
Hybrid-within-hybrid: governance issues within international airline alliances

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1 Introduction

Strategic alliances became a key feature in the airline industries in the late 1990s, following the adoption of open skies policies. However, this so-called ‘deregulation’ maintained strict restrictions, particularly on cross-border mergers and acquisitions due to strategic considerations as well as national pride (Bilotkach, 2019). These restrictions partially explain the adoption of alliances as a mode of coordination that progressively involved an increasing number of airlines, changes in scale and scope and the evolution from tactical to strategic networks. After their expansion in the 2000s, the next decade saw the stabilisation of these alliances (Castiglioni et al., 2018), three of them (*OneWorld, Sky Team, Star Alliance*) dominating the market with 59-members carrying over 60% of passengers worldwide (IATA, 2019).

These spectacular developments rapidly attracted the attention of scholars in management and organisation theory (e.g., Oxley, 1999; Bartlett et al., 2004). Transaction Cost Economics (TCE) pointed out early on that there are more than regulatory restrictions to explain alliances, which rely on contractual agreements sharing characteristics of what has been identified as ‘hybrids’. Hybrids designate agreements among autonomous firms that share significant decision rights while remaining legally and economically distinct, each entity keeping control in last resort over its specific assets and competing with its partners on a large subset of activities (Williamson, 1996; Ménard, 2004).¹ This approach inspired numerous empirical studies that showed the variety of forms hybrids can take (Ménard, 2013). In the airline industry, initial agreements included subcontracting aircrafts and related services, setting up spare parts pools, code sharing, etc., which generated contributions mainly focused on situation in which peers share a subset of decision rights while keeping separate control over their strategic assets and their governance (Oxley and Silverman, 2008). However, issues regarding the (efficient) organisation of these ventures, which might be central to explain how they can outperform alternative solutions (e.g., mergers) and specific rent-sharing rules, which might explain their resilience, remained underexplored (Gibbons, 2022; Ménard, 2022).

Recent transformations in airline alliances have even complexified the picture (Bilotkach, 2019). On the one hand, existing alliances no longer prioritise recruiting new partners but rather focus on consolidating their ties. On the other hand, and more importantly, new arrangements have emerged in which leading members of the existing alliances identify ‘privileged’ partners with whom to implement much tighter

coordination through specific contracts and specific modalities of governance. Going beyond shared decision rights that characterise global alliances, these sub-alliances agree to share joint control and even ownership over some key assets, operating as a single airline on a defined subset of destinations (a ‘bundle’) and relying on a specific modality of governance to monitor this partnership while remaining competitors on other vectors of their activities. These arrangements literally create a hybrid within the existing hybrid.

The airline industry often refers to these agreements in which for the defined routes participants are indifferent to which plane (‘metal’) carries a passenger as Metal Neutral Joint Ventures (MNJVs). This expression might be a source of confusion, since it focuses the attention on physical assets, capturing only part of the characteristics of these complex arrangements and ignoring the importance of the governance issue. Other approaches assimilate these ventures to ‘quasi-mergers’ since partners share costs, revenues and therefore risks ‘as if’ they would be an integrated company (e.g., US DoT and EC, 2010; Tan and Zhang, 2022, p.59). However, this is also misleading since shared rules concern only a specific and limited subset of activities, namely: well-determined routes. Only a handful of contributions have perceived the specificity of these arrangements, including in other industries (e.g., Dyer, 1996, on *Keiretsu*; Lavie, 2007, on software industry; Baker et al., 2008, on pharmaceutical industry; Bilotkach, 2019 on air alliances).

Our article goes further, exploring key conditions that make successful and resilient these ‘hybrid-within-hybrid’ forms. This terminology avoids the confusions mentioned above and emphasises the link with, and difference from the existing literature on hybrids (surveyed in Ménard, 2013). We do so through the examination of the pioneering agreement from 2008 between *Air France-KLM* and *Delta Air Lines*, which simultaneously remained leading members of the broader *SkyTeam* alliance, partially modified by the inclusion in 2020 of *Virgin Atlantic*, which is not part of that broader alliance. More specifically, our research focuses on two interrelated questions: (1) what institutional conditions allowed to overcome regulations precisely designed to prevent such agreements; (2) what modalities of governance were adopted to monitor and secure this remarkably resilient arrangement operating in an extremely turbulent international environment?

Using public documents, contracts and agreements linking partners and extensive interviews with high rank managers involved in the design and/or implementation and monitoring of this arrangement, we show that the success and resilience of this hybrid-within-hybrid depends on the key role of meso-institutions that adapted the rules of the game and on the combination of a specific contract and a specific governance implemented by the partners. In doing so, this analysis enriches the now classic new institutional model (Ménard and Shirley, 2022) as well as our understanding of governance in complex hybrid arrangements. It also points out challenges they raise for partners of the broader alliance and for competition policies.

The article proceeds as follows. Section 2 revisits key contributions, leading to an analytical framework that better captures the innovative character of hybrid-within-hybrid. Section 3 examines how meso-institutions played a key role in permitting the emergence of this arrangement in the airline industry. Section 4 shows how the venture under review relied on the efficient combination of a contractual blueprint and a well-designed governance structure. Section 5 discusses what made this arrangement resilient, lessons it carries for similar modes of organisation and questions it raises for public policies. Section 6 concludes.

2 Analytical framework

Early on, Parkhe (1991, p.581) provided an often referenced definition of alliances as ‘a relatively enduring inter-firm cooperative arrangement, involving flows and linkages that utilise resources and/or governance structures from autonomous organisations, for the joint accomplishment of individual goals’.² The exponential development of these arrangements in the airline industry has generated rich contributions of which only a few are discussed hereafter.

2.1 *Received wisdom on airline alliances*

Initial explanations to the emergence and rapid expansion of airline alliances took their inspiration from the strategic behaviour and/or industrial organisation literature. Following the Resource-Based View (Wernerfelt, 1984),³ several contributors considered alliances as technology-driven (Pisano, 1990; Mowery et al., 1996) and/or motivated by the expected benefits from knowledge transfer (Gulati, 1998; Lavie, 2007). In a similar vein, Button et al. (1998) argued that expected synergies from pooling resources gave way to ‘dog-bone’ networks based on code sharing,⁴ frequent flyer programs, even access to financial resources. Numerous articles followed (e.g., Oum et al., 2000; Kleymann, 2005; Gaggero and Bartolini, 2012; Wu and Lee, 2014), based on the idea that ‘for an airline, one of the critical resources through which to achieve competitive advantage is its route network, that is, access to a wide range of city-pair markets’ (Wassmer and Dussauge, 2011).

The incentives to pool resources has been accentuated by the globalisation of markets (Ireland et al., 2002) with no single firm with the capacity to satisfy customers’ demand for regular non-stop services at acceptable cost through organic growth (Bilotkach and Huschelrath, 2012; Gaggero and Bartolini, 2012; Casanueva et al., 2014). Affiliation to a network ‘... reduces the number and percentage of routes directly operated by an airline and increases the number of routes operated by third parties, which increases the virtualisation of the focal airline’ (Castiglioni et al., 2018). It also values airports with extensive connectivity, leading to the development of ‘hubs’ with co-location a major component of alliances (Janawade, 2012; Wu and Lee, 2014; Wang, 2014). These multiple partnerships raise the too often neglected issue of how to govern this diversified portfolio.

