

Mission-oriented R&I policies: In-depth case studies

# **Case Study Report**

## **From Concorde to Airbus**

Alberto Domini, Julien Chicot  
February 2018

## **Case Study Report: From Concorde to Airbus**

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EUROPEAN COMMISSION

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# **Case Study Report**

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Alberto Domini

Julien Chicot



A Study coordinated by the Joint Institute for Innovation Policy

February 2018

Directorate-General for Research and Innovation

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## 1. SUMMARY OF THE CASE STUDY

This document analyses the case of mission-oriented R&I policy initiatives in the field of air transport in Europe from the 1950s until today. The study takes into consideration the Concorde project, which developed in a limited time span, and the Airbus initiative, which is still ongoing.

*The part of this report focusing on the Airbus initiative does not focus on specific industrial projects developing the individual models of aircraft, but instead, it describes meaningful features of the Airbus initiative as a whole, whose final objective was the creation of a European consortium of aircraft manufacturers.*

The following table describes the main components of the case study:

|                | Concorde                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Airbus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Title:         | The Concorde Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Airbus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Country:       | France, United Kingdom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Europe (France, Germany, Spain and the United Kingdom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Thematic area: | Transport                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Transport                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Objective(s):  | <p>Objectives of the international agreement/consortium:</p> <ul style="list-style-type: none"> <li>• To develop the first supersonic aircraft for (civilian) transport;</li> <li>• To strengthen and further develop technological industrial sectors linked to the aircraft industry, faced with the concurrent American and Russian industries.</li> </ul> <p>Being an agreement between two sovereign countries, each of them had specific domestic objectives to fulfil:</p> <p>France's domestic objectives:</p> <ul style="list-style-type: none"> <li>• To restructure and relaunch the aircraft industry, severely downsized in the aftermath of WW2;</li> <li>• To strengthen the position of France on the international stage.</li> </ul> <p>The United Kingdom's domestic objectives:</p> <ul style="list-style-type: none"> <li>• To restructure and rationalise the aircraft industry: seeking a more efficient use of resources in the aircraft industry,</li> </ul> | <p>Objectives of the international agreement/consortium:</p> <ul style="list-style-type: none"> <li>• To create and develop a European consortium of European aircraft manufacturers able to compete with their American counterparts/competitors (e.g. Boeing, Lockheed and McDonnell Douglas);</li> <li>• To create a European consortium capable of producing bigger airplanes suitable for long and medium distances (as up to the 1960s most European countries produced aircraft too small for the needs of market of that time).</li> </ul> <p>Each of the four countries that supported national manufacturers in the consortium had specific domestic objectives to fulfil. For instance, Germany aimed to develop an industrial partnership with the French and other EEC members' counterparts, to strengthen the European integration process, while the objectives pursued by the Spanish partners were to acquire legitimacy in front of the international counterparts,<sup>2</sup> to develop industrial partnerships with other European</p> |

<sup>2</sup> The Spanish CASA joined the consortium in 1971.

|                     |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <p>and to maintain the aircraft industry's levels of employment;</p> <ul style="list-style-type: none"> <li>• To prompt the entering the European Economic Community (EEC)<sup>1</sup>;</li> <li>• To leapfrog US aircraft industry, by investing in technological advancements such as the supersonic technology.</li> </ul> | <p>powers, and to establish political and economic partnerships with the EEC.</p>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Main Governing Body | <p>Standing Committee of Officials and Committee of directors.</p>                                                                                                                                                                                                                                                            | <ol style="list-style-type: none"> <li>1. Supervisory board, Director general (1970-1989: first governance);</li> <li>2. Chief operating officer, Supervisory board, Executive board, Financial director (1989-2001: second governance);</li> <li>3. Board of Directors; Executive Committee; Commercial Aircraft Operational Executive Committee; Commercial Aircraft Subsidiary Presidents; Helicopters Executive Committee; Defence and Space Executive Committee (2001-present: privatisation).</li> </ol> |
| Timeline:           | <p><u>1962-2003</u></p> <ul style="list-style-type: none"> <li>• 1962: signature of a cooperation agreement between France and the United Kingdom;</li> <li>• 1976: first commercial flight of Concorde (from Paris to Rio de Janeiro, via Dakar; from London to Bahrain).</li> </ul>                                         | <p><u>1967-present</u></p> <ul style="list-style-type: none"> <li>• 1967: signature of a cooperation agreement (Memorandum of Understanding) between France, Germany and the United Kingdom to start the initial development of the Airbus A300<sup>3</sup>;</li> <li>• 1972: first Airbus aircraft produced takes off for its maiden flight;</li> <li>1974: first Airbus aircraft enters into service.</li> </ul>                                                                                             |
| Budget:             | <p>Initial estimated costs: GBP 150 million / FRF 14 billion.</p> <p>The costs of development and manufacturing the first four</p>                                                                                                                                                                                            | <p>Total budget (estimated): USD 40 billion (total government subsidy since its inception)<sup>5</sup>.</p>                                                                                                                                                                                                                                                                                                                                                                                                    |

<sup>1</sup> Grieco, "The Concorde SST and Change in the British Polity"

<sup>3</sup> The British representatives withdrew in 1969, and re-joined the Consortium in 1978.

<sup>5</sup> According to the complaint filed by the United States to WTO. See Carbaugh, Robert J., and John Olienyk. "Boeing-Airbus Subsidy Dispute: A Sequel." *Global Economy Journal* 4, no. 2 (2004). <https://doi.org/10.2202/1524-5861.1047>.

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|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                     | Concorde aircrafts assessed to amount to GBP 1.134 billion. <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Brief description of the case (250 words)                                                           | <p>The Concorde project was a French-UK initiative aimed at the development of the first SST (supersonic transport) passenger-carrying commercial airplane.</p> <p>The collaboration was launched by the signature of a bilateral agreement in 1962 to share costs and risks in producing an SST, with the first prototype produced 10 years later and the first routes inaugurated in 1976. Selected aircraft manufacturers were, in France, SNECMA and Aérospatiale, and in the United Kingdom, British Aerospace and Rolls-Royce.</p> <p>British Airways and Air France Concorde fleets flew to destinations all over the world, mostly on transoceanic routes only due to the linked noise, pollution and operating expense. Due to financial unviability (the development costs were so great that they could never be recovered from operations) and the fatal crash of 2000, Concorde operations were finally ceased in 2003.</p> <p>Concorde proved that European governments and manufacturers could cooperate in complex ventures, and it helped to ensure that Europe would remain at the technical forefront of aerospace development.</p> | <p>Airbus is a consortium, established in 1964. It was initially composed of European aerospace manufacturers gathered within GIE Airbus Industrie set up by the French, British and German governments. The main objective of the Airbus initiative was to strengthen European aerospace industries in order to be able together to compete with American aircraft manufacturers.</p> <p>Airbus Industrie GIE was formed in 1970 to produce planes for short-to medium-range and high-capacity airlines. Nowadays, Airbus is a private holding company comprising EADS (European Aeronautic Defence and Space Company; France, Germany, Spain) and British Aerospace (UK). The first aircraft available under the Airbus brand was the A300, in 1972. Since then, the increase in orders has been exponential. During this time the Group has become one of the world's top two commercial aircraft manufacturers, competing directly with the American Boeing Company.</p> <p>Headquartered near Toulouse, France, it employs more than 50 000 people in France, Germany, Spain, the United Kingdom, China and the United States. The consortium has more than 1500 suppliers and holds cooperative agreements with numerous companies in many countries.</p> <p>In 1999, the Airbus Military SAS was launched to conceive and support development and production of military transport aircraft, as a collaboration between 10 NATO members.</p> |
| Implementation and organisation (a brief description of the governance and policy instruments used) | <p>Three levels of governance:</p> <ul style="list-style-type: none"> <li>• Standing committee of officials;</li> <li>• Technical and Administrative Subcommittee (TASC);</li> <li>• Specialised committees for technicalities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>The governance of Airbus has changed three times since its inception. The involvement of the Government has gradually decreased, and Airbus is currently a private company.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

<sup>4</sup> Concorde History, <http://www.aerospaceweb.org/question/planes/q0186.shtml>, Retrieved on 19th December 2017



|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | The French and UK Governments provided selected aircraft manufacturers with financial support for the development of Concorde and its components. They also committed to procure, via their state-owned airline companies, a specific number of Concorde aeroplanes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The development of innovative aircrafts meeting the needs of airline companies was publicly financed via <u>Repayable Launch Investments</u> . Public support was also provided via the development of infrastructure. |
| Concorde                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                        |
| Observed / expected outputs, outcomes, and impacts                      | Outputs and new instruments <sup>6</sup> :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                        |
|                                                                         | <ul style="list-style-type: none"><li>Airplanes for civilian use (passengers and trade): first supersonic passenger aircraft; a total of 20 Concorde constructed (14 for commercial service development and six prototypes for technological development);</li><li>Development of new technological features for the aerospace industry: the Delta wings, pinpoint movable nose and the spray guard;</li><li>Profits: for British Airlines the gain mounted to GBP 30-50 million per year, while profits were more limited for Air France;</li><li>Military training: training for RAF pilots, as the Concorde was used by the UK Army to develop the pilot's ability to intercept incoming supersonic enemy aircraft (no supersonic fighter in either the US and the UK was capable of intercepting the aircraft's supersonic speed).<sup>7</sup></li></ul> |                                                                                                                                                                                                                        |
|                                                                         | Outcomes:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                        |
|                                                                         | <ul style="list-style-type: none"><li>Production of the first supersonic passenger aircraft;</li><li>First time that Air companies started targeting a specific segment of the customers;</li><li>Strengthening of collaboration between the UK and France.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                        |
|                                                                         | Impacts:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                        |
|                                                                         | <ul style="list-style-type: none"><li>Advancement in European integration;</li><li>From the most imaginative point of view, the Concorde contributed to shorten the distances between continents.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                        |
| Main elements of mission-oriented R&I initiative <sup>8</sup>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                        |
| Directionality (links to societal challenges, industry transformation): | <b>YES.</b> The Concorde project had specific objectives, very well defined at the moment of signature of the international treaty at the beginning of the 1960s, after years of technical and scientific research aimed to develop supersonic travel technology. The Concorde project brought an undeniable transformation to the aircraft industry, having developed and put at civilian use the supersonic technology which also had a significant impact on society.                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                        |
| Intentionality (specific, well-articulated targets):                    | <b>YES.</b> The main targets had been clearly set at an early stage, and were the result of international negotiations and technical cooperation which had been going on for years prior to the launch of the initiative.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                        |
| Clearly set timeline and milestones:                                    | <b>TO A CERTAIN DEGREE.</b> When the Concorde project was launched, the early timeline and budget estimations proved unrealistic and unattainable: the timeframe of the project was revised (as the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                        |

<sup>6</sup> Rowbotham, "Concorde 40 Years on: What Have We Learned?"

<sup>7</sup> Rowbotham.

<sup>8</sup> Assessment: Yes, To certain degree, No or Not known).

|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | production of the first prototype took more than the expected four years), and the budget increased significantly (as the budget grew due to inflation and additional costs not foreseen at an earlier stage).                                                                                                                                                                                                                                                                                                                                                    |
| Mobilises public and private investments:                                          | <b>YES.</b> Being the result of international negotiations with clear industrial, economic and diplomatic objectives, the Concorde project received major support from the French and UK governments. The involvement of private companies, backed and supported by public funding, was crucial to the success of the initiative. The Concorde project had the extraordinary capacity to mobilise the whole aircraft sector in the two countries.                                                                                                                 |
| Focused on new knowledge creation (basic research, TRLs 1-4):                      | <b>TO A CERTAIN EXTENT.</b> The technical improvements required to implement the Concorde project required significant knowledge creation and basic research, as well as validation of the results in laboratories and via the use of prototypes. The supersonic transport technology, which had been matter of research in the decade before the design of Concorde, was the main result of the experimental phase and knowledge creation of the endeavour.                                                                                                      |
| Focused on knowledge application (applied research, TRLs 5-9):                     | <b>YES.</b> The main focus of the Concorde project, however, was the concrete objective of production of the supersonic aircraft by the development of new technology. Besides the technological advancement, the project resulted first in the production of the prototype and later in the commercialisation and sale to international airlines of the 20 planes produced.                                                                                                                                                                                      |
| Demand articulation (involves instruments for inducing demand):                    | <b>YES:</b> For the development of the technology and prototype, the Concorde project did not entail significant consultation of customers, such as air companies and potential passengers. However, airports and air companies were consulted in the design stage of the Concorde, as the supersonic transport technology entailed some changes for airport management regarding marketing, insurance and customer relations.                                                                                                                                    |
| Multi-disciplinary (inter-disciplinary and/or trans-disciplinary):                 | <b>TO CERTAIN DEGREE.</b> The development of Concorde required mostly development and knowledge creation in various fields of engineering, but relied also on economics and management, and geopolitics.                                                                                                                                                                                                                                                                                                                                                          |
| Joint coordination (multi-level and/or horizontal governance of policies/finance): | <b>NO.</b> Some minor interaction of the Concorde project with the development of the Airbus manufacturing can be observed. However, the project's governance remained independent from any other horizontal governance, except than national transport policies of France and of the United Kingdom.                                                                                                                                                                                                                                                             |
| Reflexivity (flexible policy design, timely monitoring):                           | <b>YES/TO CERTAIN DEGREE.</b> The technological features of the project were adapted to solve the problems observed in the trial phase of the prototype. Furthermore, diplomatic documents reveal that the French and the British Governments were aware that the total cost of the project would exceed their initial estimate, which means that they had monitoring mechanisms in force.                                                                                                                                                                        |
| Openness (connected to international agenda and networks):                         | <b>TO CERTAIN DEGREE.</b> The Concorde project remains a unique example of international cooperation between two countries. There was nevertheless little connection with other international organisations' agenda.                                                                                                                                                                                                                                                                                                                                              |
| Involvement of citizens:                                                           | <b>NO.</b> The development of the Concorde project did not rely on the involvement of citizens' platforms or civil organisations. However, the venture was underpinned by huge publicity in the media, especially regarding information about the technical solutions adopted and the main features of the new aircraft. Instead, no significant detail about the legal and commercial provision of the bilateral agreement was revealed to the general public. The contract between the two companies (Sud-Aviation and BAC) was never made public. <sup>9</sup> |

