.2% and 6.6% in terms of ASKs, and total seat number respectively, and 262 routes have also been added across the two regions.

In terms of scale, In 2019, the largest intercontinental

market related to the region is the one between the Middle East and Asia Pacific, which has accounted for about a quarter of the total capacity provided by the middle eastern airlines measured in ASKs. The market between the region and Europe is the second largest, accounting for more than 20% of total international capacity by the region’s airlines.

In sum, slow down in the world economy in general combined with the region’s unstable political situation have negatively affected the region’s air traffic market to a great extent in 2019.

Fleet

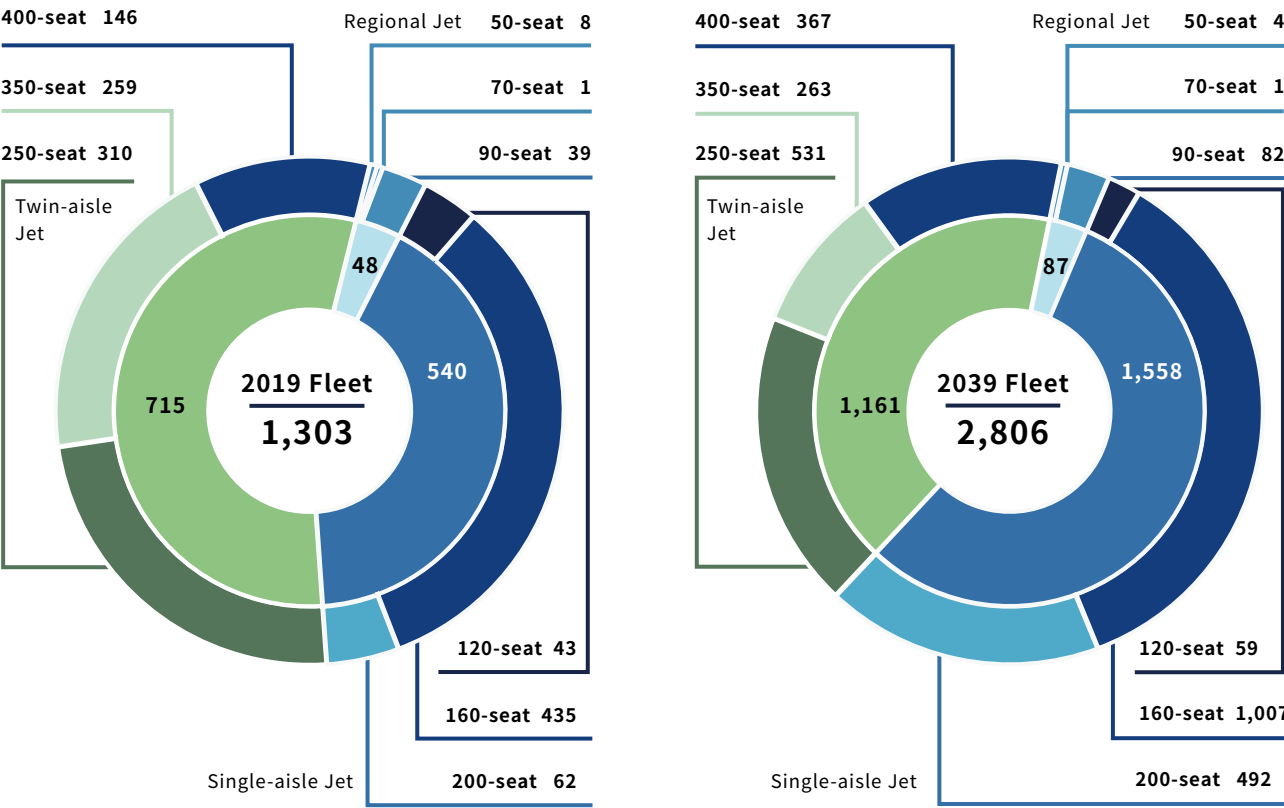
In 2019, the number of fleet in the Middle East reached 1,303, representing a decrease of 62 compared with 2018, and accounting for 5.5% of the global total fleet. By 2039, the number of the region’s fleet is expected to reach 2,806, accounting for 6.2% of the global total. Over the next two decades, 2,441 new aircraft will be delivered in the middle eastern airlines, with a value of \$518 billion.

Airlines in the Middle East currently operate a very small fleet of regional jets, mainly in the 90-seat segment. The

total number of regional jets operated by middle eastern airlines accounted for only 1.7% of the global total. By 2039, we expect 87 regional jets to be operated in the Middle-East, with 53 deliveries of new jets in the 90-seat segment.

Over the next two decades, 1,444 new single-aisle passenger jets are expected to be delivered to the middle eastern airlines, and as a result, raise the share of jet number in this category to 55.5% of the total

