



Code-share connectivity within global airline alliances – How much potential is utilized?



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ABSTRACT

This paper analyzes the code-share connectivity of carriers from the three global alliances: Star Alliance, Sky Team and oneworld. We generate 2-leg online and code-share connections to evaluate the existing connectivity. Additionally, we generate all potential interline connections between members of the same alliance that are not yet supported with existing code-shares and analyze what share of the potential connectivity remains unused. We find that code-share connections account to about one-fourth of the total number of international connections offered by alliance members. 73% of those code-share connections are with partners from the same alliance, 6% with carriers from competing alliances and the rest with other carriers, which means that airlines seek partnerships not only within their own global alliance but even with members of competing alliances. At the same time, over 25% of the total potential code-share connections between members of the same alliance remain unused. This connectivity potential is better utilized within the network of Sky Team and oneworld than within Star Alliance. American and European carriers show a higher degree of code-share partnership with their alliance partners than Asian carriers. Overall, code-share partnerships are strongly driven by strategic decisions on bilateral airline level. Many airline-pairs fully utilize their connectivity potential (almost half of the total existing code-share connections) but some cooperate only on selected routes or not at all. Over one-third of the remaining code-share connectivity potential within alliances is attributed to airline-pairs that don't partner at all.

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1. Introduction

1.1. Motivation

Since the late 90s, most of the world's biggest network carriers as well as many regional airlines joined one of the three global airline alliances: Star Alliance, Sky Team and oneworld. The alliances are still growing; since 2010 twenty-five new airlines joined one of them. Currently, 62 members of these three global alliances cover 60% of the global passenger traffic and are present on nearly 90% of all origin-destination (O&D) city-pairs worldwide.¹

There are several reasons for joining an alliance (see e.g. Oum

and Park (1997); Brueckner (2001); Iatrou and Alamdari (2005); Gaggero and Bartolini (2012)):

- facilitate collaboration with other members through various forms of partnership; code-share agreements, joint-ventures, or even merger and acquisitions
- expand global market coverage through code-share connections, offer higher frequencies on routes served by partner airlines
- increase brand awareness
- offer benefits to customers (e.g. frequent-flier programs, lower prices for interline flights)

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¹ Source: Amadeus Traffic Analytics for the six months period from April to October 2016. 60% global passenger coverage measured by number of passenger kilometers. 90% origin-destination city-pairs presence weighted by the O&D traffic volumes. Alliance counted as present on an O&D if at least one leg of the respective itinerary was operated by one of the alliance member carriers.

- enable access to regulated foreign markets and congested airports
- provide cost savings thanks to economies of traffic density and joint operations

Overall, the biggest advantage of airlines being part of global airline alliance is to facilitate the network collaboration among the members. Code-sharing is the most common way of such collaboration. A code-share agreement allows an airline to market and sell seats under its own code on the flights operated by a partner carrier. By linking their networks together, code-sharing airlines are able to provide coordinated connecting flights on many additional origin and destination (O&D) city-pairs. This allows to enhance the airline's market reach by providing service on new markets that are not covered by airline's online network and to increase its service quality by extending the frequency on routes already served. Typically, both code-share partners benefit from a code-share agreement, since each carrier receives the revenues from their segment of operation. From a passenger point of view, flight connections involving multiple airlines are more attractive, if they can buy the ticket just from one airline (baggage transfer, support in the case of delays and missed connections, lower price, booking convenience; most booking websites and computer reservation systems don't display interline connections not supported with a code-share or some other agreement).

Usually, the global alliances are seen as a group of partner airlines that maximize the collaboration within the group and therefore also provide code-shares between the member airlines wherever such potential exist. The goal of this paper is to analyze to which extent airlines within alliances are really collaborating and how much potential code-share connectivity within the alliances remains unused.

1.2. Literature review

Numerous studies analyzed the benefits of joining global airline alliances or bilateral code-share agreements e.g. (Dresner and Windle, 1996; Oum and Park, 1997; Brueckner, 2001; Morrish and Hamilton, 2002; Iatrou and Alamdari, 2005; Gaggero and Bartolini, 2012; Bilotkach and Hüscherlath, 2012; Zou and Chen, 2017). Typically, increase of traffic and load factors as well as revenue growth are identified as the most relevant benefits of airline alliances. This has been shown e.g. by Iatrou and Alamdari (2005), who interviewed managers of 28 airlines belonging to the global alliances in 2002. They further showed that the global alliance partnership has the strongest positive impact on routes between the hubs of the member carriers or on routes linking the hubs to non-hub destinations, which in turn suggest a strong impact of code-shares on the connectivity of alliance members.