Complementary arguments about alliances come from industrial organisation: alliances would be driven by market power strategies, with ‘inter-firm collaboration [...] a crucial component in building a competitive advantage’ (Nielsen, 2010, p.682). Porter (1990) already argued that alliances intend to reinforce competitiveness, a view shared by Oum et al. (2000) who portrayed air alliances as strategic choices to extend market power through enhance capabilities and economies of scale, scope and density (also Weber and Dinwoodie, 2000; Adler and Hanany, 2016). International alliances might also correspond to a strategy of differentiation from low-cost competitors through the quality of services offered (Tierman et al., 2008). However, the idea that alliances improve performance and competitiveness remains controversial and has been part of the debate surrounding the ‘antitrust immunity’ issue (see Sub-section 3.3). What became received wisdom was summarised by Oum et al. (2004) who argued that alliances with high-level

cooperation show stronger positive effect on productivity and profitability than those with low-level cooperation, making alliances 'a popular alternative to M & A' (Min and Joo, 2016; also Brueckner and Picard, 2012; Castiglioni et al., 2018).

An important issue at stake is whether these strategies benefit customers. Despite the lack of conclusive empirical evidence (US DoJ, 2009), the dominant view considers that alliances have had positive effects, leading to lower fares and better services (Kasper and Lee, 2009; Casanueva et al., 2014). However, many authors have argued that these alliances were less motivated by the well-being of passengers and/or a way to overcome the costs and risks of M & A than by the need to circumvent legal barriers prohibiting integration (Wan and Wong, 2009).

What is striking in these analyses is that they all presume strategic behaviours in which managers make choices that are either supply-push (resource-based driven) or demand-pull (expectations from customers), ultimately motivated by market power strategies. The resulting focus on ex-ante motivations falls short on exploring the ex-post factors of governance that make alliances sustainable, a significant issue when it comes to understanding the resilience of arrangements of the type under review and a key element of our analysis (see Sections 4 and 5).

2.2 *Transaction cost: alliances as hybrids*

Organisation theory shares with this literature specialising on airline industry the focus on why firms adopt alliances, with much less attention paid to the modalities of governance that make them a relevant alternative to M & A. However, it differs in that it provides specific concepts and analytical tools to capture the gist of alliances.

Leading contributions come from the transaction cost model (Williamson, 1996). In that approach, air alliances can be analysed as hybrids, organisational arrangements that differ from market as well as hierarchical ways of transacting. Hybrids designate those 'institutional structures of production' (Coase, 1992) in which partners pool strategic decisions rights while keeping property rights over strategic resources separate, so that beyond their cooperation they remain legally and economically distinct (Ménard, 2004; Reuer and Devarakonda, 2016). With partners being also competitors, a key issue for hybrids comes from risks of opportunism that cannot be fully checked by the discipline imposed by competitive markets or by hierarchical control. Hybrids circumvent this problem by carefully selecting partners, sharing some strategic information, securing the relationship through contractual agreements and building modalities of governance to coordinate their joint activities (Oxley and Silverman, 2008; Ménard, 2013).

The hard core of this literature has focused on 'why' firms go hybrid, with an emphasis on the specificity of assets involved in a transaction, the central hypothesis being that the more specific are required assets, the more exposed transactors are to contractual hazards and the more incentive they have to control these assets, moving towards integration (Joskow, 2008). When it comes to alliances, Dyer (1996) made a pioneering contribution, analysing the Japanese 'keiretsu' as alliances in which a leading firm modulates the intensity of its cooperation with suppliers according to the specificity of assets involved. Almost simultaneously Oxley (1997) pointed out variations in the type of alliance due to variations in appropriability hazards coming out of this specificity.

A decade later, reviewing the literature on alliances in this perspective, Oxley and Silverman (2008) confirmed the dominance in empirical studies of explanations focused on the specificity of assets and to a much lesser degree on uncertainty. Appropriability

issue, ‘... the ability to maintain control over particular elements of knowledge and the income that accrue to them’, would come out of tensions among partners between the need to cooperate for creating value and the divergence of interest when it comes to sharing this added value (a challenge also faced by other hybrids, e.g., franchising, Lafontaine and Slade, 2007). However, little attention had been paid until recently, with the possible exception of R & D alliances (Azoulay and Lerner, 2013; Argyres et al., 2020) to the specific characteristics of horizontal alliances based on collaboration among peers who do not share assets (or share very little).

Another important contribution of the TCE literature concerns the contractual modalities through which interfirm arrangements deal with hazards that challenge their resilience (see already Ménard, 1996). Recent developments pay special attention to the relational nature of contracts coordinating partners who maintain distinct property rights (Baker et al., 2008; Lafontaine and Slade, 2013; Gil and Zanarone, 2017). Acknowledging the existence of non-contractibilities and the limits they impose on formal contracts, these contributions relaunched interest for complementary mechanisms of governance and the status of managers (Gibbons and Henderson, 2012; see already Williamson, 1964). However, as noted by Gibbons (2022), these aspects remain underexplored (but see among others Oxley and Wada, 2009; Ménard, 2013; Berkovitz, 2020), with the attention still polarised on why firms go hybrid rather than how hybrids can overperform market solutions or integration. When it comes to situations in which a subset of firms operating within a hybrid build a distinct arrangement, leading to the complex structure of a hybrid-within-hybrid, there is very little in the literature. Besides the pioneering study of Dyer (1996), mention of such situation can be found (about the software industry in Lavie (2007) or Argyres et al. (2020), the pharmaceutical industry in Baker et al. (2008), technology transfers in Oxley and Wada (2009) or Azoulay and Lerner (2013), etc.), but without the development of a specific analysis. Our case study intends to go further in this direction.

Another underexplored issue, although pointed out by Williamson (1996) concerns the importance of institutional factors in determining firms to endorse hybrid arrangements and in selecting the form it takes. Oxley (1999) pioneered research along this line by examining the impact of property rights regimes on the choice of the type of alliance, while Henisz (2000) explored the impact of political uncertainty on inter-firm alliances and the governance structure they adopt. More recently, Zanarone (2013) assessed the impact of legal constraints on franchising agreements. However, this line of investigation remains marginal, which is unfortunate considering the importance of this institutional dimension, as the case under review will illustrate.

2.3 *Our analytical approach*

Our analysis of the alliance between *Air France-KLM* and *Delta Air Lines* (from now on *AF-KLM* and *Delta*) developed within the broader *Sky Team* alliance and recently joined by *Virgin*, which is not part of the broader alliance, provides elements to explore these issues. In doing so, we pay special attention to the role played in the emergence and consolidation of that arrangement by the combination of a relational contract, complementary mechanisms of governance and institutional adaptation.