Middle East Fleet Growth

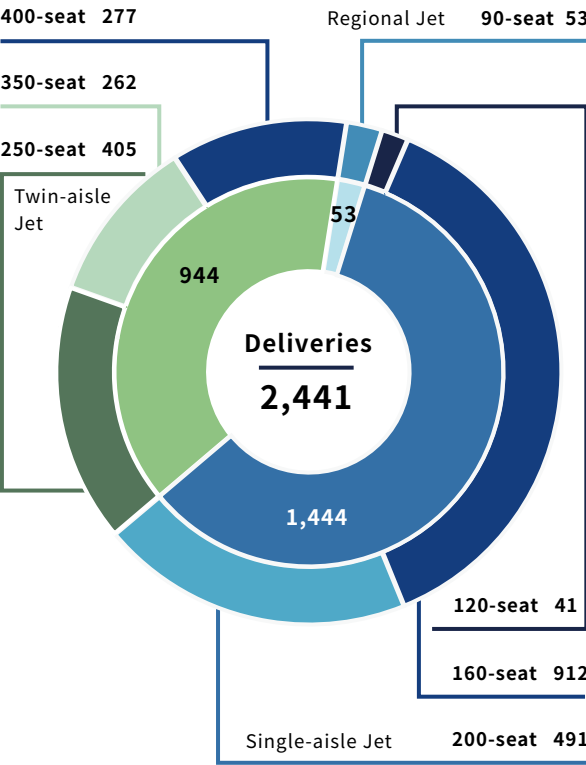


Source: COMAC, Cirium

fleet predicted to be operated by the region’s airlines, surpassing that of twin-aisle jet. The majority of those single-aisle jets will be in the 160-seat segment, accounting for 81% of the total. The region is also expected to see a rise in the 200-seat segment during the forecast period, with 491 new jet deliveries being predicted.

In 2019, 715 twin-aisle passenger jets were operated in the Middle East, accounting for 15.4% of the global total, most of which concentrated in the 250-seat segment, which accounted for 45.7% of the region’s total twin-aisle fleet. It is expected that 944 new jets in the twin-aisle category will be delivered in the next 20 years, among which 405 will be jets in the 250-seat segment, accounting for 42.9% of the total twin-aisle deliveries. We also expect the number of 400-seat fleet will exceed the 350-seat fleet and account for 32% of the total twin-aisle fleet in the region. By 2039, a total number of 2,806 twin-aisle fleet are expected to operate by airlines in the Middle East.

Middle East Deliveries by Categories & Seat Size (2020-2039)



Source: COMAC

Africa

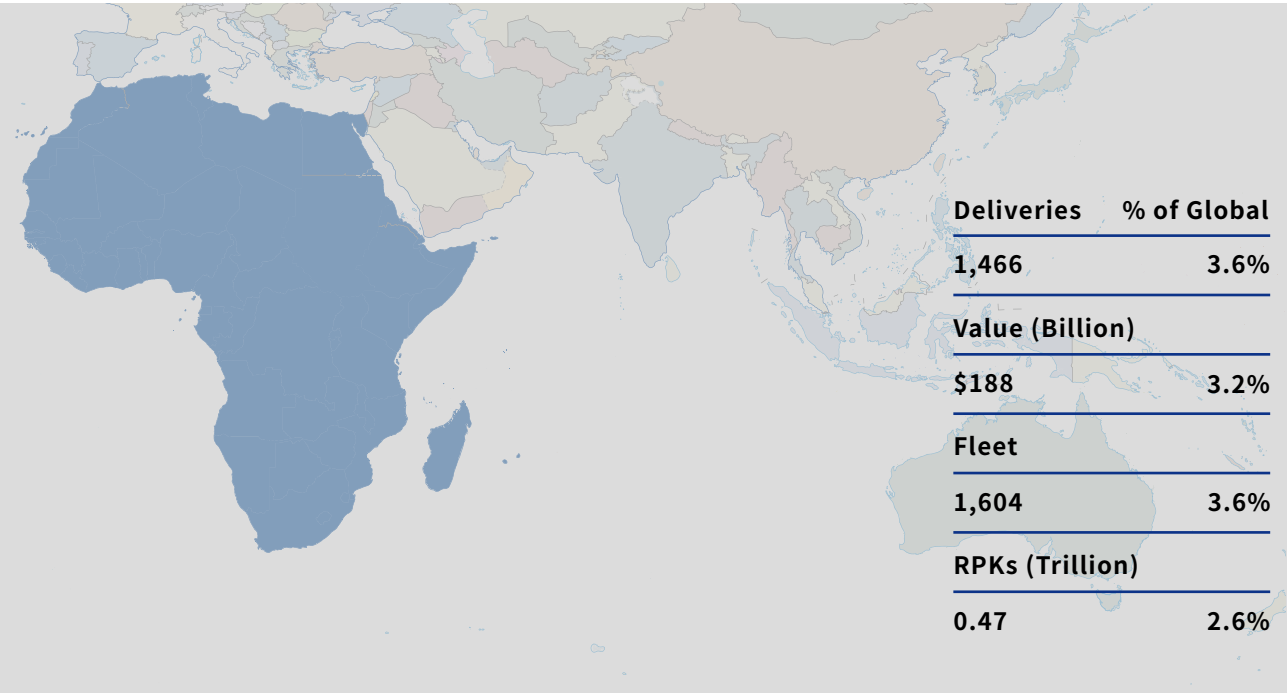
Market

In 2019, the economic growth of Africa slowed down from 3.4% to 2.2%, partly due to the economic recession in Nigeria and South Africa. In addition, climate and political risks also posed resistance to economic development. In 2020, COVID-19 severely impacted the African economy. IHS predicts that the African economy will fall by 3.9% due to the epidemic. The average annual growth rate of the African economy for the next 20 years is estimated to be about 2.8%.