<sup>9</sup> Touscoz, "La coopération aéronautique franco-britannique : l'affaire Concorde"

| Airbus                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | <p>Outputs and new instruments:</p> <ul style="list-style-type: none"> <li>• Airplanes for civilian use: Airbus is now one of the most important aircraft producers in the world (having sold in 2016 for the first time in history more than Boeing, its historical competitor);</li> <li>• Development of new technological features: the development of the European aerospace cluster triggered investments and gave the conditions for expertise gains.</li> </ul> |
|                                                                         | <p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Profits: all the national carriers which are part of the Airbus consortium have been making profits for the last years;</li> <li>• Development of the first European consortium in the aerospace industry;</li> <li>• Strong collaboration between the European countries in a strategic industrial sector;</li> <li>• New technological solutions for aviation developed.</li> </ul>                         |
|                                                                         | <p>Impacts:</p> <ul style="list-style-type: none"> <li>• Strong contribution to the European integration;</li> <li>• Saving for EU national carriers;</li> <li>• Breaking of the American hegemony in the world aircraft production;</li> <li>• Economic growth;</li> <li>• Strengthened local aerospace industry (Occitanie, France)</li> <li>• Independence for military supplies.</li> </ul>                                                                         |
| Directionality (links to societal challenges, industry transformation): | <b>YES.</b> Airbus was set with the clear ambition to increase the competitiveness of European aircraft manufacturers against their American counterparts.                                                                                                                                                                                                                                                                                                              |
| Intentionality (specific, well-articulated targets):                    | <b>TO A CERTAIN DEGREE.</b> The Airbus initiative consists of individual projects aimed at the development of aircrafts. These individual projects could be considered as targets articulated with the broad objective to strengthen European competitiveness in the aeronautical industry.                                                                                                                                                                             |
| Clearly set timeline and milestones:                                    | <b>TO A CERTAIN DEGREE.</b> There is no an overall plan with defined timeline and milestones. However, some may be defined at the project level.                                                                                                                                                                                                                                                                                                                        |
| Mobilises public and private investments:                               | <b>YES.</b> The Airbus Group is currently a private firm (since 2001). The development of aircraft still benefits from public financial support via Repayable Launch Investments. In the past, since the establishment of the consortium under French law, public funds were essential to the launch of the initiative and for the production of the first aircraft.                                                                                                    |
| Focused on new knowledge creation (basic research, TRLs 1-4):           | <b>YES.</b> Even though Airbus initially operated mainly by leveraging the knowledge developed during WW2 and following decades, it has been undertaking research activities aimed at the development of new technologies e.g. for electric aircraft.                                                                                                                                                                                                                   |
| Focused on knowledge application (applied research, TRLs 5-9):          | <b>YES.</b> The main focus of the company – in the past as at present – is to develop new aircraft, which can be competitive in the global market, by investing in new technology capable of improving operation performance and efficiency. In addition to that, Airbus aims to accelerate digital transformation and take innovations from the laboratory and testing to the market.                                                                                  |
| Demand articulation (involves instruments for inducing demand):         | <b>YES.</b> The success of the Airbus Group was due to its strong market orientation: strong focus on innovation and marketing. In its early                                                                                                                                                                                                                                                                                                                            |

|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | stages, the Airbus group carried out surveys to assess the best solutions to offer the market. <sup>10</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Multi-disciplinary (inter-disciplinary and/or trans-disciplinary):                 | <b>YES.</b> In developing innovative aircrafts, Airbus took a multidisciplinary approach, by investing in engineering, ICT, and the development of new business models.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Joint coordination (multi-level and/or horizontal governance of policies/finance): | <b>TO A CERTAIN EXTENT.</b> Some minor interaction of the Airbus initiative with the development of the Concorde project could be initially observed. Airbus, currently established as a private company, is much less under the control of governments and could be hardly conceived as the component of any policy mix.                                                                                                                                                                                                                                                                                                                                                                                                             |
| Reflexivity (flexible policy design, timely monitoring):                           | <b>YES/TO A CERTAIN DEGREE.</b> The Airbus group has proved to be particularly responsive to market exigence since its early days. Besides technological and industrial solutions, also in other fields (e.g. customer relations) the consortium has proved to be able to adapt to new requirements and environments (for instance, in the establishment of relations with new customers in developing countries, which wasn't a common feature for European manufacturers in the post-WW2 period). Furthermore, there is evidence of some kinds of reflexivity mechanisms operating within Airbus. For instance, the E-Fan project ceased in early 2017 as it was no longer in line with the most recent technological developments. |
| Openness (connected to international agendas and networks):                        | <b>YES.</b> Airbus is widely considered as a European success story that has evolved with the deepening of the European integration and the resulting business environment. Therefore, there is a strict link with the growing role of the European aerospace industry and building the common market. Other recent initiatives from the European Commission in the 2000s can be seen as complementary to the Airbus initiative.                                                                                                                                                                                                                                                                                                      |
| Involvement of citizens:                                                           | <b>NO.</b> The development of the Airbus manufacturing did not rely on the involvement of citizens' platforms or civil organisations. However, the venture was underpinned by huge publicity in the media, because of its close link to European integration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

<sup>10</sup> In 1967, Airbus Industrie organised a survey to understand which was the type of engine preferred by the French, British and German air companies.

## 2. CONTEXT AND OBJECTIVES OF THE INITIATIVE

This Chapter contains an analysis of the contextual factors that influenced the design of the Concorde and Airbus initiatives. Both happened at the regional scale and took place almost simultaneously, in the post-WW2 period characterised by strong economic development. They were linked to the successful post-conflict reconstruction in most Western European countries. The two initiatives, besides focusing on the same field, i.e. the development of new solutions in the aerospace industry, leveraged the same economic components and suffered from the same economic deadlocks, such as the petrol crisis of the early 1970s. Finally, but not less importantly, the first Concorde and Airbus aircrafts came to existence as useful tools in a geopolitical game much wider than the sole industrial competition, with close links to the Cold War development and the European integration process.

### 2.1. Contextual factors and origins of initiative

#### 2.1.1. *Economic and sectoral factors*

In the late 1950s, **air traffic** was quickly increasing. In 1962, more than 100 million passengers were registered on civilian flights particularly across the North Atlantic Ocean, and in North America and Western Europe. All air companies were increasing greatly their range of medium and long-haul flights. These increases were due to the development of new transport technologies and a significant increase in the economic prosperity of the middle classes in most industrialised countries. Air transport became a mass phenomenon: the demand for affordable flights skyrocketed, new airports were built, new destinations became viable for business and holidays purposes, etc. In such an environment, new airlines were meant to be born, in Europe and in Asia.

**Air transport** also differentiated according to the needs and the new trends of the time. On the one hand, long-haul and more expensive flights were needed to cover long distances in an even more multiconnected world, while, on the other hand, more medium and short-haul flights, at a more affordable cost, were expected by the booming enriched middle-classes. For the former, American airlines – which could also count on a well-developed internal market where no foreign company could effectively compete – and new technological solutions – such as the Concorde supersonic aircraft – played a dominant role. For the latter pivoting instead on the “**hub and spokes**” air transport model, new companies – such as Airbus – found their key to success.

Progress and innovation were shaped by the high level of **competition between the rising national aircraft companies**, supported by national governments as a means to strengthen their foreign and industrial policies, as well as the increasingly high competition **between newly-formed clusters in the aviation sector**, forged by the commitment of several European governments to supporting efforts to cooperate and modernise private national entities.

In the early 1970s, that is in the early days of the Concorde and at the very beginning of the Airbus initiative, the **oil crisis affected global economies**. Triggered by the Yom Kippur War (1973 Israeli-Arab war), members of the Organisation of Petroleum Exporting Countries (OPEC) proclaimed an oil embargo which targeted countries perceived as supporting Israel. This caused an oil crisis, or “**shock**”, with many short- and long-term effects on global politics and economy, particularly for air transport companies and aircraft producers. In the short term, the oil shortage affected the aerospace industries negatively. However, in the long run, it encouraged and accelerated significantly the finding of new solutions to lower petrol consumption and other innovations in the engine industry. For Airbus, the 1973 oil crisis was furthermore a driver for increased competitiveness and renewed demand for multinational collaboration. For the Concorde project instead, it

represented a serious backlash on the top of an industry which was already object of critics for the high consumption of petrol.<sup>11</sup>

### 2.1.2. Political factors

#### National political factors

From a **political point of view**, internal politics played a major role in determining the success or the failure of these industrial initiatives. On the one hand, the Concorde project was made possible thanks to the decision of British and French leaders, who, in the context of the Cold War, considered the supersonic transport option an opportunity to gain prestige and technological leadership in the eyes of their national audiences and of the American and USSR superpowers.

Particular attention should be paid to the **United Kingdom**, which has been a major contributor to both initiatives, and, contrary to France, had a changing attitude and in some occasions seriously put them at risk. Across the 1950s, a clear ideological shift had taken place in favour of a strong role of the State in the economy.<sup>12</sup> At the same time, the Conservative party, in power and advocating free market values until 1964, showed new commitment to coming into closer contact with UK major industrial groups. With the victory of the Labour party at the 1964 general elections, the approach to collaboration in the aerospace sector changed for geopolitical and economic reasons, including the prompted American interference and concerns about the budget, particularly for the Concorde project. However, the new government maintained the UK's participation in European aerospace collaborations to assure the national aircraft industry the continuation that it needed to face new competitors and economic instability.<sup>13</sup> Therefore, from the mid-1960s the British government renewed its commitment to the collaboration with European partners, confirming its support to the Hawker Siddeley Aviation-British Aircraft Corporation (HAS-BAC) in the Concorde project, and in the Airbus consortium. However, the United Kingdom withdrew from the Airbus agreement in 1969 due to concerns about the influence of the French Government on the newly-born Airbus consortium. Given the participation by the British Hawker Siddeley up to that point (skilled wing producers), France and the Federal Republic of Germany allowed the British company to continue as a privileged subcontractor. The United Kingdom officially re-joined the Airbus Consortium in 1978.

At the same time, policymakers and experts discussed the possibility to organise the European aerospace industries to prepare them for the new market demands. In this context, the British BAC and HAS were merged into British Aerospace (BAW) in 1977, while Aeritalia was established in Italy, and Messerschmitt-Bolkow-Blohm (MBB) in the Federal Republic of Germany.<sup>14</sup>

#### International political factors

The **role of the international institutions** of that time should not be neglected either. In the 1970s, the European Economic Community (EEC) and the Western European Union WEO (WEO) urged the creation of a "*European single market for the aerospace industry*."

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<sup>11</sup> Burigana, "L'Europe, s'envolera-t-elle?"

<sup>12</sup> Grieco, "The Concorde SST and Change in the British Polity"

<sup>13</sup> As a sign of the times, the 1965 congress of the British trade unions (backbone of the Labour support) was dedicated to the future of the aerospace industry.

<sup>14</sup> Burigana, "L'Europe, s'envolera-t-elle?"

International and multilateral organisations become forums where designs of cooperation and alliances were conceived and negotiated. In this respect, the entry of the United Kingdom in the EEC could also be seen as a driving factor triggering national integration in the European aviation sector. For instance, at the 1978 WEO summit, the British representative called for the creation of big integrated groups in aerospace;<sup>15</sup> an appeal to which States answered responsively. The following year, a working group established by the UK government presented the European Commission with a project to integrate Member States' national aircraft producers to compete with their American counterparts. Such an initiative<sup>16</sup> gave new energy to the overall continental support to the Airbus initiative.

Concorde and Airbus initiatives are not unique in the frenetic decades of the 1960s and 1970s. The interest in a real cross-border collaboration have been at the origin of the development of European multinational consortia, such as the **Tornado** (1974; for military purposes; United Kingdom, Italy and Germany), the **Europlane** (1972; United Kingdom, Sweden, Germany), **Mercure** (1971; for civilian transport; Italy, Belgium, Spain, Switzerland, Canada and France), the **Breguet 1150 Atlantic** (1961; for military purposes; NATO, France, Belgium, Germany, Italy and Netherlands), the **Transall** (1963; for transport; France, Germany), **Jaguar** (1965; France, United Kingdom), **Alpha-Jet** (1966; France, Germany), the **QSTOL** (Quiet Short Take OFF and Landing; 1972; civilian transport; Sweden, German, United Kingdom, Spain; subsequently cancelled).<sup>17</sup>

### *2.1.3. Concorde-specific factors*

At the time of the launch of the Concorde project, air traffic was booming, a strong interest into supersonic transportation started, and several producers expressed their intention to build supersonic aeroplanes capable of transporting 300 to 400 passengers. France and the United Kingdom aimed at supporting research and innovation for the development of supersonic transport solutions that would help their national industries compete internationally.

The development of the supersonic transport technology did not start with the launch of the **Concorde** initiative. In 1956, a **Supersonic Transport Aircraft Committee (STAC)** was established in the United Kingdom to explore supersonic flight. In the STAC's report released in 1959, aviation experts and policymakers recommended inviting aircraft companies to submit 'brochure studies' for two **alternative models of supersonic transport**: a medium-range version, to carry 100 passengers over journeys of 1500 miles at a speed of Mach 1.2; and a long-range version, to carry one hundred and fifty passengers at a speed of at least Mach 1.8 (estimating that the cost of such a venture would have been of GBP 175 million over ten years).

