Number 4, Volume XIII, December 2018

REQUIRED FUTURE CAPACITY ANALYSIS

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Summary: This paper pursues the chosen airline network analysis (Air France) and it contains information about the main hub, current fleet operated, numbers of passengers carried over last five years and also the visualisation of the airline network for short and long-haul flights based on a leg distance; with the focus on the key (strategy) routes. The case study also focuses on the estimation of required future capacity – as the passenger number will grow, the load factor will be increasing, but in reality, it will just rarely reach more than 90 percent. The estimated number of new planes that will be required in a future by a chosen airline are also incorporated. The very last part is dedicated to recommendations for the airline marketing strategy in connection to their further cooperation with the biggest player on the airplane´s worldwide production on the market, Airbus company.

Key words: Traditional Carriers. Airbus. Air France. Capacity. Airline Network

INTRODUCTION

Liberalization of markets with air services created a more competitive environment with new players which are represented by low-cost airlines. Low-cost business model was becoming a more common and popular throughout the world and therefore, in many O-D markets with air services, two business models of airlines coexisted side-by-side: the model of traditional (full service network carrier) and the model of low-cost carrier, which competed for customers. Consequently, traditional and low-cost business models started to influence each other and new, hybrid business model has emerged (1). Current research of airline´s business models is relatively large and particular attributes of traditional airline´s business models were examined by Tomová and Ramajová, Fichert and Klophaus and many others (2,3).

Within our research we focused on the model of traditional airline - Air France, which is the French flag carrier headquartered in Paris, Charles De Gaulle and its network and required future capacity analysis. Air France is a subsidiary of the Air France – KLM Group and a founding member of the SkyTeam global airline alliance (2). Between April 2001 and March 2002, the airline carried 43.3 million passengers and had a total revenue of €12.53bn. In November 2004, Air France ranked as the largest European airline with 25.5% total market share, and was the largest airline in the world in terms of operating revenue. In 2015 more than 89 million passengers were carried that represents +2.0 % change in comparison with the previous year when 77.450 million passengers were carried by Air France. As of 2016, 93.4 million passengers were carried to 328 destinations in 118 countries (4).

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Tab. 1 - Air France KLM – Basic Statistic of years 2014- 2016

AIR FRANCE, KLM – KEY FIGURES					
Number of passengers carried (mil.)		**Number of destinations**		**Cargo business (thousands of tons)**	
2014	77.450	**2014**	316	**2014**	1,101
2015	89.800	**2015**	319	**2015**	1,206
2016	93.400	**2016**	328	**2016**	1,130

Source: Own table based on (6)

According to Table 1, a strong passenger network performance with relatively resilient unit revenues for 2016 is obvious. Strict capacity discipline (available seat kilometre up by 0.7%) and active yield management limited the downward pressure on unit revenue, particular on premium traffic, whose long-haul unit revenue declined by 1.4%. Ancillary revenues were up by 12% amounting to 515 million euros.

On the long-haul network, capacity measured in available seat kilometres was up 0.6%, while unit revenue was down 4.7% excluding currency impact. In addition to the soft local flows to France as a result of terrorism, the capacity-demand imbalances observed on different parts of the network caused additional downward pressure on unit revenues. Nevertheless, the estimated long-haul operating result was up 250 million euros to 1,320 million euros.

1. CURRENT FLEET OPERATED BY AIR FRANCE

As of 18 August 2017, the Air France fleet consisted of 225 aircraft in service, with the following types (passenger fleet): Airbus A 318-100, A 319-100, A 320-200, A 321-100, A 321-200, A 330-200, A 340-300, A 350-900, A 380-800; Boeing 777-200 ER, Boeing 777-300 ER, Boeing 787-9 and Boeing 777F (cargo fleet) (4,5).

The mutual cooperation between Air France and Airbus is obvious and it emerges from the same or similar values that the both companies share – starting from the strong brand identity, through the fact, that both companies are well-established on the market, are well known throughout the world and represent the epitome of French travel in order to provide the high-quality services for their customers.

