Title: Competition In the Commercial Jet Industry

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Author(s): P. Lavaud

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Abstract: This paper describes the specific characteristics of the commercial jet industry and the way in which the competitors do business. The paper discusses the political factor, the reasons of its importance and the relationship between Europe, United States and China in this industry. Also, the strategies used by the two competitors: Boeing and Airbus, in order to be successful in the future are suggested in this work.

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P Lavaud

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Philippe Lavaud

COMPETITION IN THE COMMERCIAL JET INDUSTRY

Instructor: Dr. Milosevic

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I Description of the commercial jet transport industry:

World aircraft production is shared between 2 main competitors, Boeing and Airbus. This multi billion dollar industry is facing a boom in its growth over the next decade. Indeed, these two competitors are fighting within a market which plans to increase from 11,500 airplanes at the end of 1996 to nearly 17000 airplanes in 2006 (Boeing source). Which means that between 1996 and 2006, 5,800 planes will be produced [6].

Intense competition, low number of participants, high return, high risks, political and strategic interests requires this industry to conduct business and develop strategies of success in a specific way.

I-1 Development of a new aircraft and market problems

Developing a new plane is often a bet on the future of the company. When Boeing developed the 747 in 1969-1971, the company almost went bankrupt. Nowadays, the 747 is considered as a commercial success and gives Boeing a monopoly on this segment of the industry. Airbus is now facing the same challenge with the A3XX project.

If a company wants to develop a new aircraft, it has to strategically plan the next 20 years. Five years are required for planning and development, and 15 years or more will be the production period of the commercial jet [1].

Therefore, market-forecasting abilities hold a critical place in the industry strategic planning.

The capacity to raise funds is also a main factor. Indeed, a company will have to be able to wait 10 years or more before recovering its investment. Without strong financial support and long-range planning capacity, the highly competitive industry makes the percentage of market share difficult to maintain. The following is an example of market share changes for the major players in the 1980s.

In 1980 Airbus had 7% of market share, Boeing 77% and Douglas 8%.

In 1989 Airbus had 29%, Boeing 50% and Douglas 12% [2].

Now, Douglas is merging with Boeing and Airbus remains the only competitor to Boeing.

for an airline company. Indeed, to have only one manufacturer saves money on other expenses accounts such as flight crew training, inventory of spare parts, spare engines, maintenance and related expenses.

Meanwhile, the aerospace industry is very cyclical and other factors besides speed, fuel economy, range, and aircraft reliability are important. Financing possibilities often influence the choice between competing aircraft.

The main customers are often foreign airlines. In many countries like Europe or China, Government owned airlines play an important role in choosing the aircraft they buy and political pressures are often part of deals.

Because many factors have to be taken into consideration, airframe manufacturers work within their customers decision calculus to design and manufacture aircraft.

They rely heavily on forecast of expected routes, growth, range and passenger density.

I-3 Two big competitors

Nowadays, Only two companies remain on the commercial jet industry.

Boeing is merging with McDonnell Douglas and is becoming the world giant of the civil and military aerospace industry. Boeing, benefits from research money and orders from NASA and US army programs.

Airbus, the new competitor since the beginning of the seventies, Airbus receives the subsidies of four European countries (France, Germany, United Kingdoms and Spain).

These two companies share the commercial airplane market with Boeing having two-thirds of the market share and Airbus one-third.

Boeing headquartered in Seattle, is the industry leader. Its first product, the 707 was successful and was developed at the end of the fifties. Boeing has 1996 revenues equal to $ 22.7 billion, 150,981 employees [appendix 1] and is merging with McDonnell Douglas. Boeing has the objective to produce up to 90% of the world operating commercial airplanes [9].

Airbus Industrie GIE, headquartered in Blagnac, France, is a consortium of European aircraft

II The political game

The Aerospace market is under the influence of political considerations. Airbus was initiated by Europe in order to create a European competitor to the American companies Boeing and McDonnell Douglas. It was a political decision. Funding given to Airbus by European governments and money given to Boeing for military programs are subject to many polemics. Moreover, China also has ambitious plans to become a manufacturer in the aerospace industry and has a dual role of major customer and potential competitor.

II-1 Reasons for political interventions

Countries are fighting for their national champions in civil aircraft for many reasons. The civil aviation industry is a source of many well-paid jobs and important in term of export prowess [5]. Moreover, this industry is heavily linked to the defense industry. This is a highly technological industry where technical linkages and technology spillover are at stake and leverage the competitiveness for other economic sectors. It also opens up opportunities in high technology markets. For example, advanced material, computer aid design and manufacturing equipment have one of the largest customers in the civilian aircraft industry. Also it helps suppliers to achieve economies of scale and scope. Moreover, upstream suppliers have been trained in the use of new products, process and management technology in use downstream. It gives them an advantage over competitors in their own market.

For civilian aircraft, the benefits from these linkages do not diffuse beyond borders. Boeing and Airbus buy almost exclusively from national suppliers (4% of Boeing supplier base is offshore). Only 10 to 14% of the value of an airplane (excluding engines) is a foreign content. Ownership, research and development and most of the high added value work remain home.