More specifically, for what concerns the **Concorde**, **American industrial companies** (e.g. General Electric and Pratt et Whitney for engines, Boeing and Lockheed for airframes) were considering the development of prototypes of supersonic planes to cover the demand for fast transport in North America and across oceans. However, insufficient technical development and the cost uncertainty of such an endeavour stopped their intention to proceed to the launch of the initiative. **In Europe, the French and the British aircraft industries** were by far the two most developed aircraft industries: the French *Caravelle* and the British *Olympus* were two of the fastest planes ever designed and built. However, if taken separately, neither of the two industries would have been capable of developing

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<sup>15</sup> Burigana.

<sup>16</sup> Even if the British Air Board was not a strong supporter of the Airbus initiative.

<sup>17</sup> Burigana, "L'Europe, s'envolera-t-elle?"

the Concorde project alone. Cooperation between the two industrial clusters was therefore needed<sup>18</sup>.

In 1962 (29 November) the **French and British government signed an agreement** aimed at the development of a civilian transport supersonic aircraft, which was later on named **Concorde**. Three projects answered the call for bids launched by the French Civil Aviation Secretary: the one issued by Sud-Aviation won the bid, for its appreciated technical features, guaranteed by the close collaboration **with British manufacturers**.

**Legally speaking**, the **Concorde** project was based on agreements between national Governments and economic actors. In addition to the **two contracts between the companies** involved in the development of the new technology and of the aircraft itself (the first between the Sud-Aviation and the British Aircraft Cooperation BAC, and the second between the Bristol Siddeley and the *Société nationale d'études et de construction de moteurs d'aviation* SNECMA), an **international** treaty was signed by the French and the British governments and registered at the UN Secretary General<sup>19</sup>.

The first flight of Concorde for commercial use took off on 21 January 1976, from Paris to Rio de Janeiro, via Dakar. The same day, a second airplane flew from London to Bahrain. However, it was not the first plane ever with supersonic capabilities: the Tupolev 144 made the first trails a couple of months before the Franco-British competitor.

The choice of the name "Concorde" reflects the strong role of the political will in the project. It was reportedly first chosen by the United Kingdom. "Concord" seemed a perfect fit being a synonym for agreement, friendship, and cooperation. France approved it, but only if the French spelling, i.e. "Concorde," was used.

#### *2.1.4. Airbus-specific factors*

The **Airbus initiative** was the result of the same economic and political environment as Concorde, and was effectively launched a few years after the signature of the Concorde agreement.

In 1965, several consortia were formed with the intention to compete for the realisation of a European rival to the American aircraft industry: the first one submitted by Sud-Aviation and Dassault (France), the second one by Arbeitsgemeinschaft Airbus (Germany), and the third by Hawker-Siddeley (United Kingdom), Breguet and Nord-Aviation (France), also known as the HBN consortium. The **political driver** was undeniable, as proved by the signature of a "protocol about the potentials of cooperation in the aerospace sector" in April 1965, at a bilateral meeting, by the French and British counterparts. In 1966, the British and French governments asked SNECMA (*Société nationale d'études et de construction de moteurs d'aviation*) and the Bristol Siddeley Engine (BSE) to develop an engine proposal for the designed Airbus. At the same time, other European and American competitors prepared to do the same.<sup>20</sup>

A significant **push towards the creation of the Airbus consortium arrived when the United States withdrew from technical and military cooperation** agreements with the Federal Republic of Germany and the United Kingdom in late 1960s.

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<sup>18</sup> Touscoz, "La coopération aéronautique franco-britannique : l'affaire Concorde"

<sup>19</sup> Also composed by some technical additional documents

<sup>20</sup> Burigana, "L'Europe, s'envolera-t-elle?"



Airbus was born thanks to two parallel industrial reasons: the urge for the creation of national clusters in the aerospace industry,<sup>21</sup> and the political will to create a truly European cluster beyond the simple bilateral or multilateral governmental initiative that had been launched so far (such as the one leading to the Concorde project). For instance, the United Kingdom pushed for the creation of an “European Purchasing Agency” for the military and civilian sector. This proposal received nevertheless mitigated responses, because of the high concerns of the American administrations (much more interested in safeguarding the structure of the Atlantic Alliance) and EEC officials (interested in preserving the stability of the young European common institutions).

A major change happened in 1977. The Airbus initiative took off thanks to the first orders and the decision to carry on with the development of a real Airbus “family”, where different national companies cooperate for the common objective.

The success of the Airbus consortium cannot be understood without taking into account the **behaviour of the American competitors**. Faced with European activities, the US-based companies, backed by the federal government, chose to offer products different from the European ones, while signing bilateral agreements with the United Kingdom and Italy. Besides failing in producing a US-branded supersonic aircraft, which would have competed with the Concorde, the American firms, leaders in the aircraft industry, did not respond adequately to the European moves. Boeing, the Seattle-based world leader, did not prompt any major modification to the well-established production of the B747 (launched in 1966), which at that time was having a major success being sold around the globe; the other main producers, McDonnell-Douglas and Lockheed, did not succeed in commercialising any supersonic transport aircraft for civilian purposes, besides the huge investments.<sup>22</sup>

After rationalisation of both the American and European aircraft industries, Airbus, which was recognised as the sole competitor of Boeing, focused on innovation in order to win the global battle for the primacy over the aerospace sector. Closely linked to an effective marketing position, **technological advancement was the key element that explains the success of the Airbus consortium faced with the fierce American competition**.

The name “Airbus” was taken from a non-proprietary term used by the airline industry in the 1960s to refer to a commercial aircraft of a certain size and range. The term was finally chosen because it was also linguistically acceptable both in French and German.

## 2.2. Summary: Political drivers and barriers

### 2.2.1. Concorde

| Drivers | Barriers |
|---------|----------|
|---------|----------|

<sup>21</sup> As proved by the birth of the Italian Aeritalia, the German Messerschmitt-Bolkow-Blohm MBB, the Spanish CASA and the French SNIAS (Société nationale industrielle aéronautique), which later on became Aérospatiale

<sup>22</sup> Burigana, “L’Europe, s’envolera-t-elle?”

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• At the French national level, President de Gaulle's strong commitment to compete against American predominance in the aircraft industry<sup>23</sup></li> <li>• At the UK national level, changes of attitude within the political dominant parties (Conservatives, Labour) towards cooperation with European counterparts</li> <li>• At the UK national level, influence of diplomacy to limit the possibilities of withdrawal for fear of backlashes from the French side</li> <li>• At the UK national level, anti-communism of the British government (as France's President de Gaulle claimed that, in case of UK withdrawal, USSR would have replaced it)</li> <li>• At the UK national level, influence of the trade unions (particularly for the Labour party, victorious in 1964 general elections) in stopping intentions of withdrawal from the agreement</li> <li>• Strong interest in taking advantage of the prestige and reputation the French and UK governments would gain by launching the first supersonic airplane<sup>24</sup></li> <li>• Increased relevance of the air transport civilian market, due to the reduction of the relevance in military orders in many European countries after the end of WW2</li> </ul> | <ul style="list-style-type: none"> <li>• At the international level, the historical rivalry between France and the United Kingdom</li> <li>• At the international level, France's President de Gaulle intended to limit the UK's economic influence on the project</li> <li>• At the international level, the fear of the UK government towards France leading the project</li> <li>• The concerns of the UK government (Labour, since 1964) about the budget expenses the project required</li> <li>• Hostility of the two world superpowers of the time, i.e. the USA and the USSR<sup>2526</sup></li> <li>• Hostility of other states, e.g. India and African countries<sup>27</sup></li> <li>• Difference in the approach to decision-making between France and the UK: the French being state-driven, while the British liberal and market-driven</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<sup>23</sup> In 1956, only 41% of patents employed were from French companies; in 1962, this percentage lowered was to 34%. [http://www.lemonde.fr/economie/article/2012/05/21/concorde-une-politique-industrielle-hors-marche\\_1704645\\_3234.html](http://www.lemonde.fr/economie/article/2012/05/21/concorde-une-politique-industrielle-hors-marche_1704645_3234.html)

<sup>24</sup> Political will to proceed towards the development of supersonic aircraft technology, as proved by the works of the Supersonic Transport Aircraft Committee and the British government interest in the initiative

<sup>25</sup> As the American administration was concerned by the fact that if Concorde would have been able to capture the market forecast for supersonic transport, then the Americans would have lost their supremacy as civilian transport leaders, causing harm to the national industry and global influence. Sources say that in 1964 the new Labour government prompted to exit the Concorde project agreement under Washington's diplomatic pressure

<sup>26</sup> The Concorde faced strong opposition in obtaining the authorisation for operating in American airports, and quickly was not allowed to operate over US territories, then being limited to transoceanic routes only.

<sup>27</sup> Worried about the noise and air pollution caused by the Concord planes, some governments did not allow the Concorde to reach them, therefore limiting it to some routes only

### 2.2.2. Airbus

| Drivers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Barriers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>At the European level, the entry of the United Kingdom to the European Economic Community in 1973</li> <li>Absence of American aircraft producers in emerging markets, such as in Asia or Africa</li> <li>Reduction of the importance in military orders in most European countries after the end of the WW2, which led to an increased demand for civilian aeroplanes</li> <li>Increased civilian air transport in the 1950s and 1960s</li> <li>American withdrawal from technical and military cooperation with the Federal Republic of Germany and the United Kingdom in late 1960s</li> <li>Urgency for the creation of national clusters in the aerospace industry</li> <li>Political will to create a European cluster, to go beyond bilateral or multilateral governmental negotiation</li> </ul> | <ul style="list-style-type: none"> <li>At the international level, France's President de Gaulle intended to limit the UK's economic influence on the initiative</li> <li>At the international level, the fear of the UK government towards France leading the project</li> <li>At the beginning of the Airbus consortium, the difference between French and British interests: whereas France sought to obtain leadership for its frame constructors, the United Kingdom clearly privileged its engine manufacturers<sup>28</sup></li> <li>Difference in the approach to decision-making between France and the UK: the French being state-driven, while the British liberal and market-driven</li> </ul> |

## 2.3. Summary: Economic drivers and barriers

### 2.3.1. Concorde

| Drivers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Barriers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>At the international level, generalised intention to challenge the American monopoly in the aircraft industry</li> <li>Demand to ensure new long-term orders for national industries<sup>29</sup></li> <li>Intention to limit the high R&amp;D costs in the aerospace sector<sup>30</sup></li> <li>New demand and the new trends of the time (since late 1960s): interest in the development of new long-distance efficient air transport solutions, i.e. the supersonic technology</li> <li>Saving for public spending due to the use of the aircraft factories and technology research centres that served over WW2 for the production of civilian aircrafts</li> </ul> | <ul style="list-style-type: none"> <li>Strong concerns (especially in the UK) about the economic viability of the project</li> <li>Airbus' decision to not support the Concorde project beyond October 2003, which forced British Airways to stop operating Concorde (as it was not possible to continue with the opposition of the manufacturer and Air France)<sup>31</sup></li> <li>Budget increases due to the inflation rate, which exceeded the overall budget estimates of the project (37%; 31% due to the changes in specifications, and 20% on the new technologies)</li> <li>1970s oil crisis: increased cost of the oil and difficulties in petrol acquisition hurt the aircraft industry<sup>32</sup></li> </ul> |

### 2.3.2. Airbus

| Drivers | Barriers |
|---------|----------|
|---------|----------|

<sup>28</sup> Muller, "Airbus: Partners and Paradoxes"

<sup>29</sup> Touscoz, "La coopération aéronautique franco-britannique : l'affaire Concorde"

<sup>30</sup> Which brought aerospace companies to cooperate much earlier than their counterparts in other sectors

<sup>31</sup> Butcher, "Aviation: Concorde"

<sup>32</sup> Particularly serious for the Concorde due to its high petrol consumption.

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Necessity to limit the high R&amp;D costs in the aerospace sector, which brought aerospace companies to cooperate much earlier than their counterparts in other sectors</li> <li>• Increased international competition: Economic consolidation in the United States (in period 1993-1997) leading to the creation of aerospace and defence giants, with turnovers several times bigger than those of their European counterparts<sup>33</sup></li> <li>• Competition between newly-formed clusters in the aviation sector</li> <li>• Competition between the rising national aircraft companies</li> <li>• New needs and the new trends of the time (since late 1960s): "hub and spoke" air transport model for short and medium-haul flights for the enriched middle classes.</li> <li>• Oil crisis of the early 1970s: in the long-term, prompted the development of new technologies and engine solutions with lower petrol consumption</li> <li>• Saving for public spending due to the use of aircraft factories and technology research centres that served in WW2 for the production of civilian aircrafts</li> </ul> | <ul style="list-style-type: none"> <li>• 1970s oil crisis: increased cost of the oil and difficulties in petrol acquisition hurt the aircraft industry</li> <li>• Low development of the German aviation industry, particularly dependent on American exports and regionalised</li> <li>• Size of the European market: too small to allow a surge of the European consortium (whose success comes from the orders from developing countries, especially Asian)</li> <li>• Concorde's economic burdens for the French and British national carriers</li> </ul> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 2.4. Summary: Societal drivers and barriers

### 2.4.1. Concorde

| Drivers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Barriers                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Great support for the initiative in both France and the United Kingdom, given by the high symbolic value of the initiative and importance attributed by public authorities</li> <li>• Strong commitment of the workers who take part in the design and production, due to its high symbolic value</li> <li>• At the national level, influence of the trade unions (particularly for the Labour party, victorious in 1964 general elections) in stopping intentions of withdrawal from the agreement</li> </ul> | <ul style="list-style-type: none"> <li>• Cultural and linguistic differences between the French and the UK teams</li> <li>• Increasing opposition to the production, due to high costs, environmental impact (noise and pollution)</li> <li>• Opposition to the use of the supersonic aircraft, because the noise pollution was significant<sup>34</sup></li> </ul> |

### 2.4.2. Airbus

| Drivers | Barriers |
|---------|----------|
|---------|----------|

<sup>33</sup> This new situation took the European governments to move from cooperation to integration of their aerospace industries

<sup>34</sup> The noise pollution was intolerable for human ears and not suitable for people living near airports; moreover, it created shockwaves, which are sonic booms capable of shaking buildings, breaking glass and causing harm to eardrums.