Tab. 2 - Air France Passenger and Cargo Fleet

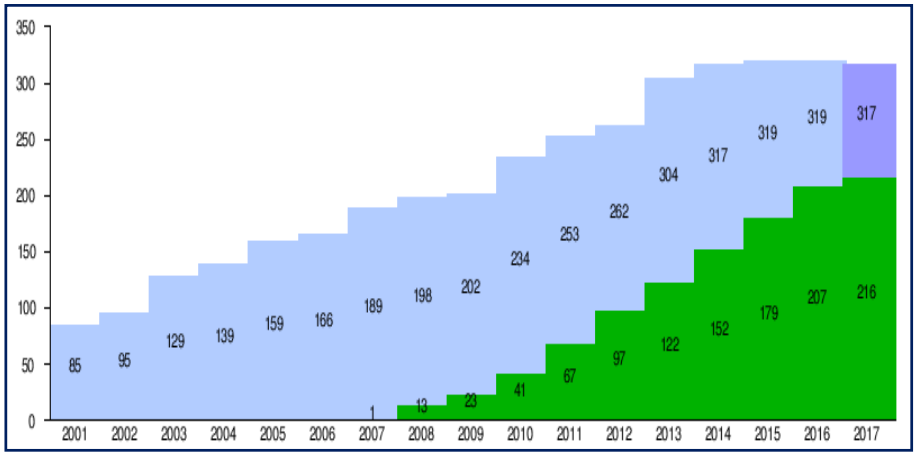
AIR FRANCE - PASSENGER FLEET (August, 2017)			
Aircraft	**In service**	**Orders**	**Note**
A318-100	18	—	Largest operator.
A319-100	38	—	2 leased to Air Côte d'Ivoire.
A320-200	43	—	2 operated for Transavia France.
A321-100	5	—	Former Air Inter fleet.
A321-200	15	—	
A330-200	15	—	
A340-300	9	—	To be replaced by Airbus A350-900.
A350-900	—	21	Entering service in 2019.
A380-800	10	—	
Boeing 777-200 ER	25	—	
Boeing 777-300 ER	43	—	Launch customer.
Boeing 787-9	2	15	
AIR FRANCE – CARGO FLEET (August, 2017)			
Boeing 777F	2	—	Launch customer.
TOTAL	**225**	**36**	

Source:(6)

1.1 Air France and Airbus cooperation

Airbus – an international pioneer in the aerospace industry, is also the leader in designing, manufacturing and delivering aerospace products, services and solutions to customers on a global scale. The company aims for a better-connected, safer and more prosperous world. A commercial aircraft manufacturer, with Space and Defence as well as Helicopters Divisions, Airbus is the largest aeronautics and space company in Europe and a **worldwide leader** (7).

From the beginning of the A380, Air France worked with Airbus to create an airplane that would met the passengers´ expectations. Now, the passengers will experience a tranquil and serene environment on-board, with the pure comfort of extra space. Air France connects its passengers to the world on such plane with its international long-haul A380 flights; therefore, the passengers can travel to Abidjan, Hong Kong, Johannesburg, Los Angeles, Mexico City, Miami, New York, Paris, San Francisco, Shanghai and Washington on the largest commercial aircraft of all time. The A380 has been infused with the Air France "touch." The A380-800 has the quietest and most silent cabin flying today. Unique features such as the six on-board bars – one for La Première, two for Business Class and three for Economy – enhance the friendly atmosphere on-board in all classes of service (3,7).



Source: (7,8)

Fig. 1 - A 380 cumulative orders and deliveries

1.2 Airbus A380 destinations and hubs

Paris-Charles De Gaulle Airport is the home base for Air France's A380s and it is the most powerful hub in Europe in terms of connections between long-haul and medium-range flights. Air France – a SkyTeam alliance member – is offering a new approach to stress-free travel at the airport. Charles De Gaulle's new Satellite 4 is dedicated to long-haul flights, with enough room for six A380s at one time. It also features a large lounge, along with opportunities to relax and unwind, sample fine French cuisine, work and shop – all with personalized service.