In the past ten years, the average annual growth rate of ASKs in Africa has remained at 4.4%, but the growth rate slowed down in the later period. In 2019, the growth rate further declined due to the pressure on the global economy downturn. However, RPK maintained a growth rate of 4.9% throughout the whole year. The international

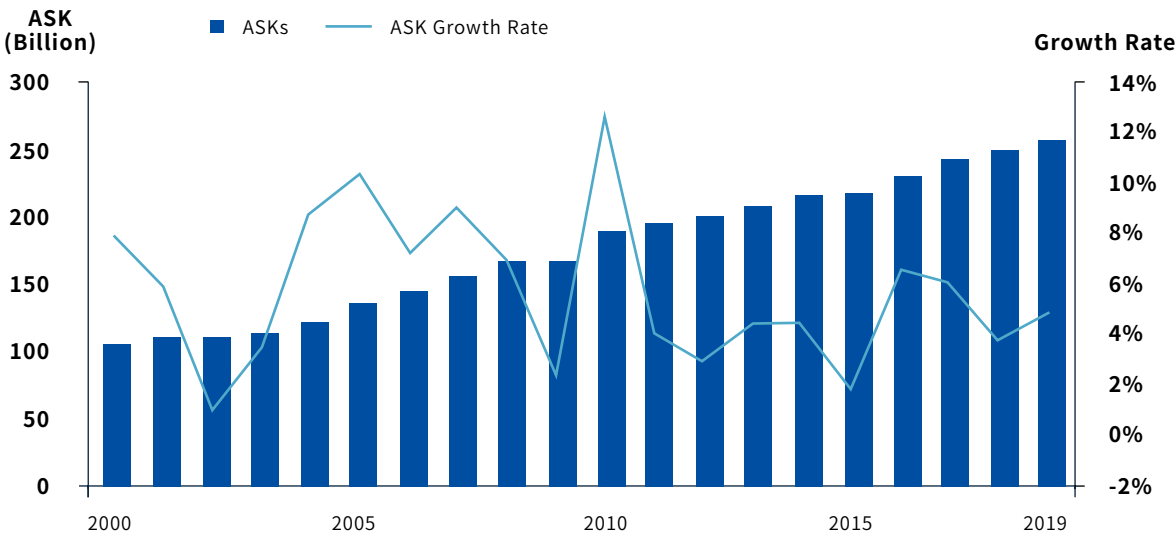
market of Africa increased by 5.0%, which was the highest among all regions, mainly due to the improvement of the political and security situation in some countries at the end of the year and the promotion of supportive fiscal policies.

As one of the regions most severely affected by COVID-19, Africa lags behind in medical treatment and infrastructure, making it difficult for the aviation market to recover quickly in a short time. As of June 2020, the load factor in Africa has reached a new low of 16.2% (compared with 71.1% in the same period last year), which was the lowest among all regions.



Source: COMAC
Map sources: Ministry of Natural Resources of the people's Republic of China

Africa Historical ASKS Trend(2000-2019)



Source: COMAC, OAG

Network

In 2019, the number of seats in the Africa increased by 4.8%, mainly due to the increase in the international market within the region. Among the inter-regional routes, Africa-Europe is still the largest market in Africa, with the number of seats increased by 3.3%. The share of African carriers in this market declined slightly, from

37.0% in 2018 to 35.8%. In the second largest inter-regional market, Africa-Middle East, the number of seats declined by 2.5%, and African carriers still accounted for 1/3 of the total capacity. The number of seats in the Africa-North America market rose sharply by 16.3%, and the African carriers accounted for 77.3%.

Fleet

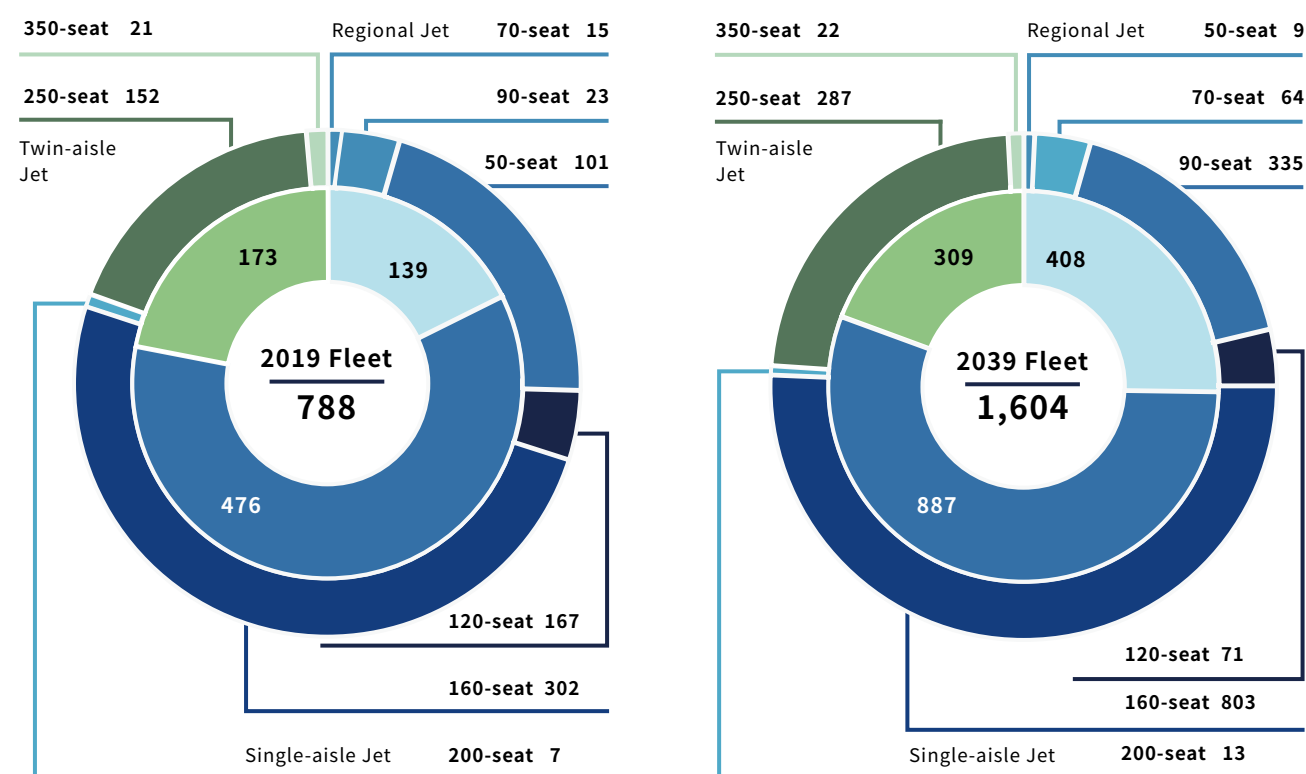
After experiencing a high growth rate of 6.1% in the fleet size in 2018, the fleet size of passenger aircraft shrank slightly in 2019, decreased by 1.8% compared with the previous year, with a total of 788 aircraft, accounting for 3.3% of the total global fleet.