Although going back to MacNeil (1974), the concept of relational contract took a new impulse following Baker et al. (2002, 2008) and Gibbons (2022). Moving away from the ‘new property rights’ theory of contracts that focused on the ex-ante design of

optimal contracts (Hart and Moore, 1988) and getting closer to Williamson (1996), this approach reorients attention to ex-post conditions of adaptation and enforcement of contracts when partners face non-contractibility. Relational contracts make room for informal provisions and unwritten codes of conduct. Sustained by the expected value from future relationships large enough to dissuade parties to renege (Klein, 1996; Baker et al., 2008; Ménard and Shirley, 2022), relational contracts include possibilities of adaptation through organisational solutions, particularly through the role of managers (Gibbons and Henderson, 2012) and/or trust supported by shared values (Bernstein, 2016).

This emphasis on internal mechanisms of adaptation, at the core of our analysis of the *AF-KLM* and *Delta* alliance, does not preclude considerations for the impact of the institutional setting. Although the seminal influence of North (1990) has long oriented institutional analysis on issues of development and growth, recent contributions (Abbott et al., 2017; Kunneke et al., 2021) reintroduce explicitly the question of how institutions influence choices of organisational arrangements and modalities of governance. Particularly relevant for the case under review is the attention paid to those intermediate institutions bridging the gap between the macro-layer at which the rules of the game are established (e.g., the US Congress) and the micro-layer at which these rules are actually implemented (e.g., air carriers). Through the translation, adaptation, monitoring and enforcement of rules, these ‘meso-institutions’ played a crucial role in the adoption of a ‘derogatory status’ that conditioned the initial emergence of air alliances and the later development of hybrid-within-hybrid.

To sum up, our analysis builds on this exiting literature and the identification of its gaps to dig deeper, through our empirical investigation, into two interrelated questions: what institutional mechanisms allowed the adaptation of general rules to make possible these different forms of organisational solutions? what internal governance was implemented to secure the resilience of arrangements operating in a highly turbulent environment?

2.4 Methodology

We investigated these issues through the *AF-KLM* and *Delta* case. We focus on this case because these carriers played a leading role in the initial development of *Sky Team*, then with the creation of the hybrid-within-hybrid arrangement within this alliance, a first of its kind in the industry. Our choice was also motivated by our close knowledge of the case, thanks to our access to private information (see below). The analysis relies on a standard triangulation protocol, with information collected through (1) publicly available information (e.g., laws and policy reports); (2) information collected through meetings with experts of the sector; (3) in-depth semi-structured interviews with key informants within the alliance.

Airlines operate in highly regulated markets, with rules differing across countries. Understanding the specifics of the alliance under review requires attention to the legal constraints within which carriers operate, from the so-called ‘deregulation’ of the industry (and the restrictions it maintained) to the ‘open skies’ policies progressively implemented since 1997. Besides these legal documents and several reports related to the delivery of derogatory statuses by competition authorities, the annual reports of *AF-KLM* and *Delta* over the period 2012 to 2020, press releases on the development of their alliance, and reports from international organisations, particularly IATA, also provided important information.

A second type of information comes from discussions with key actors in the industry (e.g., members of the civil aviation authorities) and specialists of airline alliances to double-check publicly available information as well as to collect information about the characteristics of the formal contracts among members of the mega-alliance (*SkyTeam*) and the contract establishing *AF-KLM* and *Delta* as a hybrid within this hybrid. In these meetings special attention was paid to the identity and role of the institutional entities that made possible these alliances through the translation, adaptation, monitoring and enforcement of regulations.

Last, to better understand the mechanisms of governance at the core of our research, crucial information was collected through semi-directive interviews with main actors of the agreement. Airlines are keen to communicate about benefits expected from alliances but highly reluctant to share information on their strategies and forms of cooperation. Fear of competitors and regulatory authorities makes access to the specifics jealously guarded. To circumvent this obstacle, we interviewed two categories of employees: some involved in the design of the alliance and/or its follow-up and adaptation; and others assigned to different entities of the governance structure. We did these interviews in 2012 to 2013, not long after the implementation of the agreement; and in early 2022, not long after the integration of *Virgin*. The first round mainly focused on the contract and the internal organisation of the venture; the second round, mostly done through Zoom/Team,⁵ investigated changes following the departure of *Alitalia* and the introduction of *Virgin*. All 27 interviewees (see Table 1) belong to different departments and working groups and were questioned separately complemented by e-mails exchanges when there were ambiguities or missing information.

Table 1 Summary of interviews

<i>Details of the interviews</i>	<i>WAVE 1</i>	<i>3/2012 to 2/2013</i>	<i>WAVE 2</i>	<i>1/2022 to 3/2022</i>
CATEGORY 1	<i>Nb of interviews</i>	<i>Duration</i>	<i>Nb of interviews</i>	<i>Duration</i>
Press Department (Dpt.)	1	15'; 45'		
Corporate communication Dpt.	1	1H		
Legal Dpt.	2	1H45		
Alliances Dpt.	3	45'; 1H15, 30'	2	2H; 1H
Finance Dpt.			2	1H45; 1H
CATEGORY 2	<i>Nb of interviews</i>	<i>Duration</i>	<i>Nb of interviews</i>	<i>Duration</i>
Members of the steering committee	3	45', 1H30, 2H	4	30'; 1H30; 30'; 1H
Working Group's Member	5	5H	4	4H30
Network	1	1H45	1	30'
Pricing and revenue management	2	1H		
Finance Dpt.			2	1H45; 1H
Cargo	2	45', 1H30	1	45'
Total interviews/duration (Hours)	15	12H	12	10H15

Through the entire process we paid special attention to the emergence and evolution of the arrangement. More specifically, the design of our case study intended to answer: (1) Why and how was this venture developed within the existing alliance, e.g., its purpose, legal structure, allocation of rights among partners, investments made, with partners having to deal with different regulatory settings and (2) How is the venture managed, that is: how are operational as well as strategic decisions made, through what governance bodies endowed with what attributes and power? Although the information collected remains essentially qualitative and notwithstanding the limits of our sample of interviewees we are confident that multiple cross-checking makes the analysis reliable.

3 The Air France-KLM & Delta alliance: contextualisation

Although bilateral agreements existed from the early days of the industry (Oum and Yu, 1998; Li, 2000), complex multilateral alliances took off in the wave of deregulation initiated in the US in 1978 and that opened room for innovative models of governance (Bilotkach and Hüscherlath, 2012, 2019). The *Sky Team* alliance led by *AF-KLM* and *Delta* was born in this context ... thanks to the adaptation of the 'rules of the game' by the meso-institutions in charge of regulating the sector.