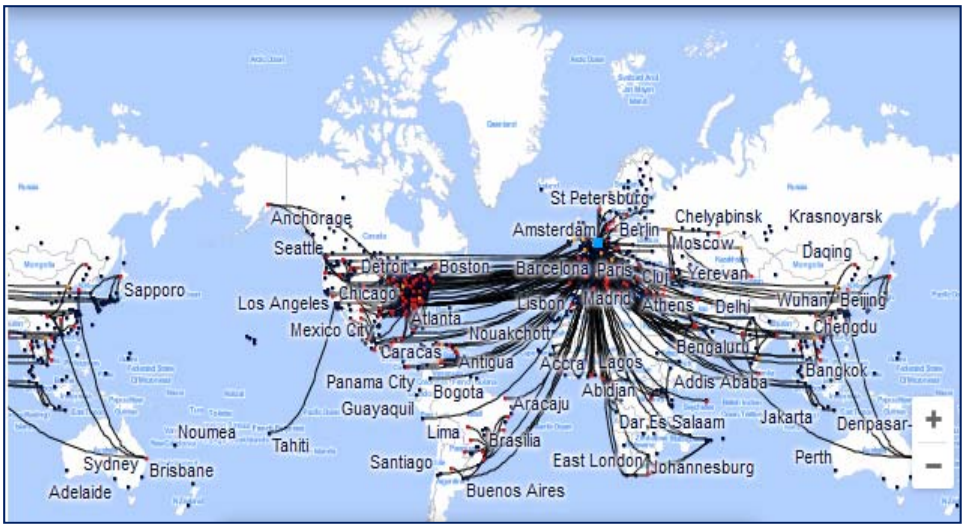
As for the hub information, six French airports are providing the hub airport function:

- **Charles de Gaulle Airport:** Air France's intercontinental and biggest hub, with 335 daily departures. It is also a hub for Air France's subsidiary HOP!.
- **Orly Airport:** Air France's second biggest hub serving 40 destinations around the world, it is also a hub for Air France's subsidiary HOP!. Long-haul flights are mainly operated to destinations in French overseas departments.
- **Lyon-Saint Exupéry Airport:** Air France's third biggest hub serving 37 destinations in France and Europe, also a hub for Air France's subsidiary HOP!.
- **Marseille Provence Airport:** This is Air France's newest hub as part of its offensive in the French regions. It serves 30 destinations in France, Europe and Africa.
- **Nice Côte d'Azur Airport:** Air France flies to four destinations from Nice.
- **Toulouse-Blagnac Airport:** Air France flies to 14 destinations from Toulouse (3, 7).

1.3 Air France – routes networks and destinations

Air France deploys a vast and effective global network, offering frequent flights to a wide variety of destinations. In metropolitan France, Air France flights serve 25 cities. Across all continents, Air France operates several flights every week, even every day, to numerous destinations. That gives its passengers freedom to travel. Air France flied to 36 domestic destinations and 168 international destinations in 93 countries (as of June 2017) across Africa, America, Asia, Europe and Oceania. The full list of destinations includes Air France Cargo

services and those destinations served for Air France by its subsidiaries and franchisees Air Corsica, Airlinair, CityJet, Chalair and HOP! (9).



Source: (10)

Fig. 2 - Air France – Route network structure.

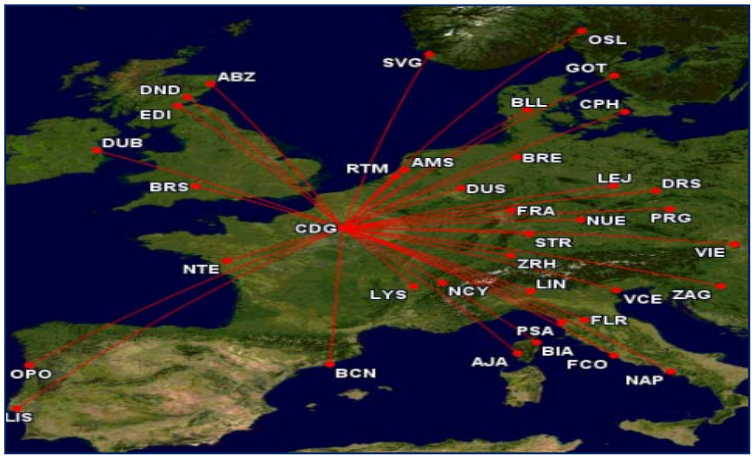
The short-haul network includes flights to 1500 km, which are:

- flights within metropolitan France,
- flights within west part of Europe and
- flights within the Caribbean (Cayenne, Fort-de-France, Pointe-a-Pitre, Port-au-Prince, Miami, Santo Domingo).