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Change in travel paradigms: in the early years of the development of the civilian aviation industries in the 1960s and 1970s, customers showed a preference for “point to point” air travel, with smaller jets flying direct (in contrast with what the American Boeing industry was offering, i.e. bigger planes for long-haul flights)<sup>35</sup></li> <li>• Focus on technological advancements: faced with the fierce American competition, Airbus built its competitiveness on investments oriented towards technological advancement and on its market orientation</li> </ul> | <ul style="list-style-type: none"> <li>• Cultural and linguistic differences between the French and the UK partners</li> <li>• Outcome of the Concorde’s difficult endeavour</li> <li>• Economic difficulties in main industrial companies of the countries involved (e.g. bankruptcy of the British Rolls-Royce)</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 2.5. Summary: Technological drivers and barriers

### 2.5.1. Concorde

| Drivers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Barriers                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• At the international level, the development of air transport technologies</li> <li>• Strong development of the metallurgical and electric industries, heavily compromised in the decades post-WW2<sup>36</sup></li> <li>• Advanced development of and great interest in the supersonic technology (particularly in the United Kingdom in the late 1950s)</li> <li>• Technological advantages in the aviation sector gained during the WW2 period through the significant military spending: the expertise gained made the development of the Concorde possible</li> </ul> | <ul style="list-style-type: none"> <li>• Risk linked to the new technologies needed to develop the SST</li> </ul> |

### 2.5.2. Airbus

| Drivers                                                                                                                                                                                                                                      | Barriers                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Technological advantages in the aviation sector gained during the WW2 period through the significant military spending: the expertise gained made the development of the Airbus possible</li> </ul> | <ul style="list-style-type: none"> <li>• N.A.</li> </ul> |

## 2.6. Summary: Legal drivers and barriers

### 2.6.1. Concorde

| Drivers | Barriers |
|---------|----------|
|---------|----------|

<sup>35</sup> Tovey, “How Airbus Achieved the Miracle of Keeping a European Project Flying”

<sup>36</sup> Touscoz, “La coopération aéronautique franco-britannique : l’affaire Concorde”

|                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Role of the United Nations (UN), under which umbrella the international agreement was signed</li> <li>• Absence of an opt-out clause in the international agreement (which would have allowed the United Kingdom to withdraw from the Concorde project, due to governmental concerns)</li> </ul> | <ul style="list-style-type: none"> <li>• Differences in tax calculations<sup>37</sup>;</li> <li>• Governance difficulties in the implementation of the cooperation as decision making was heavily dependent on the governmental and industrial partners and their own strategies<sup>38</sup></li> <li>• Impossibility of revision of the agreement</li> <li>• Difficulties in determining the ownership of the project results<sup>39</sup></li> <li>• Unbalanced composition of the Standing Committee of Officials<sup>40</sup></li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 2.6.2. Airbus

| Drivers                                                                                                                               | Barriers                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• The harmonisation of legal frameworks prompted by the European Union institutions</li> </ul> | <ul style="list-style-type: none"> <li>• Differences in tax calculations<sup>41</sup>;</li> <li>• Claims at the WTO about the Repayable Launch Investment, considered a means of subsidy for the Airbus company and against WTO rules</li> </ul> |

## 2.7. Summary: Environmental drivers and barriers

### 2.7.1. Concorde

| Drivers | Barriers |
|---------|----------|
|---------|----------|

<sup>37</sup> The third paragraph of the international treaty poses serious challenges due to the fact that VAT rates are different in the two countries; the very definition of "taxes" become a problem. These were topics of constant discussion. *La coopération aéronautique franco-britannique: l'affaire Concorde, 1965, p.180*

<sup>38</sup> The Concorde project was not run on the existence of an administrative body in charge of the full management of the initiatives taking to the design and production of the aircrafts; instead, the negotiating bodies decided on not creating a parallel administration and opted for light management based on existing administrative structures in the two countries. The Standing Committee of Officials – supreme decision-maker in the project – did not have the capabilities to effectively contribute to the management of the project due to its solemn nature. Therefore, two other bodies, which were not foreseen in the treaty, were created: the TASC (Technical and Administrative Subcommittee), and specialised committees for technicalities.

<sup>39</sup> From the technical point of view, the Concorde project was particularly challenging, in term of ensuring the security of workers and pilots, of registration of the new aircrafts – as being the production shared among two countries, the ownership was not clearly determined –, and of intellectual property rights – determining the ownership of patents and industrial designs produced.

<sup>40</sup> Its British component did not include a representative of the Ministry of Finance, as the Minister with such a portfolio was particularly critical towards the budgetary expenses due to the Concorde project.

<sup>41</sup> The third paragraph of the international treaty poses serious challenges due to the fact that VAT rates were different in the two countries; the very same definition of "taxes" become a problem. These were topics of constant discussion. *La coopération aéronautique franco-britannique: l'affaire Concorde, 1965, p.180*

|                                                                                                                        |                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>No major environmental drivers in support of the Concorde initiative</li> </ul> | <ul style="list-style-type: none"> <li>Relevant air pollution, due to the amount of oil used for the supersonic boom</li> <li>Relevant noise pollution during flight and taking off</li> <li>Contribution to the degradation of the ozone layer, particularly topical during the 1990s<sup>42</sup></li> </ul> |
|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 2.7.2. Airbus

| Drivers                                                                                                                                                                                                                                               | Barriers                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <ul style="list-style-type: none"> <li>No major environmental drivers in support of the Airbus initiative</li> <li>Difference from the main American competitor (Boeing), which produced polluting aircrafts (for noise and air pollution)</li> </ul> | <ul style="list-style-type: none"> <li>N.A.</li> </ul> |

## 2.8. Strategic and operative objectives and milestones of the initiative

France and the United Kingdom had similar objectives, which led them to decide to invest jointly in the Concorde endeavour.

First, the common objective to develop the first supersonic aircraft for civilian transport. As already mentioned, R&D in the supersonic transport (SST) solutions gained new interest among several governments from the mid-1950s. However, after that the Americans turned down their project of a supersonic Boeing aircraft and faced with Russian competition, France and the United Kingdom assumed that only through cooperation they would be able to develop a supersonic plane.

Both countries wished to reorganise and strengthen their respective aircraft industries, which were the two most advanced in Europe, but which could not fully compete with the American and Russian equivalents. Moreover, an additional objective pursued by Concorde partners was to develop technological industrial sectors linked to the aircraft industry.

The international agreement between the two countries for the launch of the Concorde expressed agreement on common interests, and also served to consolidate national strategies.

France's President **de Gaulle**, even if conscious of the difference in resources and expertise between the British and French aircraft industries, wanted to leverage the SST technology endeavour to restructure and relaunch the aircraft industry, severely downsized in the aftermath of the WW2.

As proved by other military and diplomatic actions taken since coming to power, President de Gaulle wished to restore the French *grandeur* and to make France a main actor in the geopolitical arena. With the specific purpose of strengthening the position of France on the international stage by leveraging technological advantages, France engaged in the Concorde project.

<sup>42</sup> Concorde was considered damaging the ozone layer due its heavy fuel consumption, thereby letting the sun's rays enter the environment, which ultimately causes diseases like skin cancer. In the late 1970s, the World Meteorological Organization, a UN agency in Geneva, reported that a "large fleet" (200 to 300) of supersonic planes could have a noticeable effect on the ozone layer. <https://www.theatlantic.com/past/docs/issues/77jan/gillman2.htm>

In the Concorde endeavour, the **United Kingdom** changed its objectives over time, as a consequence of the tentative withdrawal triggered in the early 1960s, a few years after the signature of the international agreement.

After the end of WW2, the United Kingdom engaged in a difficult reconstruction and recovery, which entailed strategic choices to reorganise its main industrial sectors, heavily compromised by the conflict operations. After having specialised their aircraft industries in the production of military jets – as agreed with their American counterparts – the United Kingdom wanted to revamp the national production of aircrafts for civilian purposes, by restructuring and rationalising the entire industry. At the same time, by doing so, the government aimed also to maintain the aircraft industry's levels of employment. Therefore, the launch of a new productive initiative with good margins for commercial success was considered the right solution.

In the years that led to the negotiation of the bilateral agreement, the British political and economic elites became particularly keen on supporting the European integration, and the United Kingdom took part in several initiatives to develop collaboration structures in military and economic areas, among which the most developed and promising certainly was the European Economic Community (EEC). Taking part in a joint operation with France, like the Concorde project, required, in the view of the UK supporters of integration into EEC, to convince President de Gaulle of accepting the United Kingdom in the still continental international organisation, whereas the French Head of State had already demonstrated his reluctance in this respect<sup>43</sup>. However, the objective to integrate the EEC became progressively less important, as the domestic objectives changed from seeking a more efficient use of resources in the aircraft industry to simply maintaining the aircraft industry's levels of employment, to promote political stability.

On an international level, while always maintaining the special relationship with the United States, once the perspectives of joint ventures and other forms of collaboration with the Americans in the aerospace sector blurred, the United Kingdom bet on a collaboration with its European neighbour to outclass US aircraft industry. At that time, the SST technology has become topical in the industrial investment plans: the Concorde consortium offered the opportunity to invest in technological advancements with fair chances of success to limit the expansion of the American aircraft industry.

As the driving force of the Airbus initiative has been more political than economical, the strategic objectives followed mainly geopolitical patterns. By prompting the collaboration among different national aircraft producers, the European governments aimed to create and **develop a European consortium of European aircraft manufacturers which would be able to compete globally with their American competitors**, such as Boeing, Lockheed and McDonnell Douglas, which already counted on a stable and well developed internal market.

The original partners in the Airbus initiative recognised that the only way to compete with their American companies was to consolidate national industries on a regional European basis. Through negotiation rounds, the funding national companies decided how to divide the different manufacturing operations, such that they could elaborate on **the highly advanced expertise in each national industry**. The French partner made the cockpit, the control systems and the lower-centre section of the fuselage; the UK made the wings, and the Germans were in charge of the rest of the fuselage and a part of the centre section. They were later joined by Dutch and Spanish partners, whose responsibility were the following: the moving parts of the wing, the flaps and the spoilers for the former, while the

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<sup>43</sup> Grieco, "The Concorde SST and Change in the British Polity." However, the hopes of the British got frustrated, as President De Gaulle vetoed the entry of the UK in the EEC in January 1963, less than 12 months after the historical signature for Concorde (according to the provisions of the Treaty of Rome, 1957).



latter took charge of the horizontal tail plane. The final assemblage was made in Toulouse, France.

European governments and companies were also moved by the urgency to create a European producer of airplanes larger than those produced up to that moment, which would have been suitable for long and medium routes, as those which have been opening since the mid-1950s in Europe as in other regions. Both the famous French Caravelle and the British Comet, despite their huge success in the decades corresponding to the post-war economic development, were too small for the needs of the market.

However, each of the four countries that supported national manufacturers, part of the consortium had specific domestic objectives to fulfil. For instance, Germany aimed to develop an industrial partnership with France and other EEC members' counterparts, to strengthen the European integration process, while the objectives pursued by the Spanish partners were to acquire legitimacy in front of the international counterparts,<sup>44</sup> to develop industrial partnership with other European powers, and to establish political and economic partnerships with the EEC.

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<sup>44</sup> The Spanish CASA joined the consortium in 1971.

### 3. RESOURCES AND MANAGEMENT

#### 3.1. Governance and management model

Concorde and Airbus initiatives benefitted from well-designed governance system that enabled their continuous operation while building on the respective strengths of their industrial partners. The governing bodies of Airbus, which gradually turned into a private company, furthermore played a key role in its success by balancing national and political interests and strengthening the market orientation and commercial strategy. On the reverse, the bodies established as part of the Concorde projects were still highly dominated by the national Government, the industrial partners and their respective interests.

The Concorde project and the implied cooperation between France and the United Kingdom relied on a series of international agreements, either between involved companies (Sud-Aviation and British Aircraft Corporation BAC in October 1962, and Bristol Siddeley and Société nationale d'études et de construction de moteurs d'avions SNECMA in November 1961) and between governments (in November 1962). The first article of the latter agreement (between the French and the UK governments) states that both countries share equally the risks implied by the project and the invested resources all along the project.

The governance of the Concorde project consists of a Standing Committee of Officials in charge of the monitoring (article 6 of the UK-French 1962 agreement), and two Committees of Directors (respectively in charge of the technical aspects relative to the airframe and to the engine). The stability of the composition of the Standing Committee of Official ensured the stability and continuity within the project. Both Committees of Directors were composed of an equal number of representatives of the French and British industrial partners (the chair alternating every other year). Despite the creation of these dedicated bodies, the Concorde projects relied to a high extent, regarding the technical decisions, on the governance of its industrial partners.

Industrial partners had been allocated the development and manufacturing of components with an overall attention paid to avoid any duplication. The aircraft, including its prototypes, was assembled nevertheless by a single company.

In the course of the project, the Standing Committee of Officials proved unable to ensure a continued management and monitoring of the project (partly because of the high-level position of its members). Therefore, it was decided to establish two additional bodies: the Technical and Administrative Sub-Committee (TASC) permanently managing the project; and specialised technical sub-groups advising the Standing Committee of Officials.