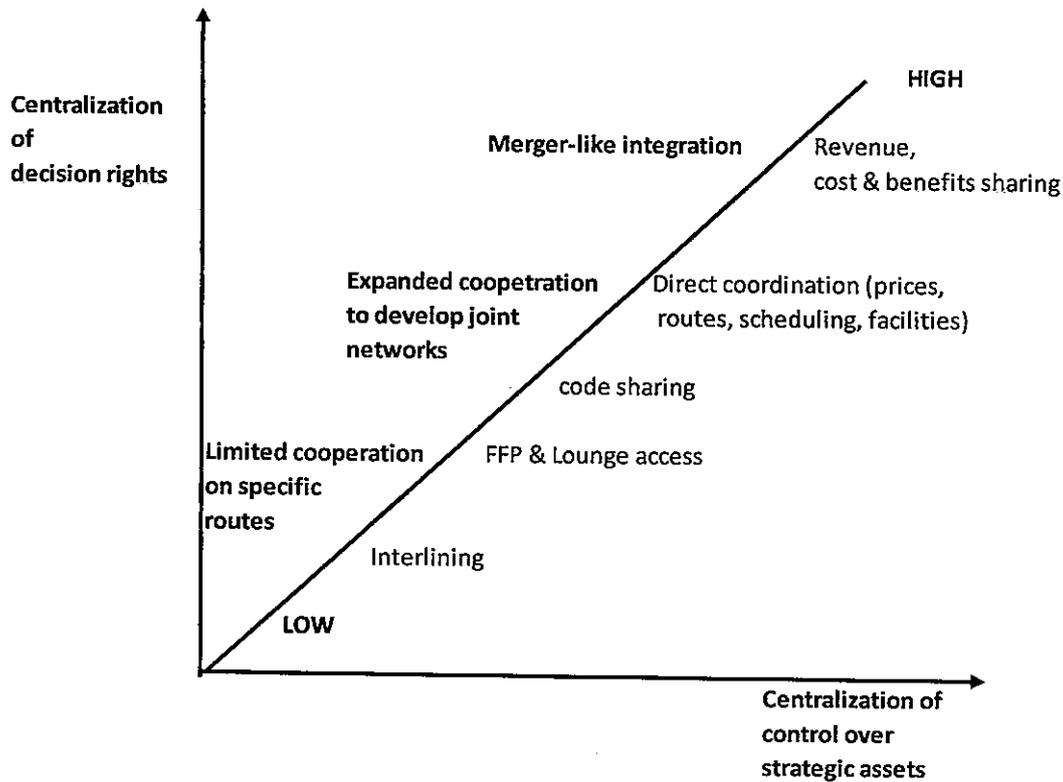
3.1 Towards mega air alliances: main characteristics

Mega-alliances emerged between 1997 and 2000 following the adoption of Open Skies policies and now dominate the airline industry. As of 2019,⁶ the three leading alliances carried close to 2 billion passengers, over two-third of the total number, with 33% for *Star Alliance*, 38% for *SkyTeam* and 24% for *One World*. The number of full (voting) members in each alliance grew rapidly, from a handful of participants in the late 1990s to 59 in 2019 (26 affiliated to *Star Alliance*, 19 to *SkyTeam* and 14 to *One World*).

Beside the distinction between full and affiliated members (often regional subsidiaries), alliances differ by the combination of different tactical as well as strategic components (Li, 2000, p.67) like block seats, code-sharing, technical pool and commercial agreements, ground support, airport facilities, joint purchasing and/or marketing, etc. Combinations have evolved over time, with increased intricacy of rights. *Tactical alliances* initially prevailed with limited decision rights pooled among a handful of carriers over specific routes (e.g., selling tickets that include connection(s) with a partner) to address loopholes in networks and circumventing restrictive regulations (Wan and Wong, 2009). Although such agreements still exist, carriers progressively moved towards *strategic alliances* with extended coordination and shared decision rights. These global alliances provide 'global seamless networks' and intend to benefit from economies of scale (joint marketing, shared hubs and slots, etc.), scope (diversified services, e.g., frequent flyer programs that include hotels, car rentals etc.) and density (thanks to lower fares and connections through hubs). The success of these strategies increased competition, incentivising some firms to consider tighter coordination to improve their comparative advantage while circumventing regulations that restrict or even preclude mergers and acquisitions.

Building a hard core of shared decision rights while keeping key property rights distinct led to the development of alliances within alliances, a solution pioneered by *AF-KLM* and *Delta* in their agreement from 2008. Figure 1 summarises characteristics and suggests the evolution that led to the emergence of this hybrid within the existing hybrid.

Figure 1 Degree of coordination in alliances



Source: (Adapted from the US DoT and European Commission joint report, 2010: 7).

3.2 From dating to engagement: the Air France-Delta alliance

Although remaining competitors, *Air France* and *Delta* engaged early into coordination to facilitate connections for their passengers and formalised this cooperation through the creation in 2000 of *SkyTeam* with *Korea Airlines* and *AeroMéxico*, part of the vast reorganisation of the airline industry following deregulation and open skies policies.

Important events contributed to the evolution from a tactical to a strategic alliance and to the emergence of a sub-alliance within *SkyTeam*. First, *Air France* and *KLM* merged in 2004 and *Delta* acquired *Northwest* in 2008. It allowed them to benefit from the experience from the elaborated joint venture created between *Northwest* and *KLM* in 1997, a venture in which the two parties developed increasingly diversified commercial and technical cooperation (see De Man et al., 2010). Second, based on this experience, *AF-KLM* and *Delta* started discussing with regulatory authorities the possibility to build a specific venture within the existing *SkyTeam*, which had 8 members at the time, to monitor their North Atlantic routes, a development that required adaptation of existing regulations by the relevant meso-institutions (see Sub-section 3.3). Third, at about the same time *Air France* bought 25% of *Alitalia*, opening the lucrative Italian market to the venture. *Delta* made *Alitalia*'s admission conditional to European partners speaking with

one voice, making the alliance walking on two legs: *AF-KLM-Alitalia* and *Delta*. Fourth, turmoil in the poorly managed *Alitalia* led to its departure from the alliance at the expiration of its contract with the venture,⁷ while *Virgin* integrated the sub-alliance in 2020, several years after *Delta* has acquired 49% of its shares (in 2012), a long delay due to the significant change involved in the balance of power between *AF-KLM* and *Delta*. Table 2 summarises the key episodes of this complex evolution of the venture.