But more than the technological performance and the employment perspective, the aerospace industry plays a more strategic role for the governments which allow them to have a diplomatic and political influence on other countries. There is competition between Americans and Europeans in the other countries in order to sell rockets or jet fighters and the result of a deal

II-3 China

China is widely thought to be the major growth market for large civilian aircraft in the decades to come. It also has the ambitious plan to become a manufacturer of large transports.
Chinese strategy is to build Chinese aerospace industry. In order to do so, they use the same strategies as in the automobile and electronics industries: subsidies and trade barrier. The goal in each of these sectors is to establish a globally competitive Chinese industry.
In civilian aerospace, the Chinese have been particularly frank about their desire to build a "people's airplane" and efforts have been underway for years to build a 100-seat aircraft with a foreign partner.
Each of the major companies, Boeing, McDonnell Douglas and Airbus, has transferred substantial production and technology to China. Beijing has been adept at playing the companies against each other to extract increasingly sophisticated production technology [12].

Airbus industry has been selected as China's partner in that country's development of a new 100-seat airplane.As a result, Airbus has established a new subsidiary company, Airbus Industry of Asia (AIA) to partner with China and Singapore in the development of the new AE316/AE317 narrow body passenger aircraft. Aviation industry of China (AVIC) and AIA have signed a framework agreement covering the joint development of the AE31X family of regional jet. The AE31X family will be developed by a new joint venture company, 46% owned by AVIC, 39 % by AIA, with Singapore Technologies holding the remaining 15% [17].
In addition to being a global industrial alliance, the AE31X program has deep political implication because it could help establish a strong business relationship between China and European nations [18].

The stepped-up battle between the two rivals over Chinese customers is complicated by high level US and French diplomatic efforts to gain an advantage for their respective sides [14].
The May 1997 visit of President Jacques Chirac resulted with the conclusion of a 71 Airbus deal and the agreement on the AE31X program. China's president, Italian transport minister and president Jacques Chirac signed the agreement. At the same time, Boeing which has dominated past deliveries to China, has seen its Chinese orders decreasing significantly during the past two

terminate its production by the end of the century. The cost of an A300-600 is estimated at $ 70 million. List price is $86 million.

Airbus Industrie A310

The A310 is a medium range, medium capacity widebody transport derived from the A300. Two Pratt & Whitney or General Electric large turbofans power it. There are two basic versions of the A310; the -200 and the extended range -300A. Convertible and freighter versions are available as well. The A310 competes with the Boeing 767. Over 240 A310s have been delivered. An A 310 -300 is estimated to cost $60-64 million. List price is $ 70 million.

Airbus Industrie A319/A320/A321

The A320 and A 321 are twin engine, narrow-body jetliners designed for short-to-medium -range airline operation. The A320 which typically seats 150 passengers, compete against the Boeing 737 and McDonnell Douglas MD-80. Its stretched version, the 186 seat A321, fills the gap between the A320 and 218-seat A310 widebody twin and compete with Boeing's 757. There is also a shortened 124-seat version, the A319. Over 600 A319/320/321s have been delivered. The A320-200 lists for $47 million, but really costs about $35 to $41 million. The A321 cost about $480 million to develop and the A321-100 list price is about $54 million. The A319 cost about $275 million to develop. It is listed for $39 million.

Airbus Industrie A330

The A330 is a twin-engine medium range large capacity widebody transport. Airbus has received over 100 orders for the A330, which entered airline service in late 1993. The current production model is the A330-300. An A330-300 is listed for $117-126 million. The -200 list price is $106-113 million.

III-2 Boeing

With 60% of the world's civilian aircraft fleet and an aircraft for each market segment, Boeing has developed a fleet of very competitive aircraft since 1957.

Boeing 737

The Boeing 737 is a twin engine short to medium-range commercial jetliner built at Boeing's Renton, Washinton plant. The 737 competes in several markets. The 108-passengers 737-500 competes head-to-head with other 100/120-seaters such as the A319. The larger version of the 737, the 128-passenger Series 300 and the 146-passenger Series 400, compete with the MD-80/90 and A320/321.

Boeing is working on a Third Generation of 737s, known as -600,-700,-800. These correspond to the -500, -400,-300 respectively, but are larger. The -700 will seat up to 149, and the -800 will seat up to 189.

A 737-300 lists $32.5 million. The -400 sells for $34 million, and the -500 for $29 million. The 737-600 lists for $32 million, the -700 for $35 million.

Boeing 747

The Boeing 747 "jumbo jet" is the world's largest airliner and was the first wide-body commercial transport. The long-range jetliner, which can seat over 500 passengers, has no direct competitor. It is powered by four of any of the major big fan families. The first 747 was delivered in 1969. The current production model is the 747-400, which is distinguished by winglets. More than 1,000 747s have been delivered. In January 1997, Boeing announced that it was shelving its 747 growth plans. The company claimed the market's size did not justify the $7 billion development cost. However, Boeing is keeping a small team of employees dedicated to this type of aircraft.

The list price of a 747-400 between $ 148 million to $ 162.5 million.