In the next two decades, 1,466 passenger aircraft will be delivered in Africa, with a total value of \$188.3 billion. Due to COVID-19, the demand for about 200 aircraft will be lost. The African aviation market is dependent on the development of the international market. Therefore, the demand for twin-aisles will be greatly affected. Deliveries will decline more than 30%, mainly in the first 5-years.

In terms of regional aircraft, it is expected that a large number of small-seat class and old types will be retired

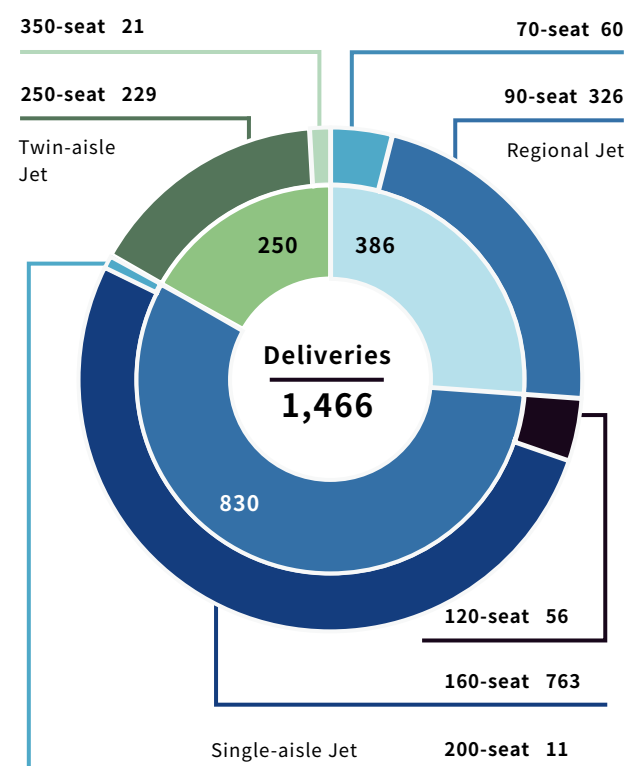
in advance in the recent 2-3 years. However, as the epidemic eases, the domestic market will recover first, and related policies such as a Single African Policy, the Three Transport Priority Network Development and Industrialization, will continue to drive regional demand growth. In the next 20 years, 386 regional passenger aircraft will be delivered in Africa, and 830 single-aisle passenger aircraft will be delivered, more than 90% of which will be 160-seat class; a total of 250 wide-body passenger aircraft will be delivered, concentrated in the 250-seat class.

Africa Fleet Growth



Source: COMAC, Cirium

Africa Deliveries by Category & Seat Size (2020-2039)



Source: COMAC

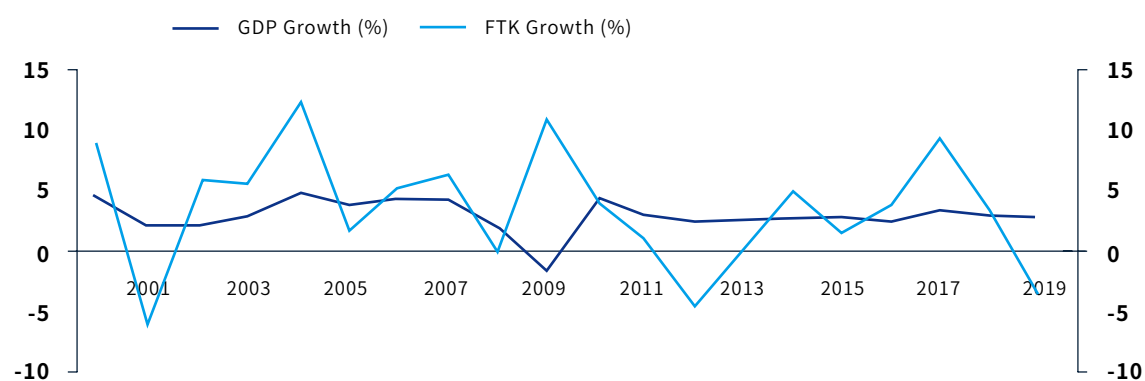
FREIGHT MARKET FORECAST

Map sources: Ministry of Natural Resources of the people's Republic of China

Global Freight Market

Over the past 50 years, global FTK has grown at an average annual rate of 4.6%, while China's average growth rate is 2.5%. There are many factors affecting the growth or decline of global air cargo industry, among which GDP is the main factor and key driving force. This connection is revealed by the historical change between GDP and FTK, the change of FTK is about twice the average change of GDP.