Table 2 Chronology of the main events shaping the venture

➤	29 September 1997: <i>Northwest</i> and <i>KLM</i> sign the first ever joint venture agreement in the air transport industry. The venture involved joint operations and the sharing of revenues and costs on their transatlantic routes.
➤	June 2000: <i>Air France</i> , <i>Delta</i> , <i>Korea Airlines</i> and <i>Aero Mexico</i> launch the SKYTEAM Alliance.
➤	2004: <i>KLM</i> joins SKYTEAM alliance.
➤	2004: <i>Air France</i> and <i>KLM</i> merge.
➤	22 March 2007: The European Union and the USA sign an open-sky agreement.
➤	17 October 2007: <i>Air France</i> and <i>Delta</i> set up a joint venture, implemented on 1 April 2008 following eight years of close Trans-Atlantic cooperation.
➤	2008: <i>Delta</i> and <i>Northwest</i> merge. <i>Alitalia</i> goes bankrupt and is relaunched as a private airline by Italian investors. <i>AF-KLM</i> holds a 25% stake in the carrier.
➤	20 May 2009: Former joint ventures (<i>AF/Delta</i>) and (<i>KLM/Northwest</i>) are combined, following the merger of <i>Delta</i> and <i>Northwest</i> .
➤	5 July 2010: <i>Alitalia</i> joins this venture, opening it up to the Italian market, the 3rd largest in Europe and providing a new hub at Rome-Fiumicino.
➤	December 2012: <i>Delta</i> acquires a 49% stake in <i>Virgin Atlantic</i> .
➤	January 2014: <i>Delta</i> and <i>Virgin</i> set up their own joint venture between the UK and the USA.
➤	25 June 2014: <i>Etihad Airways</i> buys 49% of <i>Alitalia</i> .
➤	27 July 2017: <i>Delta</i> takes 10% of <i>AF-KLM</i> .
➤	2019: the European contract between <i>AF-KLM</i> and <i>Alitalia</i> expires. <i>Alitalia</i> is no more part of the venture.
➤	March 2019: <i>Virgin</i> and <i>AF-KLM</i> launch code-shares.
➤	February 2020: <i>AF-KLM</i> , <i>Delta</i> and <i>Virgin Atlantic</i> launch a new JV in a format very close to the pre-existing one between <i>AF-KLM</i> and <i>Delta</i> .

3.3 Towards a derogatory status: 'antitrust immunity'

Institutional adjustments have been central in making the development of these alliances possible. The 1996 'open skies' agreement between the Netherlands and the USA, progressively extended to all European Union members, '.... have not only removed restrictions governing rates and fares, market entry and the ways revenues are allocated, but have also permitted the emergence of various forms of business alliances' (Button, 2008, p.61). The implementation of a type of joint ventures already existing in other sectors (e.g., pharmaceuticals, R & D) was not obvious. The tightly coordinated venture that *AF-KLM* and *Delta* were considering required centralised modalities of governance while circumventing suspicion among other partners of *SkyTeam*⁸ and overcoming national policies highly protective of 'national flags' (Bilotkach and Hüschele, 2012).

Allowing *AF-KLM* and *Delta* to share strategic decision rights, particularly with respect to frequency and fares and even some property rights also imposed substantial ‘adaptation’ of existing regulations by key meso-institutions, namely: the US DoT and DoJ and the regulatory authorities of the European Union (US DoT and European Commission, 2010; European Commission, 2011).

Removing existing regulations was out of order, particularly on the American side with a Congress firmly opposed to foreign control over national airlines. One way to circumvent the difficulty was to obtain a derogatory status, which led to the so-called ‘antitrust immunity’, protecting the venture against the risk of antitrust lawsuits, conditional to limitation to a subset of activities of partners (e.g., only North Atlantic routes). This move was made even more complex by the overlapping of different regulations implemented by different meso-institutions, mainly those mentioned above.

Delivering immunity was particularly sensitive on the American side, considering its long tradition of antitrust policies. For the DoJ, a flexible interpretation of the airline regulation had to be assessed with respect to two criteria routinely applied to merger: (1) Would the proposed venture ‘substantially reduce or eliminate competition’? (2) What conditions could be imposed (e.g., ‘carve out’ measures) to cure potential competitive problems? On the other hand, the DoT had already adopted a flexible interpretation of antitrust laws, stating that:

‘[N]o airline, however strong, is able to efficiently provide service with its own aircraft and crew to every destination its customers require. Using the transatlantic market as an example, there are several hundred cities in the USA and also in Europe that will never have the benefit of non-stop service. [Alliances] are the only practical way to provide better service to thousands of passengers in long distance, low density international markets. (...) Multinational alliances have fuelled enormous increases in connecting traffic, ...newly stimulated traffic accounts for a large proportion of alliance growth.’ (US DoT, 1999, p.2)

The question became whether these arguments could be stretched to cover the much tighter coordination projected by *AF-KLM* and *Delta* for the busy North Atlantic routes (‘bundle 1’) as well as for similar projects. The major airlines argued that ‘horizontal cooperation agreements can lead to substantial economic benefits in particular if they combine complementary activities, skills or assets. Horizontal cooperation can be a mean to share risk, save costs, increase investments, pool know-how and enhance product quality’ (IATA, 2011, p.5). Increased traffic density, improved utilisation of capacity and elimination of double marginalisation on the supply side would lower production and transaction costs. New or improved services on the demand side through expanded networks (e.g., seamless services, flight frequency, ‘online’ service options and lower fares) would benefit consumers.

The DoJ was not convinced. It expressed serious doubts regarding the expected consumers’ benefits as well as the merits of the centralised governance partners wanted to implement (US DoJ, 2009; Kasper and Lee, 2009). Similar concerns were also discernible in the position adopted by the European Commission (2011). Even the IATA discretely acknowledged that ‘On the other hand, horizontal cooperation agreements may lead to competition problems ...’ (IATA, 2011, p.6). These risks of anti-competitive effects and increased market power made competition authorities sceptical.

Nevertheless, and notwithstanding the paucity of empirical studies on already existing alliances (see Brueckner, 2001; Barla and Constantatos, 2006; US DoJ, 2009),

the ‘received wisdom’ about the advantages of alliances prevailed and an ‘antitrust immunity’ was delivered, although only for routes to be approved on a case-by-case basis and with commitment from involved carriers to not merge property rights. *Blue Skies* was born, a hybrid within the hybrid *SkyTeam*.

4 Hybrid-within-hybrid: walking on two legs

Following this approval, a key issue for this hybrid-within-hybrid was about the modalities of governance needed to overcome agency problems. Indeed, the decision to form a joint venture rather than entering into a standard contract (Bilotkach and Hüsichelrath, 2012) raises questions that requires going beyond *why* partners adopted this type of arrangement and examine *how* it was successfully implemented and controlled and *how* conflicts could be solved. This is particularly so since the governance of this arrangement partially overlaps with that of the broader alliance of which partners remain major actors. What modalities were adopted by the initial tandem *AF-KLM* and *Delta* that made the arrangement so resilient, notwithstanding numerous changes within the alliance (see Table 2) and challenges from a very volatile environment. The answer lies in the venture walking on two legs: a contractual agreement and specific mechanisms of governance.

4.1 An incomplete contractual agreement

Like most inter-firm agreements, the arrangement linking *AF-KLM* and *Delta* (later modified to integrate *Virgin*) relies on a formal contract, a short and dense document of 150 pages. Notwithstanding strict confidentiality, we were able to recoup information from our interviews and identify the key features of this contract (see Table 3).