The long-haul network includes most intercontinental flights, notably those:

- between metropolitan France and the Caribbean or the Indian Ocean,
- between metropolitan France and the French overseas departments and territories and
- between Europe and Asia, Oceania, Africa (not including North Africa), North or South America, or the Middle East (not including Israel).

International long-haul flights typically feature three or four classes of service. For short- and medium-haul flights within Europe, the airline uses a three-cabin configuration (5, 9). The airline network visualization for the most frequent short-haul and long-haul flights based on leg distance is illustrated on Figure 3 and Figure 4.



Source: authors based on (6)

Fig. 3 - Air France – Visualisation of short-haul network structure.

Source: authors based on (6)

Fig. 4 - Air France – Visualisation of long-haul network structure.

2. ESTIMATION OF REQUIRED FUTURE CAPACITY

This part of paper pursues the determination of what the trunk routes of Air France are – illustrated through graphs where the routes by total monthly seats offered, are sorted. It also provides the reader with information about the 2017-2018 winter Schedule increase in capacity on airline key routes, with required capacity estimation in 2020 on the routes as well as with the estimation of number of new planes required in future by airline.

According to Annual report of Air France - 2017, for the 2017-2018 winter season (from 29 October 2017 to 24 March 2018), Air France-KLM was continuing its growth strategy by offering 52 new services (compared with the 2016-17 winter season). The group was increasing capacity by 5.5 % compared to the previous winter season (capacity measured in available seat kilometers compared with the 2016-17 winter schedule). Growth was driven by the long-haul passenger network (+ 4.7 %), the medium- and short-haul passenger network (+ 5.5 %) and

Transavia's low-cost operations (+14.6%). This was obvious through Air France-KLM pasengers´ network activity, as Table 3 shows.

Table 3 - Air France KLM – Passengers Network Activity by Network

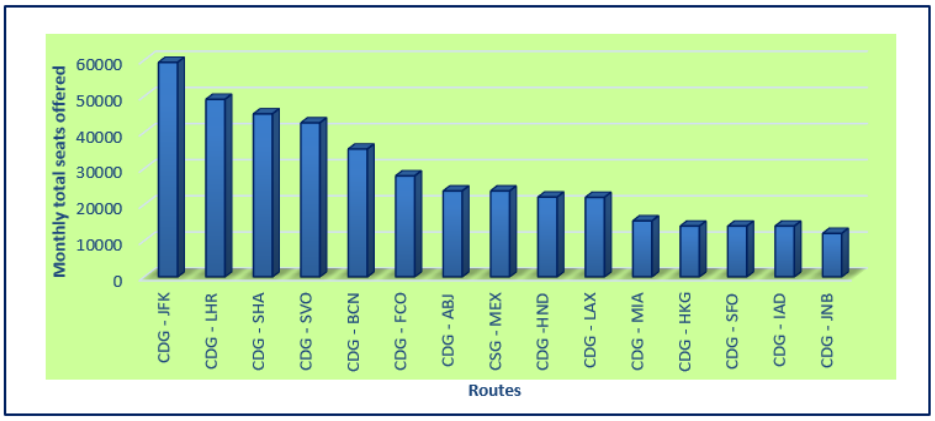
AIR FRANCE, KLM – PASSENGERS NETWORK ACTIVITY						
First Half to June 30	**Capacity in ASK (mil)**		**Load Factor (%)**		**Number of pax (mil)**	
	2017	**2016**	**2017**	**2016**	**2017**	**2016**
Long-haul	110,868	107,756	86.98	85.7	12,872	12,324
North America	30,493	28,997	87.8	86.8	3,747	3,525
Latin America	16,324	16,670	89.4	87.1	1,524	1,513
Asia/Pacific	29,676	29,051	89.4	86.1	3,027	2,873
Africa/Middle East	18,777	18,083	80.8	80.5	2,705	2,619
Carribean/Indian Ocean	15,598	14,955	87.5	87.7	1,870	1,794
Short and Medium-haul	27,934	26,887	81.1	80.1	27,462	26,300
TOTAL	**138,802**	**134,643**	**86.0**	**84.6**	**40,333**	**38,624**