Trend of GDP and FTK Growth

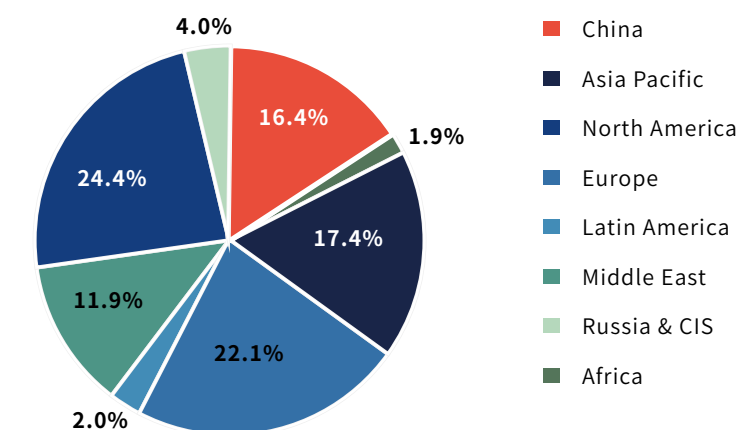


Source: WorldBank, Cirium

In 2019, the global FTK was about 61.2 million tons and decreased by 3.3%; but AFTK increased by 2.1% compared to the previous year. With global trade only grew by 0.9%, weak trade, slowing GDP growth in manufacturing-intensive economies, declining business, decreasing consumer confidence and increasing

geopolitical tensions led to negative growth in global air cargo industry. Freight volume decreased for the first time since 2012, creating the biggest decrease since the 2008 financial crisis.

FTK by Region in 2019



Source: COMAC

In 2019, the Asia-Pacific region (including China) accounted for the largest share of FTK with 33.8% of the global total; North America and Europe followed closely, accounting for 24.4% and 22.1% respectively. Although the Middle East aviation market was greatly affected by the unstable geopolitical situation, the proportion still maintains 11.9%. Africa and Latin America had smaller FTKs, accounting for 1.9% and 2.0% respectively.

In 2019, Chinese cargo market completed 7.5 million tones, an increase of 2.0% over the previous year. Domestic routes completed 5.1 million tons of cargo transportation, an increase of 3.1% over the same period in 2018, of which Hong Kong, Macao and Taiwan

completed 222,200 tons, a decrease of 5.4% over the previous year; international routes completed 2.4 million tons, a 0.3% decreased from 2018.

In the meantime, express airlines represented by SF Airlines have become a new force for the future development of China's freighter market. In 2019, among the 12 cargo carriers in China, SF Airlines took the first place with a fleet of 17 freighters, accounting for 35.3% of the total freighter aircraft fleet in China. China Postal Airlines' cargo fleet being the second largest of China, occupied 16.2% of Chinese freighter aircraft fleet total. China Southern Airlines and Suparna Airlines tied for the third place.

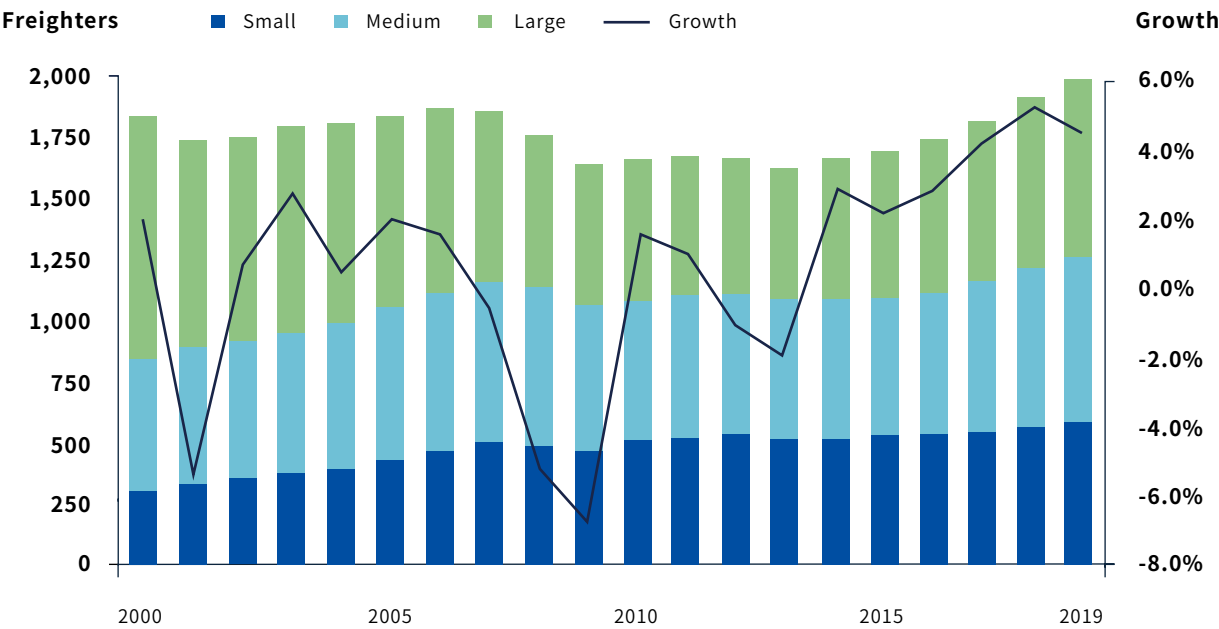


Impact of COVID-19 on Freight Market

At the end of the first half of 2020, due to the outbreak of COVID-19, a large number of routes were suspended. The shortage on the resources of aircraft lower cargo deck led to the limitation of cargo capacity, and FTK decreased significantly compared to the previous years. According to IATA data, the year on year global FTK decreases by more than 18.2%. China's FTK in the first half of 2020 was about 3 million tons, 85.2% of the same period to the previous year; China's FTK in June 2020 was 57.8 million tons. Domestic

and international routes completed 384,000 tons and 194,000 tons respectively, recovering to 92.1% and 98.6% of the same period last year. Under the epidemic, air freighter operation performs an important role in the transportation of aid supplies. With the potential of air cargo rebound accumulating, it is expected that the freighter market will recover in the short term and embrace new developing opportunity.