Table 3 Key contractual features (as of 2022)

<i>PARTIES</i>	<i>AIR FRANCE-KLM // DELTA // VIRGIN</i>
GOAL	Sharing revenue, costs and profits on routes defining the scope of the contract.
LEGAL FORM	A venture defined in a 150 pages contract.
SCOPE OF THE VENTURE	‘Bundle 1’: <i>AF-KLM</i> , <i>Delta</i> and <i>Virgin</i> : North Transatlantic routes ‘Bundle 2’: for <i>Delta</i> : USA & Africa-Middle East For <i>Virgin</i> , <i>AF-KLM</i> : Europe & South America
MAIN TERMS OF THE CONTRACT	–It is an « evergreen » agreement, running indefinitely if not notify otherwise, with the possibility for a partner to notify termination opening only after 10 years, with a three years notice. –Metal Neutral –Settlement once a year –Baseline 2020
FINANCIAL RULES	40% <i>AF-KLM</i> // 40% <i>Delta</i> // 20% <i>Virgin</i>

Table 3 Key contractual features (as of 2022) (continued)

<i>PARTIES</i>	<i>AIR FRANCE-KLM // DELTA // VIRGIN</i>	
DECISION-MAKING PROCESS	<i>Consensus</i> (no unilateral action allowed for the routes agreed upon). <i>Discretionary decision rights</i> (the contract specifies that rights allowing unilateral actions to make the contract flexible shall be listed in Codes of Conduct after prior notice to Co-Chairmen of the relevant committee(s) in case of disagreement or conflict.	
GOVERNANCE	CEOs' committee (<i>AF-KLM / Delta / Virgin</i>) Join Venture Leadership Team (meeting every month) 15 Working groups (meeting at least every month)	
COMMUNICATION	Viewed as central to the agreement. Organised along two channels:	
	<i>FORMAL</i>	<i>INFORMAL</i>
	Multiple points of contacts defined in the governance procedures (weekly meetings, steering committee, ...)	–Personal relationships among members of the Board and high rank managers –Social events to build personal relationships (even between the CEOs).

Of particular significance in this contract are clauses regarding the decision-making process; financial clauses and the sharing-risks rules they involve; and clauses about the governance structure (more in Sub-section 4.2), with special attention paid to the definition and allocation of responsibilities. These clauses clearly introduce elements differentiating this 'sub-alliance' from the global alliance of which the partners are part because they simultaneously implement a much tighter coordination to overcome agency problems and much more flexible mechanisms of adaptation. Notwithstanding its importance in framing the relationship among partners, the contract remains highly relational: it provides essentially a blueprint, complemented upfront and until now by 'Codes of Conduct' formally agreed upon in July 2009 and by working groups approved by the Steering Committee.

4.1.1 The 'metal-neutrality' issue

The so-called 'metal-neutral' component of the contract is key to understanding the inter-firm nature of this hybrid. In line with the distinction between decision rights and property rights in the relational contract literature, 'metal neutral' corresponds to assets for which usage is partially pooled although property rights remain distinct. Technically, it means that participating carriers engage in 'comprehensive revenue sharing on [relevant]international routes, so that a partner's revenue from a passenger is independent of which airline actually provides the service.' In other terms, '...the identity of the 'metal' (the aircraft) involved in the service is irrelevant to individual airline revenue' (Brueckner and Proost, 2010, p.658). Two complementary reasons might have motivated this arrangement. One is institutional: because of restrictions on foreign control over national carriers, particularly in the USA, the 'antitrust immunity' allowed parties to share information, jointly control flights' capacity and frequency, monitor joint frequent flyers programs and even adopt pricing strategies on the specified routes, to the strict exclusion of control over assets that would lead to merger or acquisition. The other is

organisational: in an industry submitted to highly cyclical activity, a volatile demand, high variation in customers' preferences and persistent shortage of cash, this hybrid-within-hybrid develops a governance to face risks and monitor potential internal conflicts that may prove superior to merger or acquisition by allowing maximisation strategies without supporting the risks of highly irreversible investments in specific assets. The resilience of the arrangement speaks for this argument.

4.1.2 *The financial dimension*

Financial clauses also support to this view. According to several interviewees directly involved in the running of the venture (Joint Venture Leadership Team, alliances department, finance department), the key element of the contract lies indeed in the financial facet to metal neutrality: the settlement rules. One interlocutor suggested comparison with a 'marriage.' At the time the agreement was sealed, 'dowries' were estimated through partners' Available Seat Kilometres (ASK) on the segments of the networks (routes) falling under the agreement. This assessment defined for these routes a 'baseline' that frame the cost and revenue sharing rules (the initial sharing rule 50–50 for the North Atlantic 'bundle' was modified following the integration of *Virgin* and became *AF-KLM* 40%, *Delta* 40%, *Virgin* 20%). As summarised by one interviewee: 'We grow the pie, we share the gross'. This rule involves mutualisation of risks for the relevant routes: 'all revenues and expenses are put into the pot'. Once a year incremental revenues and costs are formally estimated for trunk routes as well as for routes connected to trunk routes. Indeed, another important financial provision is that 25% of the revenues coming from the connections to routes provided by a partner are transferred to that partner. This yearly financial rebalancing ensures partners that the value jointly created is fairly distributed, *in fine* benefitting to all and making acceptable decisions otherwise unfit to the specific interest of one member but favourable to the venture. To manage this complex financial arrangement a specific accounting system has been implemented. Not all costs are fully charged to the venture: some are adjusted (e.g., wages and benefits for pilots and/or stewards; fuel cost not hedged) and others are referenced in specific tables (e.g., lease of aircrafts).

All in all, this short contract establishes a blueprint defining boundaries within which participants to the venture operate.

4.2 *Organisational structure: multiple layers*

Another key component of this hybrid-within-hybrid is its mechanism of governance. Governance is a polysemic term. In the context of alliances, it refers to those mechanisms embedded in the contractual blueprint to monitor agency problems with a view at minimising transaction costs. Bernstein and Peterson (2022) qualified as 'quasi-contractual mechanisms' these modalities of governance complementing relational contracts.

As suggested by Figure 1 (see also Oxley and Silverman, 2008; Oxley and Wada, 2009; Ménard, 2013), governance mechanisms differ across alliances depending on the intensity of rights shared, from *information-based networks* typical of tactical alliances to more elaborated coordination and safeguards that characterises global alliances, all the way up to the development of a *strategic centre* that monitor extensive decision rights to secure and allocate quasi-rents coming out of cooperation.

The *AF-KLM/ Delta/Virgin* agreement falls into this last category, with the extra qualification that it operates within a broader alliance. The governance of this hybrid-within-hybrid combines three layers, mixing hierarchical components and bottom-up procedures. First, the CEOs keep control over decision rights in last resort and statutorily meet at least twice a year to discuss and confirm strategic decisions. Second, a Joint Venture Leadership Team with 12 members (3 full members and a chief coordinator for each partner), routinely augmented by invited experts, monitors and implements major decisions with respect to the organisation of the venture, its coordination, marketing and sales activities, finance and operations on the relevant routes. This committee meets at least once a month. Third, the 2020 revised agreement extended to 15 the initial 11 Working Groups (WG)⁹ responsible for the actual coordination of the venture. These WG must statutorily meet at least once a month, although most of them actually interact much more frequently, some on a daily basis (e.g., the Network WG). Each WG is co-chaired by the three constitutive parties and reports to the steering committee.