IV New organization and new methods of doing business

Business arrangement between airlines manufacturers and majors airlines customers are expected to shift dramatically in future years based on their collective needs to reduce cost and to improve overall efficiency of the supplier-operator relationship [9].

New agreements in the future could appear and many have already appeared. Airframe manufacturers are taking on the responsibility of maintaining, modifying and upgrading aircraft they sell.

Some of today's more practical issues are:

Reducing delivery lead times, making aircraft production rates more flexible and changing the manufacture of commercial transports to a more standardized process. Beyond these measures, the aircraft makers are working on organizational change, international partnership, extension and diversification of their product lines.

IV-1 Boeing

Boeing is working with Flight Safety International to provide airline customers with flight and ground crew training available worldwide. Indeed, Boeing is also more involved in training airline personnel or modifying and maintaining its aircraft after they have been delivered and placed in operation.

Boeing plans to continue making process and structural changes required to achieve more flexible production rates and reduce delivery lead times. The effort has resulted in cutting the typical 1.5 year lead time from the early 1990s to the current 10 months for standard body models and 10.5 months on wide body aircraft [9]. According to company officials, that capability means that 737 customers can make a model substitution 10 months prior to schedule delivery if the configuration of the aircraft is defined and production slot is open. The flexibility to make "last minute" changes including wide body to narrow body and vice versa is one of Boeing's main trump cards.

In addition the European consortium is committed to increasing to a combined production rate of its seven aircraft products range to approximately 220 up from125 in 1996.
An increased deliveries will boost annual sales to an estimated $20 billion per year compared to about $9 billion last year.
In the early 2000s, Airbus extended product range also could include the European Future Large Aircraft (FLA) military transport. Airbus industrie's Hong-Kong headquarter is expected to manage Europe 39% share in the AE316/317 twinjet being developed by Aviation Industry of China and Singapore Aerospace Technologies. The AE316/317 will compete against the Boeing 737-800 and McDonnell Douglas MD-95. An increased range, increased capacity version of the A340 (A340-500/600) are also planned to replace aging 747-100s DC10s and L-1011s and to compete against the 747-400 [4].

Airbus is also envisioning additional partnership agreements and strategic alliances.
Lockheed Martin is discussing potential cooperation with Airbus industrie partners on several specific programs, including military, transports and the proposed A340-600 and A3XX [7]. If successful, these ties could possibly blossom into a larger strategic alliance. But that would only be possible after the Airbus consortium reorganizes itself as a pure commercial entity.
The possible area of cooperation involves a new strategic transport to replace the C141. Lockheed Martin has been studying a joint program with 2 members of the Airbus consortium Aerospatiale and Daimler Benz Aerospace. This would compete with the McDonnell Douglas C17s. But there has been resistance at Airbus industries due to its involvement in the Future Large Aircraft (FLA) program to develop a transport to meet European requirements.

Lockheed Martin is also seeking opportunities with Airbus Industrie on the civil side. The US company is particularly interested in getting nacelle and thrust-reverser work on the A340-500/600 program. This would eventually lead to involvement in the A3XX.
A Pacific Rim partner and a US partner such as Lockheed Martin would give a global dimension to the A3XX program to help its marketing effort in North America.
Airbus is planning to assign 40% of the A3XX program to new risk sharing partners who would become "associated members of the consortium".
Five European manufacturers or industrial group are already in line for a share in funding

Conclusion

The strategies developed by the two competitors in the commercial jet market have to take into consideration many factors. The industry is very specific and very risky and as a result only 2 competitors are left in the market. But further than just an economical game, the competition has a lot of political issues.

The strategy of the competition between Boeing and Airbus are different in US and in Europe and each has its weaknesses. An American private company requires return on equity and accounts receivable, which may slow the long-term investment and the research. On the other hand, Europe suffers from political division, from the absence of a single currency, and from the fact that Airbus is not a "real" society but a groupment of economic interests.

With the merger between Boeing and McDonnell Douglas the creating a world aerospace giant controlling 70% of the market share and 84% of the existing planes, one can assume that the game will be over very soon and that Airbus will not be able to compete. But more than the possible external alliances or the change of the structure of the consortium, Airbus' best hope is the need to have a competitor to Boeing in order to avoid a total world monopoly.

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Appendix 2

Airbus deliveries:

	1973	1974	1975	1976	1977	1978	1979	1980	1981
A300	2	5	9	12	18	13	29	37	39
A310	-	-	-	-	-	-	-	-	-
A319									
A320									
A321									
A330									
A340									

	1982	1983	1984	1985	1986	1987	1988	1989	1990
A300	46	26	19	14	10	10	16	19	16
A310	-	17	29	26	19	21	26	24	18
A319									
A320							16	58	58
A321									
A330									
A340									

	1991	1992	1993	1994	1995	1996*	Total
A300	24	22	22	23	17		448
A310	20	24	22	2	2		250
A319						9	9
A320	119	111	71	48	34	30	545
A321				16	22	15	53
A330			1	9	30	10	50
A340			22	25	19	28	94

*Through September 30

Appendix 3