Most research around airline alliances focused on the impact of airline alliances on airfares (Oum and Park, 1997; Brueckner, 2001; Bilotkach, 2005; Chen and Gayle, 2007; Wan et al., 2009; Bilotkach and Hüscherlath, 2012; Gayle and Brown, 2014). On one hand, alliances lead to lower airfares on interline connections. On the other hand, various policy makers and authorities raise concerns that an increased market share of the allied airlines may lead to anti-competitive practices and increasing airfares. These concerns apply mainly for code-share partnerships on routes operated by both code-share partners (parallel code-sharing). While some evidence for airfare increase as result of such partnerships has been found for certain market conditions, (Bilotkach, 2005; Brueckner and Pels, 2005), the literature suggests that those negative effects are often insignificant or offset e.g. by increased efficiencies. Overall, most studies to date seem to reject the hypothesis of a structural anti-competitive impact of global alliances on increase

airfares (Wan et al., 2009; Gayle and Brown, 2014). In case of the code-share agreements on non-overlapping routes operated by only one of the partner airlines (complementary code-sharing) an airfare decrease effect is observed in most of the existing studies, e.g. (Brueckner, 2001; Bilotkach, 2005; Chen and Gayle, 2007). Complementary code-shares are typically implemented on routes feeding or de-feeding the hub connecting traffic of the code-share partners. Thanks to such code-shares a connection operated by two different operating carriers can be sold on a single ticket issued by one of the partner airlines. Such connections are more attractive to passengers (seamless connections) and they also allow partner airlines to increase their hub connectivity and market reach.

Typically, both partners profit from a code-share cooperation. The marketing carrier sells a seat on the flight operated by the partner, it collects the ticket revenue and compensates the operating carrier based on a predefined revenue sharing scheme (Gerlach et al., 2016). Since both carriers act as separate profit centers and aim to maximize their own revenue, the benefit from the code-share cooperation may not be fairly distributed between the partners and in certain circumstances may even lead to a disadvantage for one of them (Gerlach, 2013).² The fear of being in such a disadvantage is, apart from strategical goals, the main reason why carriers sometimes decide not to code-share with other partners, even from the same alliance. In order to avoid unfair distribution of revenues and to maximize the mutual benefit, code-shares should be integrated into the revenue management of both partners. Gerlach et al. (2016) summarized the main challenges of such an integration (selfishness, information asymmetry, heterogeneity and decentralization) and discussed how they can be addressed.

Since global alliances have a major impact on airline connectivity, they are often analyzed as one of the dimensions of connectivity studies (Burghouwt and Veldhuis, 2006; Malighetti et al., 2008; De Wit et al., 2009; Suau-Sanchez and Burghouwt, 2012; Redondi et al., 2011; Lieshout et al., 2016; Suau-Sanchez et al., 2016). Burghouwt and Veldhuis (2006) analyzed the competition between hubs on the transatlantic market between the United States and Northwestern Europe. The study showed, how the evolution of the global alliances, in particular expansion of Sky Team after the entry of KLM and Northwest, increased the connectivity of their respective hubs. De Wit et al. (2009) provided a similar study for the Asian airports. Suau-Sanchez and Burghouwt (2012) analyzed the connectivity of the Spanish airports. They discussed the dominant position of oneworld in Madrid and a major role of all three global alliances in shaping accessibility between Spain and the rest of the world. Lieshout et al. (2016) analyzed the competition between airlines and airports in Europe. Among other results, they provided an interesting overview of the connectivity and market shares of Star Alliance, Sky Team and oneworld in European countries. They grouped airlines belonging to the same alliance together, assuming for the purpose of their study, that these airlines do not compete with one another and proposed to relax this simplifying assumption in future research.

Grouping of airlines belonging to the same alliance (at the stage of model design or presentation of results) is a common practice in connectivity related studies. Burghouwt and Veldhuis (2006); De Wit et al. (2009); Suau-Sanchez and Burghouwt (2012) applied a connection builder that allowed all interline connections within a global alliances and ignored other interline connections, irrespective on existing code-share agreements. Redondi et al. (2011) also allowed all interline connections within global alliances when building connections in their analysis of hub connectivity in the

² This works differently in the closer forms of cooperation such as joint-ventures.

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