4.3 The key role of the working groups

What is striking is that notwithstanding changes in the composition of the sub-alliance and an extremely turbulent environment, this governance structure has remained remarkably stable. Parity in the Joint Venture Leadership Team, which defines strategies based on the expertise of the specialised WGs and arbitrates among alternative options, as well as in the WGs, which implement and adapt decisions through continuing interactions shaped by ‘codes of conduct’ adopted at the time the contract was signed, have been crucial in creating a ‘team’ spirit among the management. It is noticeable that the CEOs rarely interfere with this bottom-up procedure.

The WGs mobilise ‘generalists’, mostly heads of departments and ‘experts’ selected for their technical knowledge (e.g., network planners). Many generalists have been early players, and participated to the elaboration and/or the implementation of the contract. Some are members of the Joint Venture Leadership Team, which allows signalling problems early on. The composition of the WGs has also been remarkably stable, feeding personal connections and informal understanding of each other position and this ‘team spirit.’ (see already De Man et al., 2010, p.177).

This governance structure has secured efficient monitoring without noticeable clashes through the numerous adaptations imposed by a volatile environment as well as internal conflicts, thus lowering transaction costs and comforting this sub-alliance over time.

5 Resilience: discussion and lessons

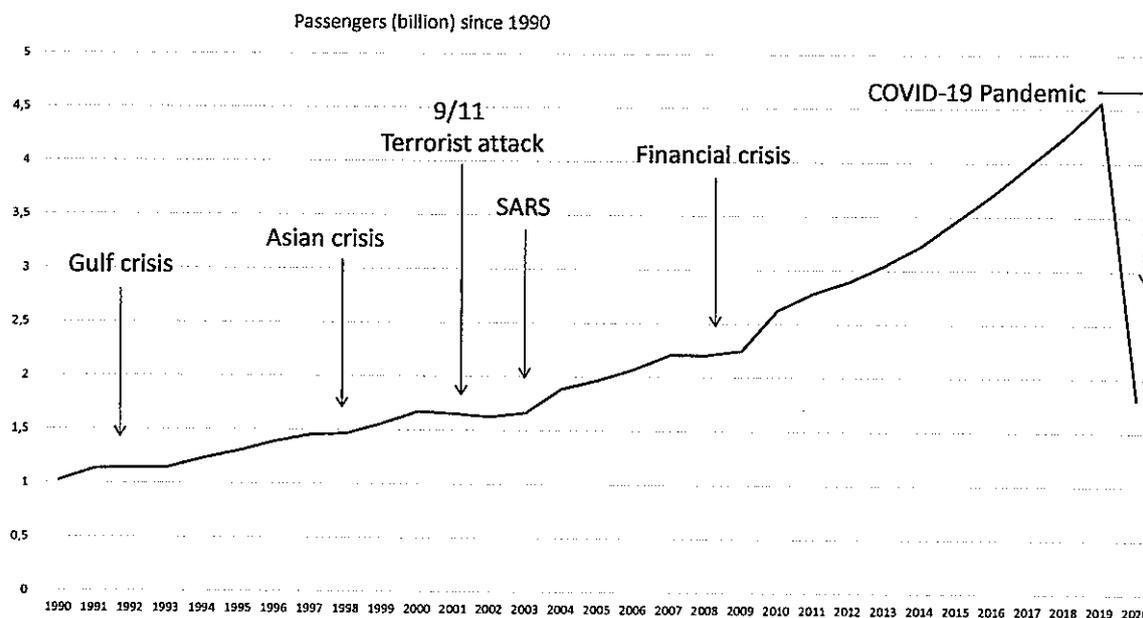
Indeed, the relational properties of the contract paired with these specific mechanisms of governance worked ‘hand-in-hand’ to make the arrangement resilient through a highly turbulent environment. Nevertheless, several aspects still require to be explored to better understand the function and success of such arrangements.

5.1 Facing hazards

Beyond the advantages of the coordination provided by the broader alliance, this hybrid-within-hybrid has been designed and monitored to face the turbulences and cyclicity

faced by the industry. Several events provide illustration of these turbulences, the 2020 dramatic health crisis being an extreme case that has exposed the three partners to a shock never experienced before (see Figure 2).

Figure 2 Number of passengers carried since 1990



Source: Based on data from IATA (2020/2021)

Self-centred strategies could have been expected from partners facing an event of this amplitude. In the 2008 to 2009 financial crisis, at a time the new arrangement was emerging, quite the opposite happened, with partners coordinating through renegotiation of aircraft leasing contracts, financial payment deadlines, etc. With the Covid episode, help from national governments likely reinforced the interest of a venture keeping parties independent by comparison to what would have happened if they would have merged. At the operational level, several interviewees emphasised the advantages of the quick decision-making process facilitated by the governance of the arrangement in an environment in which governments and specialised institutions left airlines without clear and unified rules to face the crisis.¹⁰

Endogenous episodes also challenged the resilience of the venture. The most critical is likely the 49% shares acquired by *Delta* in *Virgin*, leading to the creation of a joint venture that could have been viewed as betrayal by *AF-KLM*. It required sacrifices (and likely some resignation) from *AF-KLM* to maintain confidence in a common future. The governing bodies worked hard to overcome the tension, which ended up in redesigning the alliance and making *Virgin* a full partner of *Blue Skies* at a 20% level although not a partner of the broader *SkyTeam* alliance. Other less dramatic episodes also challenged this hybrid-within-hybrid. For example, *Delta* started charging for baggage and wanted reluctant *Air France* to do the same notwithstanding its fear to lose customers with a different culture regarding expected services. Other challenging issues were the alignment of business class on the highest standards in the venture, which entailed significant costs; or the impact on fares and benefits of a French legislation that imposed increased use of sustainable fuel. These are a few among unanticipated adaptations solved through the relational mechanisms of governance described in Section 4.

This complementarity between a relational contract and specific mechanisms of governance smoothening and cost-minimising adaptations is far from fully acknowledged in the literature. Following the influential paper by Klein (1996); see also Baker et al. (2008), a core argument among organisational theorists has been that hybrids remain stable as long as contracting parties expect benefits exceeding the cost of leaving the alliance. This argument could explain why partners do not quit, it does not explain why they do not fully integrate so as to consolidate benefits in a single entity. This is where the institutional argument enters into the picture: parties would stick to the quasi-integrated form because this is the only way to circumvent regulations that preclude mergers and acquisitions (Wan and Wong, 2009).

5.2 *Some lessons and questions for future research*

These arguments have of course relevance to explain why firms go hybrid. However, our analysis of how the *AF-KLM/Delta-Virgin* alliance operates, comforted by our interviews, suggests that more is needed to explain the existence, success and resilience of this hybrid-within-hybrid: it has to do with its very nature.

First, embedding into the arrangement mechanisms favouring collaboration through flexible management helps mitigating risk in an industry exposed to substantial uncertainty. Traditional financial approaches might not provide adequate tools in that respect. For instance, calculating net present value does not fully capture the value of managerial flexibility to adapt to unexpected events. In that respect, future research might benefit from Real Option Theories (Dixit and Pindyck, 1994) to study the strategies of these ventures ‘since the capabilities and assets of an organisation can be seen as a bundle of options for future strategies’ (Cuypers and Martin, 2010, p.49). These tools might be suitable to better understand as well as shape organisations’ strategic decisions, especially those encompassing multiple stages with interference of unexpected events that so much matter in the trade-off between commitment and flexibility (Trigeorgis and Reuer, 2017, p.43).