The conduct of the Concorde project therefore relied on a dense and complex network of UK and French national administrations and aerospace industries, which fostered the success of their collaboration. Furthermore, this governance system successfully prevented the political change and Cabinet reshuffles at national level from impeding the progress of the project.<sup>45</sup>

Sud-Aviation and BAC (then British Aerospace BAE) became later parts of Airbus.<sup>46</sup>

The governance of **Airbus** should be considered divided in three periods: the first governance, established by articles 4 and 5 of the international treaty, and goes from the establishment of the Groupement d'intérêt économique (GIE) in 1970 until 1989; the

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<sup>45</sup> Touscoz, "La coopération aéronautique franco-britannique : l'affaire Concorde"

<sup>46</sup> Rowbotham, "Concorde 40 Years on: What Have We Learned?"

second governance, from its major reform until the establishment of the EADS in 2000; and a third governance, which is still currently in force.

In the first governance period, French and German manufacturers had the major role in taking the main strategic decisions of the consortium (following the British withdrawal in 1969). The system was profoundly two-headed, as all relevant position consisted in a co-chairmanship of one French and one German representative. However, the GIE succeeded in establishing its leadership over Airbus operations by relying on its commercial expertise. Therefore, it had been able to balance the sometimes-diverging rationales of the governmental and industrial partners involved. The Supervisory Board and the Director General took the strategic decisions for the consortium. The coordination of research and production, client interface and the test-flying were guaranteed by the independent entity of Airbus Industrie. This was a result of negotiations between the French and German counterparts (the French would have preferred these services to be under total control of one single manufacturer, i.e. the French component, the *Aérospatiale*).<sup>47</sup>

In the second governance period, which was prompted by the re-joining of the United Kingdom, the Airbus governance became less dependent on national government and more balanced between the then four countries (France, Germany, Spain and the United Kingdom). The reform of 1989 did not change the legal structure of the Airbus Group; however, new bodies were created as the joining of new members occurred and as the differentiation of services required a broader distribution of responsibilities. Moreover, it established a better equilibrium between the countries composing the consortium. The Supervisory Board was reduced to five members (four members, one for each company of the consortium, one president) and given the role of making the final strategic decisions concerning the Airbus programme. The Director General was replaced by a Chief Operating Officer with the role of overseeing the everyday activities of the consortium. In addition, the figure of the Financial Director<sup>48</sup> was created and the Executive Board (seven members) was formed as instrument of control of the partners over the consortium (seven members, presided over by the president of Airbus and composed of the directors of the aircraft divisions of the four partner companies plus the chief operating officer and the financial director of Airbus Industry).

In the third period, Airbus Group was privatised and became a holding company (80% EADS, 20% British Aerospace). Until 2001, GIE Airbus Industrie was controlled by the countries in the consortium: *Aérospatiale-Matra* held 37.9% of the shares, *DASA Daimler Chrysler Aerospace AG* (funded by *Deutsche Aerospace* at the end of the 1980s) 37.9%, *British Aerospace* 20%, and *CASA (Construcciones Aeronáuticas SA)* 4.2%. In 2000, the French, German and Spanish manufacturers merged into the European Aeronautic Defence and Space Company (EADS), with *DASA* operating as EADS Germany. In 2001, EADS and BAE formed the Airbus Integrated Company (Airbus SAS).<sup>49</sup> The creation of the new holding company coincided with the development of the Airbus A380, the world's largest commercial passenger jet. Until the reforms of the 2000s, the governance structure foresaw a co-chairmanship of all executive positions, having both one German and one French national in the top positions. New bodies and figures were added to the previous structure. The Board of Directors (12 members appointed and removed from the Shareholders' Meeting) is responsible for the management of the Company and for the overall conduct of the Group. The board is supported by three other committees: the Audit Committee, the Remuneration, Nomination and Governance Committee (RNGC, which makes recommendations for major appointments within the Group), the Ethics & Compliance Committee (which supports the Board in overseeing Airbus culture and commitment to ethical business and integrity), the Executive Committee (which supports the Chief Executive Officer in his duty of managing the day-to-day operations of the Company, and it is chaired by the CEO). In order to keep shareholders informed, Airbus

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<sup>47</sup> Muller, "Airbus: Partners and Paradoxes"

<sup>48</sup> The first time a high position in the Airbus governance had been given to a UK national.

<sup>49</sup> Airbus SAS employed about 57 000 people, mainly in six EU countries.

Group holds Annual General Meetings, where the members of the Board of Directors are elected.<sup>50</sup>

### **3.2. Financing model**

Both the Concorde project and the Airbus programme have been prompted by the intervention of the national governments (or international organisations, such as the EEC in the case of the Airbus). For this reason, the share of the public funds fuelling both initiatives has been fundamental in their early days as well as in the more difficult periods (such as the 1970s oil crisis).

The UK-French Agreement signed on 29 November 1962 for the launch of the Concorde initiative specified that the work and expenditure for the development and production of the aircraft would be shared equally between France and the United Kingdom. The induced costs were initially estimated to amount to around EUR 2.4 billion (FRF 14 billion). There is no official estimate of the total costs of the Concorde project, and available ones vary between a few billion and a few dozen billion euro. For instance, an aerospace-dedicated website for aerospace engineers and scientists reported that the costs for the development and production of the first four Concorde aircrafts amounted only to EUR 1.8 billion (GBP 1.134 billion). The cost for producing the remainder 16 aircrafts was assessed to account for EUR 1.1 billion (GBP 654 million). In addition to these development and production costs, the UK and French government subsidised the maintenance costs of the operating aircrafts.<sup>51</sup> Another estimate of total expenditure induced by Concorde, including interest rates and adjusted to 1975 prices, equals EUR 7.6 billion (GBP 4.26 billion).<sup>52</sup>

In a report to the UK Parliament, the total UK Government gross expenditure given in support until 2003 was estimated at EUR 2.0 billion (GBR 1.35 billion).<sup>53</sup> The French Government invested EUR 3.9 billion in the Concorde programme over 1970-1990.<sup>54</sup>

As the Concorde aircraft was meant to be sold to airline companies beyond those which had to commit to procure it, part of its financing model was designed as relying on potential benefits from such sales. However, as no airline company other than the state-owned Air France and British Airways was willing to buy Concorde aircraft, the French and the UK Governments did not recoup their investments.

The development of Airbus was similarly supported by public funds. Since the 1960s, the governments involved in the initiative were granted significant funding via Repayable Launch Investments (see Description of R&I policy instruments below). A report of the Business, Innovation and Skills Committee of the UK House of Commons reported on the importance of such a funding scheme in the government policy in support of the national aerospace industry. For instance, Airbus received, from the UK Government, EUR 382 million (GBP 340 million) in 2009 for the development of the A350XWB.<sup>55</sup> Through a similar scheme, the French government provided financial support to the development of the A380 amounting to EUR 1.2 billion in 2004, and received an application for EUR 1 billion support for the A350.<sup>56</sup> The total amount of government support that Airbus has thereby received is assessed to amount to USD 15 billion since 1992 and USD 40 billion since its launch

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<sup>50</sup> Airbus Corporate Governance, <http://company.airbus.com/company/corporate-governance.html>

<sup>51</sup> Aerospaceweb.org, "Concorde History"

<sup>52</sup> Gillman, "Supersonic Bust"

<sup>53</sup> Butcher, "Aviation: Concorde"

<sup>54</sup> Beffa, *Pour Une Nouvelle Politique Industrielle*

<sup>55</sup> House of Commons, "Full Speed Ahead: Maintaining UK Excellence in Motorsport and Aerospace"

<sup>56</sup> Beffa, *Pour Une Nouvelle Politique Industrielle*

(according to the 2004 complaint filed by the United States to the World Trade Organisation). Even though Airbus is still receiving public financial support, public grants have lost importance in its business model subsequent to its privatisation.

### **3.3. Key actors and key technologies and platforms involved in the initiative**

#### *3.3.1. Key actors*

**National governments:** the national governments were the main promoters of the Concorde and Airbus programmes. They backed the national companies by holding shares in them. More specifically, France's President de Gaulle played a prominent role in leading the negotiation and preparatory work that led to the signature of the Concorde agreement. The President was a major supporter of European initiatives challenging their American counterparts, on condition that the French industry would have played a significant role. In the United Kingdom, the Conservative-led governments during the 1950s and early 1960s played a major role in determining the industrial policy of the country, and took the fundamental decisions that brought about the Concorde and Airbus programmes.

**Aviation industrial companies:** both programmes were made possible thanks to the participation of national companies in the aviation and metallurgical sectors.

- **SNECMA (Société nationale d'études et de construction de moteurs d'aviation):** the French engine manufacturer was part of the agreements at the basis of both the Concorde project and the Airbus consortium. SNECMA was a state-owned and publicly-funded enterprise, whose origin traces back to the origin of the French Fourth Republic: the Minister of Aviation, Charles Tillon, formed it as a nationalised entity by merging the respective aeroplane engine divisions of Renault and Gnome-et-Rhône, both nationalised after the liberation for having collaborated with the Nazi Petain regime<sup>57</sup>.
- **Hawker Siddeley:** English company, which manufactured the wings for the (first) Airbus planes, and which later on merged with **BAC** (former **British Aerospace, Bae**) in 1977 and become **BAE Systems**.
- **Sud-Aviation:** French company in the aircraft industry, which manufactured the main components for the (first) Airbus planes and was the French component in the joint venture which led to the Concorde.
- **CASA:** Spanish manufacturer in the aircraft industry, which joined the Airbus consortium in 1971 and contributed to the creation of main innovative components for the (first) Airbus planes.<sup>58</sup>

### **Key technologies and platforms**

**Delta Wings:** the characteristic wing with a specific slender and aerodynamic shape, containing over six trailing edge "elevons" (control surfaces that combine the functions of the elevator and the aileron) that replace the traditional elevators and ailerons that allow control of both pitch and roll of the aircraft. The Delta wing allowed the Concorde to generate sufficient lift at low speeds by increasing the angle of attack of the wing, but also

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<sup>57</sup> Johnman and Lynch, "The Road to Concorde: Franco-British Relations and the Supersonic Project"

<sup>58</sup> Vindt, "Airbus: Une Success Story Européenne"

to perform very efficiently at high speeds and land very smoothly even if at a much higher speed than traditional planes.

**Pinpoint Movable Nose:** also known as “droop-nose”, it was a feature of the Russian SST plane, the Tupolev Tu-144, too. When in service, the very front of the plane would have lowered the nose cone to improve visibility of the runway and taxiways for the pilots. When in flight, the nose would be raised. Concorde also had a moving visor that would slide into and out of the nose.

**The spray guard** (also called the tire guard): small metal strip located on the rear of the nose and main landing gear. Since Concorde had much faster take-off and landing speeds than other aircrafts, the turning wheels often threw water or other debris up from the runway and towards the underside of the aircraft, which could potentially and critically damage the aircraft. The purpose of the spray guard was to deflect that debris away so that it would not threaten the plane.

### 3.4. Monitoring system and evaluation of the initiatives

Both the Concorde and Airbus initiatives had monitoring mechanisms in place. Furthermore, because of their high visibility and widespread public interest in aircraft, many studies have been produced by experts, researchers and amateurs and document well their history, implied technological developments, commercial progress, state of the fleets, etc. However, the decision-making process within both initiatives did not use to the same extent the outputs of (official) interim evaluation and monitoring exercises.

The UK-French Agreement signed in 1962 for the launch of the Concorde project includes provision on monitoring mechanisms. Article 6 states that “a Standing Committee of officials from the two countries shall supervise the progress of the work, report to the Governments and propose the necessary measures for the carrying out of the programme”. There is evidence that cost monitoring exercises had actually been conducted. For instance, in a 1964 briefing note to the UK Prime Minister, a significant increase of the costs to at least GBP 275 billion (“*nearly as much as the cost of two Channel Tunnels*”) was reported.<sup>59</sup> Similarly, the French State Secretary of Transports forecast, in a 1966 note to the Prime Minister, that the costs would exceed the initial estimates.<sup>60</sup> However, even though both governments were informed and made aware of a significant and unexpected increase in the costs of the Concorde development, they finally decided to pursue the project (in spite of some initial reserves on the UK side). The rationale for this decision is both strategic and political: the Concorde initiative was still seen as a means to strengthen the national aerospace industry, and a similar project was still ongoing in the United States. The aforementioned briefing notes to Prime Minister Douglas-Home contented therefore that “*it would not be practical politics to throw [Concorde] overboard now*”. Most importantly, the diplomatic documents reveal the importance of the political dimension in the final decision to pursue the Concorde project, especially in France where it was considered a ‘grand projet’ and which was highly promoted by the President of the Republic at that time (President de Gaulle).

Despite these evidenced monitoring mechanisms, the total cost of Concorde has not been publicly communicated. Estimates made by experts vary largely between a few billion euro and a few dozen of billion euro (see Financing model above).

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<sup>59</sup> UK Government, “The Concord”

<sup>60</sup> French Government, “Le Point de L’opération Concorde Au 1er Juillet 1966”

In addition to economic monitoring mechanisms, the development process of Concorde included a trial phase with prototypes which enabled the identification of problems and the adaptation of technologies accordingly.

A major strength of Airbus is its responsiveness to market exigence since its early days. Besides technological and industrial solutions, the consortium has proved to be able to adapt to new requirements and changing market environments. Airbus was one of the first European industries to have a commercial strategy embracing visits to clients' premises, trials of prototypes, and exploration of new markets. Airline companies (i.e. potential buyers) were consulted for the design of aircraft. The constraints of existing infrastructure (i.e. airports), and the habits and wishes of passengers were additionally considered for the same purpose. Such a strategy is nowadays even more prominent as Airbus became a private company. Its governance includes, for instance, an Audit Committee in charge of approving financial statements of the companies and ensuring the operation of auditing activities.