Source: (10, 11)

As far as the estimation of future required capacity is concerned, we focused on determining the trunk routes of the chosen airline illustrated through Figure 5 and Figure 6, where routes were sorted by total monthly seats offered from the highest to lowest. In addition, this part of paper contains the required future capacity calculation for 2020 on the routes as well as the estimation of number of new planes required in future by Air France.

2.1. Route structure network analysis

According to Figure 5, the majority of the trunk routes can be considered as routes from France to America, since the highest value was reached by long-haul route from Paris to New York with a more than 59,000 seats offered per month for 2017. The second one is: route Paris – London, which represents short-haul flights, with more than 49,000 seats offered per month. On the other hand, on the route Paris – Johannesburg, only more than 12,000 seats were offered per month – in comparison with the route Paris – New York, the difference is 47,000 seats per month. The lowest numbers were also reached on the following routes: CDG – HKG, CDG – SFO and CDG – IAD.



Source: (12)

Fig. 5 - Air France monthly total seats offered on their route network structure in 2017

2.2. Required future capacity calculation

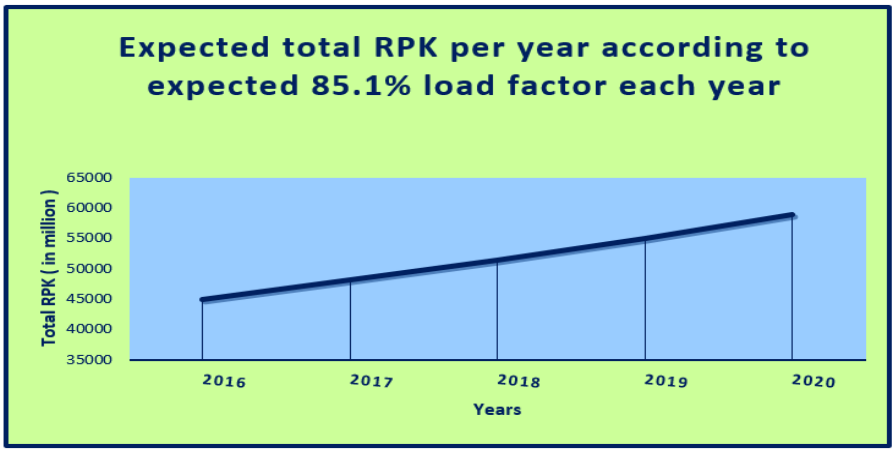
Calculation of required future capacity plays an important role for all companies throughout the world – as the key questions like „How many aircraft and how many types of aircraft do the carriers have in the fleet “, should be answered. Air France has in its disposal many types of aircraft, different for short-haul and for long-haul route. Within our analysis, we calculated with 7 % annual growth rate on long-haul routes from 2016 to 2020, as illustrated in Graph 3 and Graph 4.

Source: (12)

Fig. 6 - Expected total ASK growth per year according to expected 7 % growth per year

According to Figure 6, in 2016, there were more than 52,786 million available seat kilometers, but in the 2020 considering the 7 percent annual growth, we can expect the value more than 69,191 million. As far as the revenue passenger kilometres (RPK) are concerned, our calculations were based on the expected value of load factor equalled to 85.1 percent each year, as this number represents the last value of load factor reached in financial year 2016. As the Figure 7 shows, the revenue passenger kilometres in 2016 were more the 44,920 million and the value of RPKs will increase by 14,000 milion in the year 2020 – therefore, the value more

than 58,882 million of RPKs could be expected. These figures indicate that Air France will most likely need to increase their fleet capacity in the next 4 years.