Second, the complex transactions and related costs each carrier would face if acting separately were and remain a key motivation to find modes of cooperation without having to support the financial and organisational costs of full integration. Beyond institutional constraints, there might be important advantages in sharing substantial decision rights without having to merge or acquire. (a) A hybrid arrangement incentivises partners by keeping them under competitive pressures hardly sustainable among divisions of an integrated company. (b) Keeping independent entities close to the specificity and rules of their dominant market (e.g., consumers’ preferences, labour laws) allows reducing agency problems. (c) The relational properties of the contractual regime, as materialised in the key role of the WGs, facilitate adaptation, of great value in the turbulent environment to which the airline industry is particularly exposed. These characteristics substantiate the existing knowledge on hybrids (Williamson, 1996; Ménard, 2004, 2013, 2022).

However, they leave partially open the question: why build a hybrid within the existing hybrid? Recent developments in the airline industry suggest that the case under review is not unique. Similar types of sub-alliances have proliferated within other global alliances, with several long-haul routes (e.g., Europe – Japan, Europe – China, USA – Japan, Europe – South-East Asia, North America – South America, USA – Australia / New Zealand) nowadays monitored through arrangements of the hybrid-within-hybrid

type. This evolution parallels the multiplication of classic bilateral agreements within existing mega-alliances (e.g., between *Air Canada* and *Air China* or *Singapore Airlines*; *Lufthansa* and *Air China* or *All Nippon Airways*, etc.) or even with companies not affiliated with the concerned mega-alliance (e.g., *Virgin* in our case study but also *Aer Lingus* and *American Airlines*, *British Airways/Iberia/Finnair*. These developments draw a very complex picture of the industry and suggest that significant benefits are expected from these hybrid arrangements. However, more research is needed about the motivation and performance as key factors for understanding these strategic choices, and particularly the building of a hybrid-within-hybrid. The multiplication of cases may open an opportunity to develop extensive database to explore further these aspects through more quantitative studies, as it has been done about the factors of success in alliances among Portuguese firms (Franco, 2011) or about the impact of contractual constraints on performance of franchising (e.g., Zanarone, 2013; Jell-Ojobor et al., 2022).

This example suggests that this evolution is not specific to the airline industry. In his pioneering paper, Dyer (1996) already showed the benefits of the complex arrangements characterising *keiretsu* in the Japanese automobile industry, which combine integration, alliance with selected suppliers and arms-length relationships with others suppliers according to the degree of specificity of assets involved. Although about vertical relationships, Dyer's analysis carries *mutatis mutandis* lessons for horizontal relationships among parties involved in similar activities. For instance, the hybrid-within-hybrid under review introduces through the much tighter coordination over the North Atlantic routes a form of hierarchy within the broader *SkyTeam* alliance, sharing similarities with the relationship between *Toyota* and its first and second rank suppliers. Other examples have been pointed out, although not analysed as such, e.g., in the pharmaceutical industry (Baker et al., 2008), the software sector (Lavie, 2007), or franchising (Lafontaine and Slade, 2013). There is the need for more in-depth investigations and comparisons to better understand the motivation(s) behind these choices, capture similarities and differences and identify the specific mechanisms of governance that might explain the success and resilience of these arrangements.

6 Conclusions

An abundant literature has enriched our understanding of WHY firms engage into hybrid agreements (Ménard, 2013, 2022). However, there is very little about organisational solutions in which parties participating to a global alliance (or franchising system, etc.) decide to build sub-alliances or other forms of hybrid-within-hybrid. And much remain to be done about the mechanisms of governance and the role of managers in explaining HOW these arrangements might overcome the benefits of organising transactions through markets or within an integrated firm.

This article made steps in these directions through the case study of the agreement between *AF-KLM* and *Delta-Virgin*. Although it acknowledges the role of expected benefits from contracting and of constraints imposed by regulatory authorities in the decision to adopt the 'hybrid-within-hybrid' form, our analysis went further, pointing out gains expected by the flexibility and adaptability of this arrangement for managing risks in a turbulent environment. In doing so, it identified elements that can explain the success and resilience of such arrangements.

The extension of the agreement between *AF-KLM/Delta-Virgin* to other routes, its imitation by competitors in the airline industry and the observation of similar solutions adopted in other sectors signal a category of organisations that deserves specific attention. Besides those identified above, several other questions remain to explore. What are the conditions of acceptance of this type of arrangement by partners to the broader alliance kept aside? What about the consequences of the resulting mammoth organisations when it comes to competition policies? And what is the generality of the modalities of governance we have identified? Better understanding how ‘hybrids-within-hybrids’ successfully overcome endogenous agency problems as well as challenges coming from unexpected events deserves further exploration, towards a more inclusive theory of alternative modes of organisations.

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Notes

- 1 In the airline industry 'hybrid' often refers to a mix of attributes from different business models. Hereafter, we stick to its usual meaning in economics and organisation theory.
- 2 This is one definition among many others. For a discussion of the blurred concept of international strategic alliances, see Silva et al. (2022).
- 3 RBV explains organisational choices through a distinction between tradable resources, which are non-specific to a firm and can be acquired through markets; and capabilities, which are specific to a firm so that trading them could challenge the firm's identity and survival, pushing towards integration (Amit and Schoemaker, 1993).
- 4 Code sharing allows an airline to place its two-letters identification code on a flight scheduled by another airline, selling tickets to destinations it does not serve.
- 5 A summary of what we already knew about the contract and the governance and a list of 26 questions (available on demand) were sent to interviewees of the second round ahead of time.
- 6 The major disruption due to the Covid pandemic makes more recent data meaningless for the purpose of this article.

- 7 Our interviews revealed the existence of two contracts in the initial venture: an evergreen contract between the European parties and *Delta* and, nested in this contract, an intra-European 10-year contract with *Alitalia*. At its expiration in 2019, the venture cut out *Alitalia* (*Eti* had bought 49% of its shares in 2014) that went bankrupt in August 2021.
- 8 Norheim-Hansen (2017) distinction between high-reputation firms and low-reputation partners might help understanding possible tensions with members of the broader alliance excluded from the *AF-KLM* and *Delta* partnership perceiving themselves as ‘inferior’ partners.
- 9 Alliance, Cargo, Customer experience, Distribution, e-commerce, Finance, IT, Loyalty, Marketing, Network, Operations, Reservation, Revenues & Management & Pricing, Sales, Sustainability.
- 10 Illustrative is the ‘ready-to-fly’ stamp on the boarding pass introduced by *AF-KLM* and rapidly adopted in the alliance signalling the health status of passengers (e.g., PCR, certified vaccination) to partners, airports and regulatory authorities. It considerably accelerated check-in and boarding at a time of important variations of rules across countries or even airports within a country.