It can be furthermore assumed that monitoring mechanisms are put in place at the project level guaranteeing that the developments of specific aircraft proceed well and in the direction of the set objectives. For instance, Airbus ceased, in early 2017, the development of an electric aircraft as part of the so-called E-Fan project. It was reported to be no longer in line with most recent technological developments, and that more ambitious objectives could be set. However, the technologies developed in this context will be used for developing instead a hybrid electric aircraft, the E-FanX.<sup>61</sup>

### **3.5. Level and type of citizen engagement in the initiative**

Given that both the Concorde and the Airbus programmes are commercial initiatives, the citizen engagement level has been particularly low. Citizens have not been involved in the design of the two programmes, if not as final consumers. Due to the fact that both are the result of the political will of national policymakers, the citizens have participated by other means into the decision process that led to their implementation, e.g. via political campaigns or electoral processes when the budget spending for the Airbus and particularly for the Concorde project has been a topic of national electoral campaigns.

The negotiations that led to the signature of the Anglo-French treaty have remained secret and anonymous. The very first time the British Parliament was permitted to debate the Concorde project was one month *after* the treaty had committed the United Kingdom irrevocably to contribute to the development of the plane (December 1962).<sup>62</sup>

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<sup>61</sup> Calderwood, "Airbus Abandons E-Fan as Electric Tech Moves on"

<sup>62</sup> Gillman, "Supersonic Bust"

## **4. POLICY INSTRUMENTS AND WIDER POLICY MIX USED FOR IMPLEMENTING THE INITIATIVE.**

### **4.1. Description of the R&I policy instruments used for implementing the initiative**

Slightly different policy mixes have been employed for the achievement of the Concorde and Airbus initiatives. Both have relied on public financial support for the development of the aircraft and their components (including technologies). However, public procurement was the main means to accelerate (tentatively) the uptake of Concorde, whereas Airbus adopted a more market-based approach by designing and producing aircraft in response to orders of airline companies (beyond those of the state-owned companies of the countries involved in the Airbus initiative).

The governments involved in both initiatives support financially their national aerospace industries via Repayable Launch Investments. This scheme consists of financial risk-sharing investment for the design and development of civilian aerospace projects. It aims to fund projects that would otherwise get hardly any funding from capital markets because of their high product development costs, high technological and market risks and long pay back periods on investments. Once aircraft are developed and successfully commercialised, the earnings from sales are used to repay, at a commercial rate of return, the government investments. The UK Government provides additional support to the aerospace industry by providing export credits.<sup>63</sup>

In the case of Concorde, in addition to the financial support for development and manufacturing, the UK and French governments granted funding to their national airline companies for covering the costs induced by the operation of the aircrafts. Indeed, because of unexpected inflation and a significant increase in petrol price, operating Concorde aircraft was much more expensive than initially forecast.

In line with the 1969 UK-French agreement, the airline companies of both countries, i.e. British Airways and Air France, which were both state-owned at that time, committed themselves to procure a specific number of aircrafts. In 1977, five were bought by British Airways and four by Air France at an estimated cost of EUR 35 million (GBP 23 million) each in 1977 prices.<sup>64</sup> This type of public procurement is said to be 'catalytic' as what it procures (here aircrafts) is aimed at being used ultimately by private users. The success of the initiative therefore depends on the actual market penetration of the procured goods, i.e. on subsequent (private) demand.<sup>65</sup> However, in this case, no other airline company willing to buy Concorde aircrafts was found. In consequence, the rest of produced fleet was acquired by British Airways and Air France.

Air France was also the first buyer of the first Airbus aircraft. Therefore, it can be contended that public procurement was one of the R&I policy instruments employed for achieving the objectives of the initiative. However, the main difference with Concorde is that the success of Airbus started with the first orders outside Europe in 1977 (to the US-based Eastern Air Lines). It benefitted from lower operating costs that made it more competitive than Concorde, but also from a strategy that is more market oriented. Indeed, the design of Airbus involved further airline companies and airport operators to identify better the needs and the constraints. The Groupement d'intérêt économique (GIE) Airbus, which was the main governing body of Airbus in its early phase, had recognised commercial expertise and applied sales techniques that were still barely used at that time in Europe: systemic visits

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<sup>63</sup> House of Commons, "Full Speed Ahead: Maintaining UK Excellence in Motorsport and Aerospace"

<sup>64</sup> Aerospaceweb.org, "Concorde History"

<sup>65</sup> Edler and Georghiou, "Public Procurement and Innovation - Resurrecting the Demand Side"



to all clients, demonstration of prototypes, exploration of new markets, etc.<sup>66</sup> This market orientation has been further developed and driven by the gradual transformation of Airbus into a private company.

Airbus indirectly benefits from regional policies in France's Occitanie region (previously, Midi-Pyrénées) where its operational headquarters is located. For instance, the Competitiveness Cluster Aerospace Valley supports, notably via dedicated public funding (e.g. Inter-Ministerial Unique Fund FUI), collaborative research and innovation activities between different actors of the local aerospace industry.

#### **4.2. Connection with other policies**

Both initiatives are the result of the strong driving force for European integration, started immediately after the end of the conflict in Western Europe under the American umbrella. They were driven by a common willingness to increase cooperation between European countries and their industries in order to strengthen their competitiveness against the global powers of that time, i.e. the United States and the Soviet Union, in the context of the Cold War.

Concorde and Airbus were not only research and innovation initiatives. They could also be conceived, considering their ultimate objective, as industrial policy aimed at boosting a particular sector, which is here the aerospace industry. For this reason, the UK Government additionally provides, for instance, export credits to national aerospace companies including Airbus.<sup>67</sup>

The (civilian) aerospace industry has historically had an important strategical dimension at least in France, Germany and the United Kingdom. It has been for long considered, by the military, as the testing ground of new technologies that could then be used for defence purposes. In consequence, the maintain of strong national aerospace industries is linked to national strategic interests and has justified large public funding (and the involvement of the Ministry of Defence on this issue in France).<sup>68</sup>

Despite its privatisation, Airbus has maintained strong ties with the defence sector. It develops and commercialises dedicated aircraft (e.g. A400M) within dedicated business units (e.g. the 1997-established Airbus Military SAS). Furthermore, the former name of the Airbus Group, which still includes a Defence and Space Executive Committee, was the European Aeronautic Defence and Space Company.

Airbus has also gained importance for the local economy of the French region Occitanie (previously, Midi-Pyrénées) where its operational headquarters is located, and has contributed to accelerating the development of a local aeronautical industry. Regional initiatives for supporting this industry benefits indirectly Airbus. For instance, the Regional Council implemented initiatives like the Action Plan for the Development of Regional Subcontractors (plan d'actions pour le développement des entreprises régionales de sous-traitance ADER) which was launched in 2000 and renewed in 2006 and which targeted (mostly Airbus') local subcontractors in the aerospace industry.<sup>69</sup> An Aeronautic Plan provided EUR 130 million over 2011-2014 and EUR 55 million over 2015-2016 to support

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<sup>66</sup> Muller, "Airbus: Partners and Paradoxes"

<sup>67</sup> House of Commons, "Full Speed Ahead: Maintaining UK Excellence in Motorsport and Aerospace"

<sup>68</sup> Muller, "La transformation des modes d'action de l'Etat à travers l'histoire du programme Airbus"

<sup>69</sup> Igalens and Vicens, "Les Mutations Dans Le Secteur Aéronautique : Le Cas d'Airbus En Midi Pyrénées"

the same industry.<sup>70</sup> Finally, Airbus has access to (public) infrastructure facilities (airports) for testing its aircrafts in Occitanie and other regions.

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<sup>70</sup> Angel, "La Région Midi-Pyrénées Alloue 55 Millions D'euros Supplémentaires Pour L'aéronautique"

## 5. REALISED OR EXPECTED OUTPUTS, OUTCOMES AND IMPACTS

### 5.1. Outputs and New Instruments

The cooperation between the French and British aerospace carriers produced:

- **Airplanes for civilian use (passengers and trade):** between 1966 and 1979, a total of 20 Concorde were built. The first two Concorde were prototype models (one built in France and the other in the United Kingdom), while two other pre-production prototypes were built to refine further the design and test ground-breaking systems before the production runs. Therefore, the total number of aircrafts which were commenced in both countries amount to 16 only.<sup>71</sup> Out of the 18 air companies that ordered Concorde for their fleets, only British Airways and Air France finally purchased them, as these were politically and economically backed by their national governments.<sup>72</sup>
- **Development of new technological features for the aerospace industry:** Concorde has become an essential masterpiece of engineering for the following three technological improvements: the delta wings, pinpoint movable nose and the spray guard:
- **Profits:** In the long run, the Concorde cannot be considered as a profitable transport solution, as it has been removed from the market specifically for its exponential costs. However, researchers found that for the national governments the supersonic adventure has been particularly interesting regarding costs, as for the national carriers, gains exceeded the initial losses. British Airways made an operating profit of GBP 30-50 million a year in the boom years when many passengers were travelling first class. British Airways reportedly received GBP 1.75 billion in revenue for Concorde services against an operating cost of around GBP 1 billion. Air France made a much smaller profit.<sup>73</sup>

Besides the abovementioned concrete results, Concorde proved to be extremely useful as an instrument for other sectors, which did not entail civilian aviation: for instance, it served the militaries of both the United Kingdom and France. First, the research activities resulted in new expertise and patents which proved to be useful to the production of military aircraft. Secondly, the new prototypes served to train RAF pilots: when Concorde was originally announced, at the beginning of the trials leading to its commercialisation, the RAF used it to determine the ability of its pilots to intercept incoming supersonic enemy aircraft (no supersonic fighter in either the US and the United Kingdom was capable of intercepting the aircraft's supersonic speed).<sup>74</sup>

As for Concorde, the Airbus initiative had some very concrete outputs, which can be summarised as follows:

- **Airplanes for civilian use (passengers and trade):** since its early years, Airbus has seen an exponential increase in orders, and nowadays it has become one the

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<sup>71</sup> Concorde, The Fleet: <http://www.concordesst.com/fleet.html>. Retrieved on 22<sup>nd</sup> December 2017

<sup>72</sup> Concorde orders and options: <https://www.heritageconcorde.com/concorde-orders-and-options>. Retrieved on 22<sup>nd</sup> December 2017

<sup>73</sup> Concorde History: <http://www.aerospaceweb.org/question/planes/q0186.shtml>. Retrieved on 22<sup>nd</sup> December 2017

<sup>74</sup> Rowbotham, "Concorde 40 Years on: What Have We Learned?"

most important aircraft producers in the world. In 2016, for the first time in history, Airbus sold more than Boeing, its historical competitor;

- **Development of new technological features:** the development of the European aerospace cluster triggered investments and gave the conditions for expertise gains. Now there are hundreds of enterprises (majority being SMEs), operating in a broad range of different sectors, divided in 10 branches and established in several EU and non-EU countries;
- **Profit**, which had been redistributed to the national companies integrating the consortium and, since privatisation, to the shareholders. At the end of 2017, the total revenue of the Airbus company was of EUR 43 billion, while the operating income is more than EUR 1.5 billion.

In addition to the most quantitative outputs, the huge investments put in place for Concorde and for the Airbus triggered and supported the birth and development of the industrial leaders involved in the two initiatives, with the cascade effect of producing jobs and growth.

## 5.2. Outcomes

The outcomes of Anglo-French supersonic endeavour were mainly:

- Production of the **first supersonic passenger aircraft**:<sup>75</sup> the construction of the first prototype began in 1965, with the first test flight in March **1969**, and went supersonic in October 1969. Commercial passenger service began in January 1976 with flights from Paris to Rio de Janeiro (via Dakar) by Air France and from London to Bahrain by British Airways. Later on, new routes were commercialised: from Paris and London to New York, Washington, Caracas (via the Azores), Rio (via Dakar), Bahrain, Mexico (via Washington), Rio de Janeiro (via Dakar), Singapore (via Bahrain), Toronto, Dallas, Miami. The level of service for the two airlines combined was about 110 flights per month for the first year of operation and rose to about 140 per month since inauguration of flights to New York in December 1977. Load factors for all routes have averaged slightly under 50%, but have reached as high as 85% to 90% for North Atlantic routes. The aircraft presently operates at an average of 70% capacity on these routes. Concorde was, however, not the first supersonic aircraft ever produced or ever taking off: the first prototype of the Russian TU-144LL (which was later improved, as TU-144) was produced and tailed in December 1968, two months before the first flight of Concorde, and had its first supersonic flight in June 1969, and became the first commercial transport ever in 1970. However, it was introduced into passenger service only in 1977, almost two years after Concorde, because of budget restrictions. Moreover, only one commercial route (Moscow to the city then known as Alma-Ata) was ever used and flights were limited to one a week;
- **First time that airline companies started targeting a specific segment of the customers:** celebrities, top executives, businessmen and government officials. Due to Concorde's high maintenance expenses and consequent high fares, only first-class consumers could afford the tickets. As a consequence, travelling on the supersonic trans-oceanic routes became a status symbol which profoundly characterised the Concorde experience and also attracted some criticisms against it;
- **Strengthen collaboration between the United Kingdom and France:** besides the economic and diplomatic rivalries between the two countries, the Concorde initiative prompted even closer collaboration between the two economic and political

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<sup>75</sup> Rowbotham, "Concorde 40 Years on: What Have We Learned?"

elites. The French and the British governments were bonded on the personal ties President De Gaulle established during his exile in England after the Nazi occupation of France, the joint military and diplomatic operations (Suez, 1956) and cooperation in several industrial sectors (for instance, the military jet Jaguar, which was conceived before the Concorde and put in service in 1973 and 1974. This strengthened cooperation led during the same years of the entry into service of Concorde to the launch of the cooperation which led to the Airbus (even though, negotiations with the UK government failed and the programme was launched without British participation).