Source: (12)

Fig. 7 - Expected total RPKs per year according ro expected 85,1 % load factor each year

Our calculation of Air France´s required future capacity was based on the following facts: we expected 7 percent annual growth until 2020 for Air France and also the that the company will be able to reach 85.1 % load factor in average each year. Moreover, our calculation was created for the Airbus A380-800 with the standard four classes cabin layout – 516 seats on-board the aircraft.

Table 4: Required future capacity for Air France from 2016 to 2020 (Note: TSK stands for Total Seats Offered, ASK means Available Seat Kilometres and RPK stands for Revenue Passenger Kilometres)

AIR FRANCE – REQUIRED FUTURE CAPACITY			
	TSO	**ASK**	**RPK**
2016	5,048,761.04	52,786,104,197.09	44,920,974,671.73
2020	6,617,895.83	69,191,814,764.99	58,882,234,365.01
Difference per year	1,569,134.79	-	1,335,333.70
Difference per day	4,299	-	3,658.45
A380 daily flights	8.33	-	-

Source: own (12)

As stated in Table 4, Air France reached 52,786 million of available seat kilometres in 2016, which represents approximately 5.05 million of total seats offered per year; but in 2020, as we expect, Air France would be able to reach approximately 69,192 million of available seat kilometres, which represents approximately 6.62 million of seat capacity offered with the 1.57 million differences per year. As aforementioned, our calculation was created for the Airbus

A380-800 with the standard cabin layout of 516 seats: which shows that Air France will be able to offer approximately 9 new flights each day operated by Airbus A380-800 in 2020.

The final part of this analysis was dedicated to number of new planes estimation that will be required in 2020 by Air France - as we calculated and expected, Air France will need approximately 8 new flights each day, operated by Airbus A380-800 with 516 seats. Taking into account all aforementioned facts as well as the Air France´s route network structure, we could recommend the purchase of five new Airbus A380-800 – provided that new aircraft are used for "shorter" long-haul flights and also for long-haul flights, it could possibly bring eight new flights: For example, two A380 aircaft will be used for a long-haul flight (with frequency of one flight per day) and another three A380s for short-haul flights with average length up to 2 hours, then we can say that assuming the load factor value between 86 – 90 percent, the capacity of 45 new A380-800 could potentially cover increasing demand in future.

CONCLUSIONS AND KEY FINDINGS

According to our findings concerning tha Air France´s current market position, we are able to say that Air France established itself on the market and built a strong brand identity; furthermore, the company strives for innovations and positive passengers´s experiences and that is why it has made a significant investment in many areas: Air France has completely redesigned its cabins on its long-haul flights to deliver unrivalled comfort in the La Première, Business, Premium Economy and Economy seats, there's also an enhanced range of in-flight and ground services for passengers.

As one of the marketing messages for Air France, we would recommend to continue in the further cooperation with Airbus into the future. To support our statement, we can use the results of our calculations - by using Airbus A380, the airline will increase capacity, load factor and revenues; furthermore, Airbus A380 will definitely bring the company new passengers, as the A380 cabin is the quietest and most spacious in the sky and A380 service offerings range from a comfortable 11-abreast economy section with 18-inch wide seats, up to a private three-room suite for a luxurious first-class experience and it is no wonder that the superior comfort of this modern icon makes the A380 the preferred passenger choice – resulting in higher market share, load factors and revenues for airlines, and Air France as well. Airbus' A380 also delivers superior environmental protection, resulting in 50 per cent less CO_2 emissions per passenger than its nearest competitor. Further demonstrating the A380's reputation as a good neighbour and sustainable solution is the jetliner's low noise emissions. In many cases, the larger wing area of the A380 enables it to land significantly slower, which generates half the noise of competing large aircraft.

As global air traffic continues to grow, the spacious A380 is the optimal solution for efficiently meeting increasing passenger demand. The A380 – which typically seats more than 500 travellers – provides immediate congestion relief for some of the world's busiest airports by offering unrivalled capability to carry 60 per cent more passengers at the lowest cost on the market. Airlines and airports benefit from this increased capacity – as extra passengers can be served at key hubs during high-value peak times.

If Air France wants to benefit from the increased capacity, load factor, revenues and the huge number of satisfied customers as well, the Airbus A380´s purchase will definitely be the best option.

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