Global Freight Fleet Trend (2000-2019)



Source: Cirium

The global freighter aircraft fleet reached 2,014 aircraft in 2019, with an increase of 3.6% over 2018, including 747 narrow-body freighter aircraft, 665 medium size wide-body freighter aircraft and 602 large wide-body freighter aircraft. With increased tension of international trade, regional

political instability, Brexit and other factors, the global air cargo market was affected to a certain extent. The growth rate of the global freighter aircraft fleet showed the first negative growth since 2015.

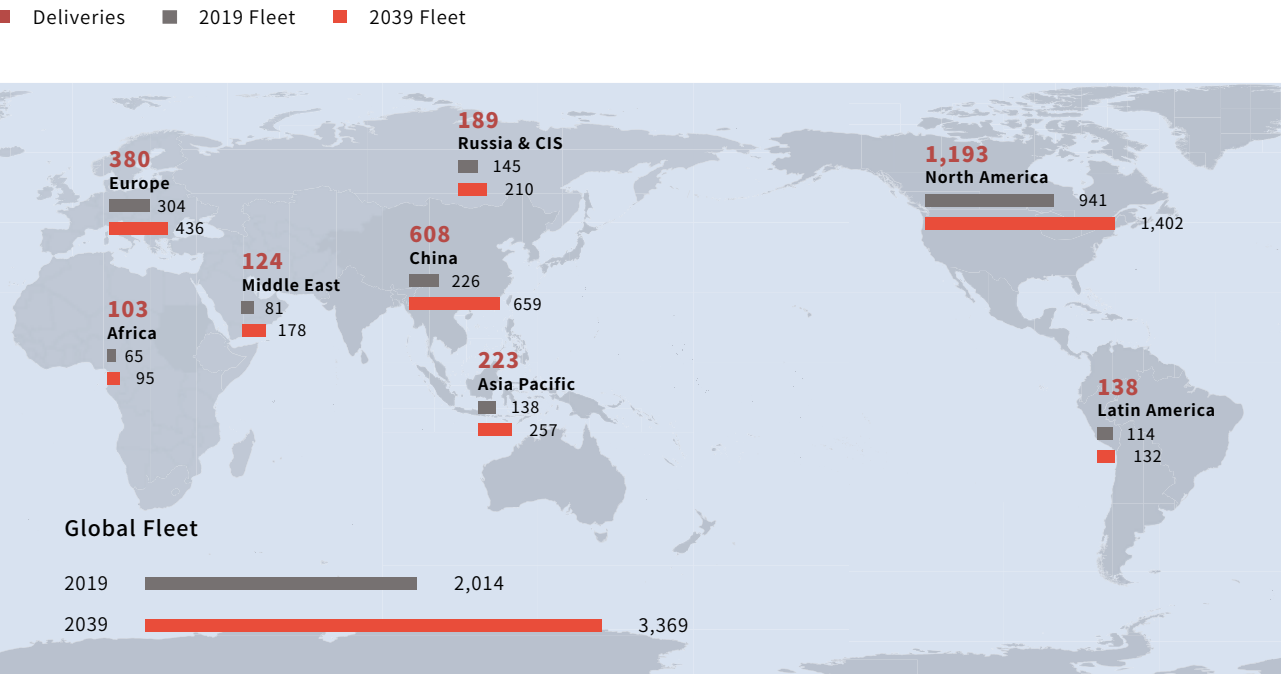
Freighter Fleet Forecast

It is estimated that for the next 20 years, the global FTK will maintain an annual growth rate of 2.6%. By 2039, the global cargo fleet will reach 3,369 aircraft, including 1,269 narrow-body freighter aircraft, 1,159 medium size wide-body freighter aircraft and 941 large wide-body freighter aircraft. Among the 966 brand new freighters deliveries, there will be 8 narrow-body freighter aircraft, 375 medium size wide-body freighter aircraft and 583 large wide-body freighter aircraft. In addition, 1,959 passenger aircraft will enter the market by cargo conversions (PTF), including 1,257 narrow-body freighter aircraft, 592 medium size wide-body freighter aircraft and 110 large wide-body freighter aircraft.

From COMAC's projection of the global cargo market on various region, North America owns a relative

superiority over other regions, its cargo fleet will reach 1,402 freighters. The whole Asia-Pacific (including China) is progressing steady and well; among this region, the compound growth rate of China's freighter aircraft fleet will reach 14.6% and China will surpass Europe to take second largest market with a cargo fleet of 659 freighters. The Middle East region has a strong growth potential, with a 10.9% growth rate over the next two decades. Europe, Africa and Russia & CIS's cargo fleet growth rate will remain at 7.3%. European fleet will reach 436 aircraft, ranking the third; Latin American fleet growth will have a slow growth rate at 5.8%.

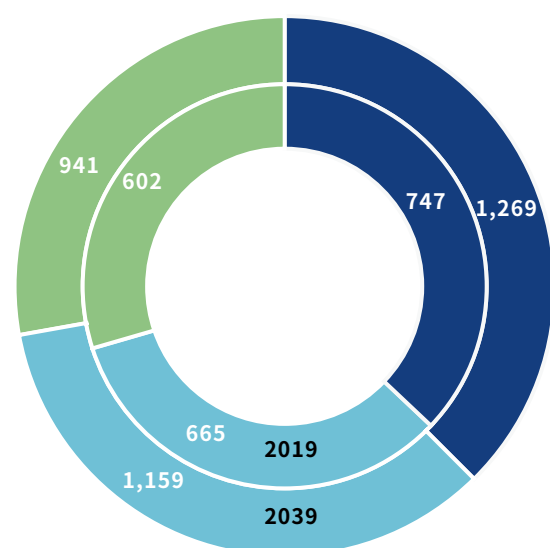
Global Freight Fleet Growth by Region



Source: COMAC, Cirium
China Including Hong Kong, Macau and Taiwan Asia-Pacific excludes China
Map sources: Ministry of Natural Resources of the people's Republic of China