The Airbus programme led to:

- **Development of the first European consortium in the aerospace industry:** the synergies created with the Pan-European collaboration in the framework of the Airbus programme became a model that the European institution and several Member States consider it as a successful model to be applied to other fields (e.g. batteries, ships, etc.);
- **Strong collaboration between the European countries in a strategic industrial sector:** the aerospace and aeronautical sector of all EU Member States which took part in the programme had the possibility to relaunch their national sectors by collaborating and profiting from other countries' expertise;
- **New technological solutions for aviation developed:** the Airbus initiative prompted R&I investments in the companies and the states taking part to it, which was fundamental for the development of new technological solutions which are part of current airplanes. The breaking of the monopoly of the American manufacturers led to healthy competition among the two aerospace clusters.

### 5.3. Impacts

The bilateral collaboration between strategic national industries took to:

- **Advancement in the European integration:** besides the false expectation of the British government, which considered the Concorde endeavour as a driving force to its entry into the EEC, the project strengthened the ties between two strong national industries;
- **From the most imaginative point of view, Concorde contributed to shorten the distances between continents,** as it drastically shortened the travel time for intercontinental routes. With the supersonic plane, capable of flying faster than the Earth could spin, passengers could travel the emblematic routes from London and Paris to New York in less than 3.5 hours. Moreover, the Concorde aircraft became a symbol of national pride in the public imagination, both in France and in the United Kingdom, as before only the United States and USSR were the leaders in aerospace and aviation technology.

The impact at the geopolitical and economic levels of the Airbus were much more significant than those of the Concorde, having significant impact in several European countries. These are:

- **Strong contribution to the European integration:** as it counted – since the beginning – with the participation of national carriers supported by several EU (EEC) Member States, the Airbus initiative prompted additional integration in several aerospace-related domains (e.g. Single European Sky initiative);
- **Saving for EU national carriers:** the national carriers of the states involved do not anymore have to rely on foreign supplies for their airplanes fleets;

- **Breaking of the American hegemony in the world aircraft production:** with the creation of a new industrial cluster able to compete with international well-established competitors (such as the American Boeing industry). In 2016, for the first time in history, Airbus sold more than Boeing, its historical competitor;
- **Economic growth:** the development of the aerospace sector has certainly become a triggering factor for investments in several industrial sectors (ICT, steel supplies, etc.);
- **Strengthened local economy.** The French Occitanie region (formerly, Midi-Pyrénées) benefitted from the presence of the operational headquarters of Airbus. In 2006, Airbus was reported to employ more than 50 000 persons, 10 000 of whom in France. In total, 14 000 were employed by aircraft manufacturers in Midi-Pyrénées in 2004. However, this number rises to 31 000 when considering sub-contractors.<sup>76</sup>
- **Independence for military supplies:** given the fact that European countries have put in common the production of military aircraft and related technologies, national states can rely on Airbus (more specifically Airbus Military SAS, created in 1999) to provide their militaries at a lower price than if they would have to buy them from foreign producers.

#### 5.4. Key turning points of the initiative and policy adaptation measures

The tables below describe the major changes, either external to both Concorde and Airbus (e.g. the oil crisis in the 1970s) or in their conduct (e.g. privatisation of Airbus), how they have been affected by them, and how they have adapted or not to them.

##### 5.4.1. The Concorde Project

| Major changes / turning points of the initiative                                                                                              | Description of the flexibility mechanism / policy adaptation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>1964, UK general elections: the victory of the Labour Party brought to a new cabinet which changed the commitments of the predecessors</i> | With the victory of the Labour party at 1964 general elections, the approach to the collaboration in the aerospace sector changed for geopolitical and economic reasons, including the prompted American interference and the concerns about the budget, particularly for the Concorde project. However, the new government maintained the UK participation in European aerospace collaborations to ensure the national aircraft industry the continuation that it needs to face new competitors and economic instability.<br><br>Therefore, the commitment with the Concorde project was maintained. |
| <i>1970s oil crisis, which affected all global economies and sectors (especially the oil-dependent transport ones)</i>                        | Triggered by the Yom Kippur War (1973 Israeli-Arab war), the members of the Organisation of Petroleum Exporting Countries (OPEC) proclaimed an oil embargo which targeted countries perceived as supporting Israel. This caused an oil crisis, or "shock", with many short- and long-term effects on global politics and economy, particularly for the air transport companies and aircraft producers. In the short term, the oil shortage affected the aerospace industries negatively. However, in the long run, it encouraged and accelerated                                                      |

<sup>76</sup> Igalens and Vicens, "Les Mutations Dans Le Secteur Aéronautique : Le Cas d'Airbus En Midi Pyrénées"

|  |                                                                                                                                                                                                                                                                                                            |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>significantly the finding of new solutions to lower petrol consumption and other innovations in the engine industry.</p> <p>For the Concorde project instead, it represented a serious backlash on the top of an industry which was already object of criticism for the high consumption of petrol.</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 5.4.2. Airbus

| Major changes / turning points of the initiative                                                                                              | Description of the flexibility mechanism / policy adaptation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>1964, UK general elections: the victory of the Labour Party brought to a new cabinet which changed the commitments of the predecessors</i> | <p>With the victory of the Labour party at 1964 general elections, the approach to the collaboration in the aerospace sector changed for geopolitical and economic reasons, including the prompted American interference and the concerns about the budget, particularly for the Concorde project. However, the new government maintained the UK participation in European aerospace collaborations to ensure the national aircraft industry the continuation that it needs to face new competitors and economic instability.</p> <p>Therefore, the commitment with the Airbus initiative was maintained. However, the United Kingdom withdrew from the Airbus agreement in 1969 due to concerns about the influence of the French Government on the newly-born Airbus consortium.</p>                                         |
| <i>Creation of the Airbus Industrie GIE, changes the legal identity of the consortium</i>                                                     | <p>In 1970, from a consortium based on an international agreement among European countries, the cluster of aerospace manufacturers assumes an independent legal entity under French law.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>1970s oil crisis, which affected all global economies and sectors (especially the oil-dependent transport ones)</i>                        | <p>Triggered by the Yom Kippur War (1973 Israeli-Arab war), the members of the Organisation of Petroleum Exporting Countries (OPEC) proclaimed an oil embargo which targeted countries perceived as supporting Israel. This caused an oil crisis, or "shock", with many short- and long-term effects on global politics and economy, particularly for the air transport companies and aircraft producers. In the short term, the oil shortage affected the aerospace industries negatively. However, in the long run, it encouraged and accelerated significantly the finding of new solutions to lower petrol consumption and other innovations in the engine industry.</p> <p>For Airbus, the 1973 oil crisis was furthermore a driver for increased competitiveness and renewed demand for multinational collaboration.</p> |
| <i>Change in the management in 1989, following the joining of the United Kingdom</i>                                                          | <p>In 1989, the Airbus governance changed, which was prompted by the joining of the United Kingdom, by becoming less dependent on national government and more balanced between the then four countries (France, Germany, Spain and the United Kingdom). The reform of 1989 did not change the legal structure of the Airbus Group; however, new bodies were created as the joining of new members and the differentiation of services required a broader distribution of</p>                                                                                                                                                                                                                                                                                                                                                  |

|                                                                            |                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                            | responsibilities. Moreover, it established a better equilibrium between the countries composing the consortium.                                                                                                                                                                                                                                              |
| <i>Change in the management in 2000: privatisation of the Airbus group</i> | In 2000, the shares held by the national governments (French and German, followed by the Spanish and with a special agreement with the British Aerospace, supported by the British government) are sold and Airbus becomes a holding company (80% EADS, 20% British Aerospace). A few years later it will become the Airbus Integrated Company (Airbus SAS). |



## 6. CONCLUSIONS AND LESSONS LEARNED

### 6.1. Identification and assessment of key strengths and weaknesses of the initiative

#### Concorde

| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <b>New technologies developed for making the supersonic transport possible:</b> even if the Concorde did not become the commercial success as was expected, these new technologies put the French and British industries in a dominant (even if temporary) position in the market</li> <li>• <b>Strong commitment and support from the public authorities:</b> both the French and the British government launched the initiative and supported it financially and politically (but, in the case of the United Kingdom, changes at the political level and the degrading economic situation weakened public support and lowered the funding).</li> <li>• <b>Strong support from the public:</b> the supersonic aircraft become a symbol of national pride for both British and French audiences.</li> <li>• <b>Fruitful collaboration between well-established aerospace industries:</b> the teams of engineers and decisionmakers could exchange best practice and expertise.</li> <li>• <b>Growing aerospace market:</b> since the 1950s the market for air companies and aircraft manufacturers surged, due to the increase of the middle class and the higher purchasing power.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Environmental issues:</b> noise and air pollution caused the degradation of the ozone layer (a topical issue and a serious ecological threat, especially in the 1990s) and raised concerns of environmentalists.</li> <li>• <b>Insufficient financial assessment:</b> the budget allocated at the signing of the bilateral agreement between France and the United Kingdom was not sufficient to cover the technical development costs. For this reason, the British government attempted to pull out of the project.<sup>77</sup> Sources report that the initial budget has not been caused by simple miscalculation,</li> </ul> |

<sup>77</sup> UK Government, "The Concord"

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>but it was lowered to appease political counterparts.<sup>78</sup></p> <ul style="list-style-type: none"> <li>• <b>Insufficient technical assessment:</b> during the first years of the implementation, the developing team found more difficulties than expected and had to more than double the timespan foreseen for the development of the aircraft (the first trials were done after six years and the first commercial flight took off 14 after the launch of the initiative, contrary to the four years foreseen at the design stage).</li> <li>• <b>Dependence of the sole (main) energy source and its price fluctuation:</b> the petrol crisis of the early 1970s damaged particularly the Concorde project, as this was launched in those very same years and the SST depends on very high petrol consumption.</li> <li>• <b>Unfavourable economic environment:</b> one of the main reasons for the failure of Concorde is the unfortunate coincidence with a downgrading economic cycle, triggered by the petrol crisis of the early 1970s.</li> <li>• <b>Absence of market-driven commercial schemes:</b> the market targeted by Concorde already existed, and the costs of the SST were more than those of normal transport (for passengers, air companies, national carriers, etc.).<sup>79</sup></li> <li>• <b>Different monetary systems:</b> France and the United Kingdom had (as today) different currencies, with different exchange rates with other currencies, and inflation rates. As a consequence, the fluctuation of the currencies and the inflation had a different impact on the economies of the two countries. This led to economic dysfunctions and tensions between the two contracting parties, leading to upset and doubts on whether or not to continue with the project among the political and economic stakeholders (which finally ended in the attempt of withdrawal triggered by the British government).</li> </ul> |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Airbus

| Strengths | Weaknesses |
|-----------|------------|
|-----------|------------|

<sup>78</sup> Gillman, "Supersonic Bust"

<sup>79</sup> Gillman, "Supersonic Bust"

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <b>Cultural diversity and European progressive integration applied to human resources:</b> Airbus group's corporate culture and philosophy are critical success factors which have been successfully applied to HR management. Internally, Airbus promotes a strong message to staff to become involved in multicultural teams, cooperating and sharing experiences, to move internationally and to recognise differences as complementary. Personal training sessions are regularly organised.<sup>80</sup></li> <li>• <b>Strong internationalisation:</b> Airbus has strong collaboration with producers in developing countries (e.g. Hindustan Aeronautics Limited, India, Tam, Brazil's largest airline).</li> <li>• <b>Fruitful collaboration between well-established aerospace industries:</b> the teams of engineers and decision makers could exchange best practice and expertise.</li> <li>• <b>Growing aerospace market:</b> since the 1950s the market for airline companies and aircraft manufacturers surged, due to the increase of the middle class and the higher purchasing power.</li> <li>• <b>Strong market orientation scheme:</b> by learning on the Concorde's experience, the Airbus governance(s) decided to produce aircrafts responding to new market needs.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>WTO dispute:</b> the Repayable Launch Investment has been the subject of an ongoing dispute at the World Trade Organisation (WTO), when the United States contested it, as it may be considered as a means for subsidising the Airbus company, which goes against WTO rules.<sup>81</sup> Even if the repayable subsidies were fully compliant with the 1992 agreement and WTO rules,<sup>82</sup> the WTO ruled in 2010 that Boeing's complaint about excessive subsidies to Airbus was justified.</li> <li>• Tension between the different partners, between the Airbus Group and its partners, as these are reluctant to accept the subordination of their commercial expertise to the benefit of the Group (initially the GIE)<sup>83</sup>.</li> <li>• Conflict among the manufacturing parties themselves, since by definition they are in competition for the advantages to be gained from Airbus<sup>84</sup>.</li> <li>• Differences in the political support from the respective governments: Aerospatiale always benefitted from the backing of the French government, while British Aerospace suffered from the British hesitations up to 1978 (when a British financial director was finally nominated)<sup>85</sup>.</li> </ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6.2. Lessons learned and key messages for European R&I policy

The results of the Concorde and Airbus initiatives are not solely linked to the context in which these were designed and launched: the political, economic and technical factors that influenced their development are certainly relevant to understand them, but a strong focus should be maintained on other crucial elements: the management, monitoring and assessments.