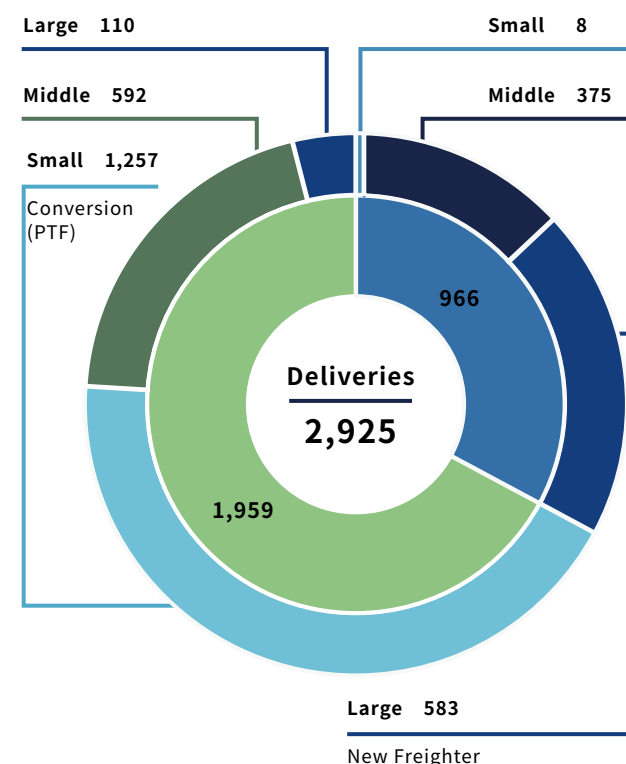
Global Freighter Fleet Growth

■ Small ■ Middle ■ Large



Source: COMAC, Cirium

Global Deliveries by Category & Size (2020-2039)

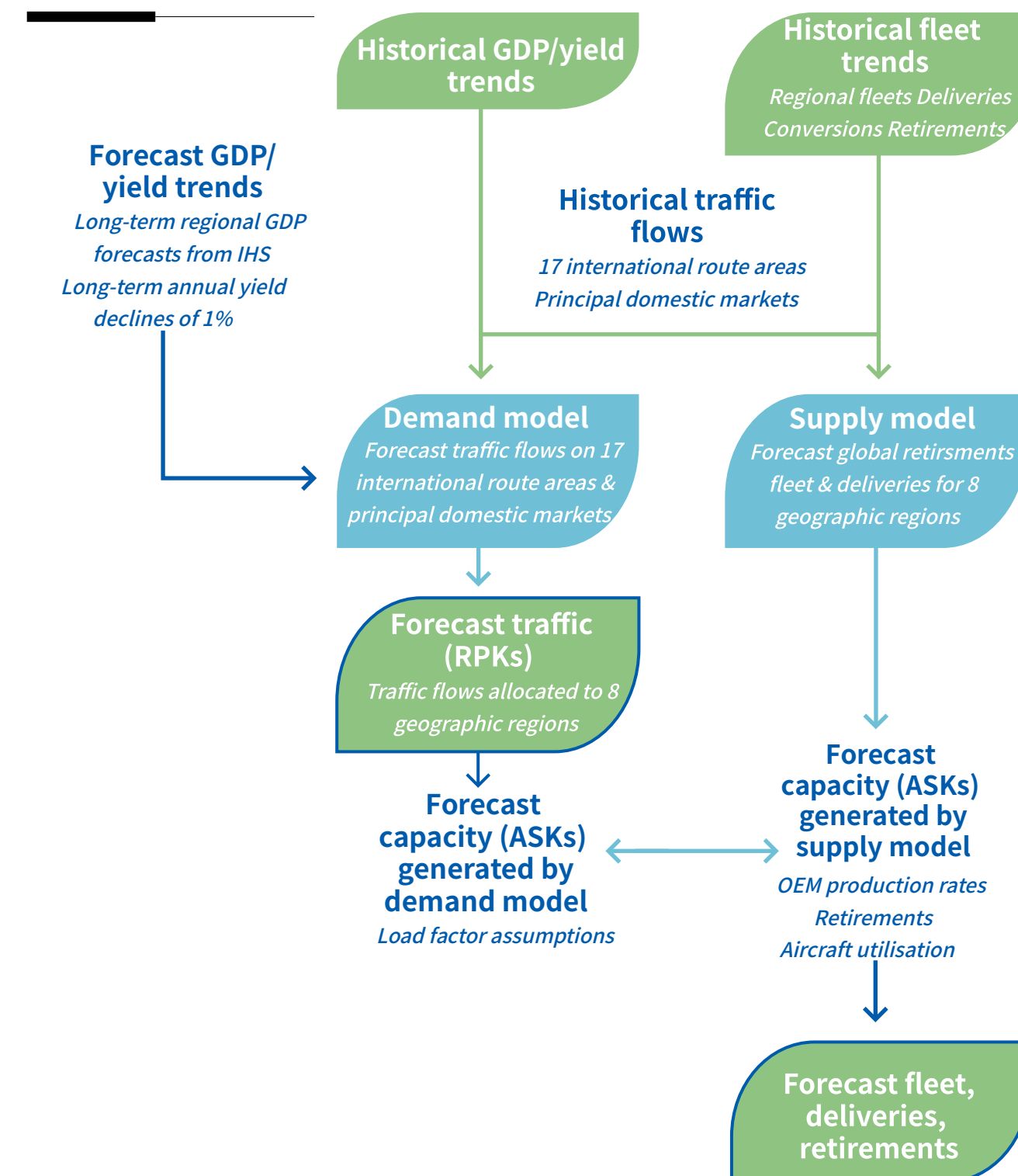


Source: COMAC



APPENDICIES & DATA TABLES

Methodology



Aircraft Size Category Definition

	Passenger Regional Jets	Passenger Single-Aisle Jets	Passenger Twin-Aisle Jets
50 seats	Embraer ERJ145 Bombardier CRJ100 / 200 Dornier 328Jet Embraer ERJ135/140 UAC Yak-40		
70 seats	Bombardier CRJ700 Embraer E170 Antonov An-148 Mitsubishi Spacejet M70 BAE System RJ70 BAE System 146-100 Fokker 70 Fokker F28-1000		
90 seats	COMAC ARJ21 Bombardier CRJ900 / 1000 Embraer E175 / 175-E2 Mitsubishi Spacejet M90 UAC Superjet 100 Antonov An-158 BAE System RJ85/RJ100 BAE System 146-200/300 Fokker F28-4000 / 100		
120 seats	Embraer E190 / 195 / 190-E2 / 195-E2 Airbus A318 / A319 / A319neo Airbus A220 Boeing 737-600 / 700 / MAX 7 Boeing 717 Boeing 737-200 / 300 / 500 McDonnell Douglas DC-9 / MD-87 Tupolev Tu-134 / UAC Yak- 42		
160 seats	Airbus A320 / A320neo Boeing 737-800 / MAX 8 / MAX 200 COMAC C919 UAC MC-21 Boeing 727-200 Boeing 737-400 McDonnell Douglas MD-80 / -90 Tupolev TU-154		
200 seats	Airbus A321 / A321neo Boeing 737-900ER / MAX 9 Boeing 737 MAX 10 Tupolev TU-204 Boeing 737-900 Boeing 757-200 / 300 Ilyushin Il-62		
250 seats	Airbus A330-200 / 300 / 800neo / 900neo Airbus A350XWB-800 / 900 Boeing 777-200ER / LR Boeing 787-8 / 9 / 10X Boeing 767-300ER		
350 seats	Airbus A350XWB-1000 Boeing 777-300ER Boeing 777-X Airbus A340-600 Boeing 777-300		
400 seats	Boeing 747-8 Airbus A380-800 Boeing 747-400 Boeing 747 Classics		

Note: Aircraft in Bold represents “In Production”

Freighter Size Category

Small Narrowbody Freighter	Medium Widebody Freighter	Large Widebody Freighter
Antonov An-72	Airbus A300	Airbus A380
Antonov An-74	Airbus A310	Antonov An-124
Antonov An-148	Airbus A330	Antonov An-225
Antonov An-178	Boeing 767	Beoing 747
BAE 146	Ilyushin Il-76	Boeing 777
Boeing 707	Lockheed L-1011	Ilyushin Il-96
Boeing 727		McDonnell Douglas DC-10/MD-11
Boeing 737		
Boeing 757		
Bombardier CRJ		
Caravelle		
Embraer ERJ 145		
Ilyushin Il-62		
McDonnell Douglas DC-8/-9		
McDonnell Douglas MD-80		
SukhoiSuperjet 100		
Tupolev TU-204		
Tupolev TU-144/145		
Yakovlev Yak-40		
Yakovlev Yak-42		

Global RPK

Traffic Forecast Summary

	2019	2024	2029	2034	2039	2020-2039 CAGR
International RPKs (billions)						
Between North America and Central America/Caribbean	116,457	99,564	145,131	175,384	216,519	3.1%
Between and within Central America and the Caribbean	8,481	5,989	10,752	13,414	16,894	3.5%
Between Bermuda, Canada, Mexico and the United States	127,862	104,214	138,640	156,958	176,931	1.6%
Between North America/ Central America/Caribbean and South America	148,501	114,529	183,315	223,658	280,419	3.2%
Local South America	30,441	23,200	45,032	60,226	84,865	5.3%
Local Europe	700,622	567,117	750,596	812,076	833,086	0.9%
Local Middle East	39,095	29,085	46,924	54,485	62,988	2.4%
Local Africa	42,319	36,922	51,674	60,140	79,015	3.2%
Between Europe and Middle East	218,548	168,498	265,190	313,616	353,837	2.4%
Between Europe/Middle East and Africa	317,279	280,266	446,529	568,905	723,043	4.2%
North Atlantic	729,307	597,009	800,765	891,386	885,534	1.0%
Mid-Atlantic	141,479	104,674	146,556	161,680	148,254	0.2%
South Atlantic	118,734	93,015	140,983	165,870	168,985	1.8%
Local Asia/Pacific	988,262	1,219,822	1,751,394	2,310,366	3,101,437	5.9%
Between Europe/Middle East/ Africa and Asia/Pacific	1,172,704	1,168,713	1,877,797	2,439,659	2,991,778	4.8%
North/Mid-Pacific	427,786	423,942	524,945	633,042	790,147	3.1%
South Pacific	78,397	76,719	96,760	115,975	141,378	3.0%
Total International	5,406,275	5,113,281	7,422,985	9,156,841	11,055,109	3.6%
Domestic RPKs (billions)						
Europe	141,574	144,670	179,223	205,942	195,358	1.6%
Japan	79,688	89,713	86,176	89,787	93,831	0.8%
China	790,114	1,118,866	1,461,382	1,948,774	2,568,401	6.1%
US	1,128,074	1,298,917	1,349,625	1,468,188	1,646,873	1.9%
Other	1,050,572	1,224,565	1,547,717	1,874,009	2,329,905	4.1%
Total Domestic	3,190,022	3,876,731	4,624,123	5,586,699	6,834,368	3.9%
World Total	8,596,296	8,990,012	12,047,108	14,743,540	17,889,476	3.73%