The failure of the UK-French project (Concorde) and the utmost success of the pan-European programme (Airbus) are partly the consequence of the form of management and governance they implied, as well as of the level of assessment (both financial and technical) previous to their launch. In the Concorde case, financial and technical assessment were poor and did not complement one the other: on the top of not having a broad market

<sup>80</sup> Suder, "Airbus: A Catalyst of European Integration"

<sup>81</sup> House of Commons, "Full Speed Ahead: Maintaining UK Excellence in Motorsport and Aerospace"

<sup>82</sup> Carbaugh and Olienyk, "Boeing-Airbus Subsidy Dispute: A Sequel"

<sup>83</sup> Muller, "Airbus: Partners and Paradoxes"

<sup>84</sup> Muller, "Airbus: Partners and Paradoxes"

<sup>85</sup> Muller, "Airbus: Partners and Paradoxes"

justifying such investments, the high operating costs impeded its diffusion beyond the two airline companies that had to commit themselves to procure it.

Being both commercial initiatives, which did not mainly focus in solving societal challenges, the monitoring mechanisms became decisive in determining their failure or success. The Concorde's failure (or mitigated success) teaches us that market-orientation is crucial, and highly-technological endeavours need to establish a strong feedback response system in order to be truly competitive faced with fierce competitors. On this lesson, Airbus developed a strong monitoring system and a successful market orientation, which enabled the Group to effectively respond to the market's new needs and to become a world leader in aircraft manufacturing.

Both endeavours, however, were made possible because they were capable of encouraging and diffusing the best practice and expertise among different countries with unique and interdependent specialised aircraft industries: in the odds of the difficulties coming from linguistic and cultural differences or the frustrations from often diverging national interests, the collaboration of various European partners is one of the core reasons of their success.

However, in case of mission and challenge-oriented initiatives based on collaboration between countries and, more in general, major stakeholders, balanced decision-making process, both political and economic, is mandatory. Political balance comes from the governance, which should not leave room to national rivalries or opposite interests to arise; economic balance can be guaranteed by complementarity between the economies of the states involved, secured by their belonging to the same monetary and/or financial system. In this regard, we saw that the budgetary issues which the UK experienced in the 1960s – to the contrary of France, in the *Trente Glorieuses* era – were determining the withdrawal attempt from Concorde and temporary absence from the Airbus programme.

By confronting these two cases, many questions remain open/unsolved: should we consider Concorde a failed mission, because it did not transform the aerospace market as expected in the design phase of the initiative? Nevertheless, isn't it a mission accomplished despite its ending, because still capable of implementing the technologies needed for the SST on a global scale? On the other hand, should the Airbus programme be considered completed, as all the main strategic objectives have been accomplished? Doesn't its success open the way to other mission-oriented initiatives, such as the E-Fan or other initiatives to make the exponentially booming aerial transport cleaner and more efficient?

### 6.3. Summary of the key indicators

| Key indicators         | Concorde                                                                                                                                                                                                                                                                                                           | Airbus                                                                                                                                                                                                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timeline:              | 1962-2003                                                                                                                                                                                                                                                                                                          | 1967-present                                                                                                                                                                                                                                                                                                          |
| Objective and targets: | <p>Overall objectives:</p> <ul style="list-style-type: none"> <li>To develop the first supersonic aircraft for (civilian) transport;</li> <li>To strengthen and further develop technological industrial sectors linked to the aircraft industry, faced with competing American and Russian industries.</li> </ul> | <p>Overall objectives:</p> <ul style="list-style-type: none"> <li>To create and develop a European consortium of European aircraft manufacturers able to compete with their American counterparts/competitors;</li> <li>To create a European consortium capable of producing bigger airplanes suitable for</li> </ul> |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  | <ul style="list-style-type: none"> <li>To contribute to the achievement of national/domestic objectives of the countries involved in the initiatives (France and the United Kingdom).<br/>More detailed targets to be achieved:</li> <li>To build airplanes for civilian use (passengers and trade);</li> <li>To develop new technological features for the aerospace industry;</li> <li>To increase profits for British Airlines and Air France;</li> <li>To strengthen collaboration between the UK and France.</li> </ul> | <p>long and medium distances;</p> <ul style="list-style-type: none"> <li>To contribute to the achievement of national/domestic objectives of the countries involved in the initiatives (France, Germany, Spain and – in a second moment – the United Kingdom).<br/>More detailed targets to be achieved:</li> <li>To advance European integration;</li> <li>To increase profits for the national carriers which are part of the Airbus consortium;</li> <li>To develop of new technological features for the aircraft industry;</li> <li>To contribute to the post-WW2 European economic growth.</li> </ul> |
| Total budget:                    | The total cost has been estimated up to GBP 1.3 billion pounds (while early estimations foresaw a global cost of only GBP 150 million pounds) <sup>86</sup> . However, it is not possible to estimate the exact amount of the operation, due to the confidentiality of the financial documents.                                                                                                                                                                                                                              | USD 40 billion (estimated total government subsidy since its inception); it is not possible to determine the investment made by the private companies over the development of the Airbus consortium and after the complete privatisation of it.                                                                                                                                                                                                                                                                                                                                                             |
| Annual budget:                   | It is not possible to break down the budget on a year basis, as the information is not publicly available.                                                                                                                                                                                                                                                                                                                                                                                                                   | It is not possible to break down the budget on a year basis; the budget has been increasing over the years, as a result of the increase of the turnover.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Share of budget, public funding: | The vast majority of the budget has been provided by the national airlines, backed                                                                                                                                                                                                                                                                                                                                                                                                                                           | It is not possible to know the budget contribution of each                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

<sup>86</sup> Marston, Paul (16 August 2000). [\*"Is this the end of the Concorde dream?"\*](#). London: The Daily Telegraph, 16 August 2000.

|                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                           | by their respective national governments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | country, as these was strictly confidential.                                                                                                                                                                                                                                                                                                                                                                                                          |
| Share of budget, private investment:                                                      | It is not possible to know the details of the private funds allocated for the development of Concorde, as this was strictly confidential. However, private funds have always been in the minority of the total expenditure, by far covered with public funds.                                                                                                                                                                                                                                                                                                                                     | It is not possible to know the details of the private funds allocated for the development of the Airbus aircrafts, as this was strictly confidential. Over time, the share of public funding decreased, and since 2000, when the Airbus Group became a holding company, only a minority of the shares are publicly owned (from 36%, the shares of the French and German governments were reduced to 15%, while the Spanish share was kept around 5%). |
| Leverage effect (additional public/private investments the initiative has triggered):     | No evidence of any leverage effect was found during the desk research.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | No evidence of any leverage effect was found during the desk research.                                                                                                                                                                                                                                                                                                                                                                                |
| Key (official/public) indicators applied for monitoring the progress towards the targets: | <p>It is not possible to understand which were the key indicators the Standing Committee of Officials in charge of the monitoring and two Committees of Directors (for the technical aspects) used, as these were considered to be confidential information and not made public.</p> <p>However, the most obvious indicator of the achievement of set objectives is the delivery of the supersonic planes to the contracting airplane companies.</p> <p>Other technology-related indicators cannot be identified as these are not in the public domain (also due to the fact that the SST was</p> | <p>Considering the nature of the missions pursued by Airbus, the most obvious indicator of its progress is the delivery of the new models to the contracting airplane companies.</p> <p>Other technology-related indicators cannot be identified as these are not in the public domain (also due to the high competition with the American competitors).</p>                                                                                          |

|                                                       |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                  |
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|                                                       | matter of high competition between the competing world superpowers during the Cold War).                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                  |
| Other key indicators (e.g. outputs/outcomes/impacts): | Relevant indicators to measure the success of the project may consist of the production of the supersonic aircraft, which started in 1975 and led to the first commercial flight taking place the following year, but also the number of aircraft sold and the return on investments for the involved aircraft manufacturers. | <p>For the accomplishment of this mission, the most relevant indicator is the market share of Airbus in comparison with the one of Boeing: in 2016 the European manufacturer sold more aircraft than the American one.</p> <p>Other relevant indicators may include: the volume of aircraft sold, the revenues, the size of the European aircraft industry linked to Airbus.</p> |

## 7. REFERENCES:

- Aerospaceweb.org. "Concorde History." Accessed December 20, 2017. <http://www.aerospaceweb.org/question/planes/q0186.shtml>.
- Angel, Marina. "La Région Midi-Pyrénées Alloue 55 Millions D'euros Supplémentaires Pour L'aéronautique." *L'Usine Nouvelle*, June 23, 2015. <https://www.usinenouvelle.com/article/la-region-midi-pyrenees-alloue-55-millions-d-euros-supplementaires-pour-l-aeronautique.N337753>.
- Beffa, Jean-Louis. *Pour Une Nouvelle Politique Industrielle*. La Documentation française., 2005.
- Burigana, D. "L'Europe, s'envolera-t-elle? Le lancement de Airbus et le sabordage d'une coopération aéronautique 'communautaire' (1965-78)." *JOURNAL OF EUROPEAN INTEGRATION HISTORY* 13, no. 1 (2007): 91-109.
- Butcher, Louise. "Aviation: Concorde." Note to the Members of the UK Parliament. House of Commons Library, 2010.
- Calderwood, Dave. "Airbus Abandons E-Fan as Electric Tech Moves on." *Flyer*, March 30, 2017. <https://www.flyer.co.uk/airbus-abandons-e-fan-as-electric-tech-moves-on/>.
- Carbaugh, Robert J., and John Olienyk. "Boeing-Airbus Subsidy Dispute: A Sequel." *Global Economy Journal* 4, no. 2 (2004). <https://doi.org/10.2202/1524-5861.1047>.
- Edler, Jakob, and Luke Georghiou. "Public Procurement and Innovation - Resurrecting the Demand Side." *Research Policy* 36, no. 7 (2007): 949-63. <https://doi.org/10.1016/j.respol.2007.03.003>.
- French Government. "Le Point de L'opération Concorde Au 1er Juillet 1966." Note to the Prime Minister. Documents Diplomatiques Français: 1966 Tome II. Paris: Ministère des Affaires étrangères, 1966.
- Gillman, Peter. "Supersonic Bust." *The Atlantic Monthly*, January 1977. <https://www.theatlantic.com/past/docs/issues/77jan/gillman.htm>.
- Grieco, Joseph M. "The Concorde SST and Change in the British Polity." *World Politics* 31, no. 4 (1979): 518-38. <https://doi.org/10.2307/2009908>.
- House of Commons. "Full Speed Ahead: Maintaining UK Excellence in Motorsport and Aerospace." Business, Innovation and Skills Committee Report. Business, Innovation and Skills Committee of the House of Commons, 2010.
- Igalens, Jacques, and Christine Vicens. "Les Mutations Dans Le Secteur Aéronautique : Le Cas d'Airbus En Midi Pyrénées." Monitoring Innovative Restructuring in Europe. Université européenne du travail (UET), 2006.
- Johnman, Lewis, and Frances M. B. Lynch. "The Road to Concorde: Franco-British Relations and the Supersonic Project." *Contemporary European History* 11, no. 02 (2002). <https://doi.org/10.1017/S0960777302002035>.
- Muller, Pierre. "Airbus: Partners and Paradoxes." *The European Journal of International Affairs* 8 (1990): 25-45.
- . "La transformation des modes d'action de l'Etat à travers l'histoire du programme Airbus." *Politiques et management public* 7, no. 1 (1989): 247-72. <https://doi.org/10.3406/pomap.1989.2877>.
- Rowbotham, Mark. "Concorde 40 Years on: What Have We Learned?" *Logistics & Transport Focus* 18, no. 2 (2016).
- Suder, Gabriele. "Airbus: A Catalyst of European Integration." In *Doing Business in Europe*, by Gabriele Suder. SAGE Publishing, 2014.
- Touscoz, Jean. "La coopération aéronautique franco-britannique : l'affaire Concorde." *Annuaire français de droit international* 11, no. 1 (1965): 174-92. <https://doi.org/10.3406/afdi.1965.1813>.
- Tovey, Alan. "How Airbus Achieved the Miracle of Keeping a European Project Flying." *The Telegraph*, October 22, 2016. <http://www.telegraph.co.uk/business/2016/10/22/how-airbus-achieved-the-miracle-of-----keeping-a-european-pr/>.
- UK Government. "The Concord." Briefing notes for the Prime Minister. National Archives, 1964.
- Vindt, Gérard. "Airbus : Une Success Story Européenne." *Alternative Économiques*, January 6, 2005.



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Both Concorde and Airbus are international initiatives aimed at improving the competitiveness of the European aircraft manufacturing. The former, Concorde, was the first supersonic transport passenger-carrying commercial airplane, built jointly by aircraft manufacturers in France and the United Kingdom. The collaboration was launched by the signature of a bilateral agreement in 1962 to share costs and risks in producing an SST, with the first prototype produced 10 years later and the first routes inaugurated in 1976. The manufactured aircrafts were procured by the respective state-owned airline companies, British Airways and Air France. Their Concorde fleets flew to destinations all over the world, mostly on transoceanic routes. Due to financial unviability, which hampered its uptake by other airline companies, and the fatal crash of 2000, Concorde operations were finally ceased in 2003. Airbus is a consortium established in 1964 of European aerospace manufacturers, set up by the French, English and German governments and was founded to compete with the American aircraft manufacturers. Its origins trace back to the late 1960s, when the British, French, German decided to foster collaboration between their respective aircraft manufacturers for the development and manufacturing of planes for short- to medium-range and high-capacity airlines. In comparison to Concorde, Airbus has a much stronger market orientation and a strategy much more attentive to the needs of airline companies (beyond Europe) which may be potential purchasers. Nowadays, Airbus is a private company involving British, French, German and Spanish partners. The first aircraft available under the Airbus brand was the A300, in 1972. Since then, the increase in orders has been exponential. In time the Group has become one of the world's top two commercial aircraft manufacturers, competing directly with the American Boeing Company. This case study explores both initiatives, their overall context, implementation and main impacts from the perspective of mission-oriented research and innovation policy.

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