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Note

A note on effective code-share management in practice

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ABSTRACT

Because code-sharing lets airlines market inventory jointly, it is central to alliance strategy. This research note discusses a common code-share revenue management process and quantifies code-sharing based on empirical data provided by Lufthansa German Airlines. We highlight overcoming selfishness, information asymmetry, system heterogeneity and decentralization as main challenges to effective code-share management.

1. Introduction

As alliances can improve profitability and market share, they enjoy increasing popularity in the airline industry (Topaloglu, 2012). Between 2003 and 2010, the number of alliance members grew by 60% (Hu et al., 2013). Most large and mid-sized network carriers are engaged in one of the three big alliances – Star Alliance, Oneworld and SkyTeam (compare Table 1). The case of Lufthansa and StarAlliance as examined later in this contribution underlines this increasing diffusion of code-sharing. Competition among alliances is replacing competition among individual airlines, as each alliance strives for the best customer service and the most extensive network.

The success of alliances is explained by their benefits. Airlines use the alliance's brand awareness to attract more passengers and to access partners' infrastructure - compare Youssef and Hansen (1994) for an exemplary analysis of the case of SwissAir and SAS. Alliances establish standards of safety, technical equipment, and customer service. They promise passengers better connections, higher service quality, more lounges, and frequent flyer miles - see Goh and Uncles (2003) for a critical analysis. However, alliances also challenge airline planning: They increase process complexity, which can negatively impact performance.

This contribution highlights alliance challenges particularly for revenue management. Revenue management describes the art of *selling the right seats to the right customers for the right prices at the right times* (compare Smith et al., 1992). It is a central component of the airline planning process: Given a demand forecast, optimization determines revenue-maximizing inventory controls, which are implemented in the sales process.

Capacity-based network revenue management controls product availability via itinerary–fare class combinations. While intraline itineraries are sold and operated by the a single carrier, code-share itineraries result as multiple carriers cooperate by assigning their designators to each other's flights and marketing them under their own name (Vinod, 2005). This enables airlines to serve new markets and feed additional passengers into the own network (Oum et al., 1996).

As selling code-share itineraries involves multiple airlines, we distinguish marketing and operating carriers. The former issues the ticket; the latter operates the flights. Fig. 1 illustrates a typical airline code-share revenue management process.

To sell a code-share ticket, the involved flights' operating carriers must each provide a seat. In practice, this is realized by exchanging real-time inventory levels. Following Vinod (2005), code-share revenue management is currently realized via either blocked space or free sale agreements. In a blocked space agreement, the marketing carrier receives a fixed share of the partner's capacity to sell as desired. Soft blocks allow for updates over the booking horizon, whereas hard blocks are fixed. In a free sale agreement, every operating carrier controls their own inventory and transfers their flight-class availabilities to the marketing carrier. Based on a mapping that connects the operating and the

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Table 1
Summary of airline alliances.

	Members	Revenue (BUSD)	Passengers (mil.)
Star Alliance[a]	28	179.05	641.10
SkyTeam[b]	20	146	665.4
Oneworld[c]	15	141.4	512.6

[a] http://www.staralliance.com/en/about, March 2016.
[b] http://www.skyteam.com/en/About-us, March 2016.
[c] http://www.oneworld.com/news-information/oneworld-fact-sheets/, March 2016.

marketing carriers' classes, the marketing carrier determines the code-share availability. Accordingly, all code-share itineraries receive the availability assigned to the local itinerary. The challenges of code-share management as pointed out in this note do apply to each type of agreement, as each requires going beyond selfish motives, exchanging information, establishing joint standards, and centralizing acceptance decisions.

Once a code-share booking is accepted, the operating carriers update their inventory and booking references. The marketing carrier collects the fare, issues the ticket, and compensates operating carriers. Revenue sharing schemes govern compensation and revenue distribution.

2. The increasing diffusion of code-sharing – the case of Lufthansa and Star Alliance

The number of Lufthansa flights used for or impacted by code-sharing increased tremendously from 2000 to 2010. While operated flights remained relatively constant, the share of exclusively marketed flights dropped from 60% in 2000 to less than 20% in 2010. During the same period, the number of flights marketed by Lufthansa but operated by another airline increased by more than 80%.

Fig. 2 depicts the average number of Lufthansa marketed flights per week from 1994 to 2011. Flights are divided into three categories: (1) operated and marketed by Lufthansa, (2) operated by Lufthansa and marketed by at least one other airline and (3) operated by another airline and marketed by Lufthansa.

Code-sharing increased Lufthansa marketed flights by more than 115% to about 4100 per day in 2011. More than 90% of these were either operated by a code-share partner or marketed by one. This shows that code-sharing impacts large parts of the network; furthermore, it accounts for 7–9% of total bookings. Experts from other airlines report numbers between 6 and 16%. However, the share of code-share bookings is considerably higher on hub-to-hub routes, reaching values between 15 and 25%. It is even higher on

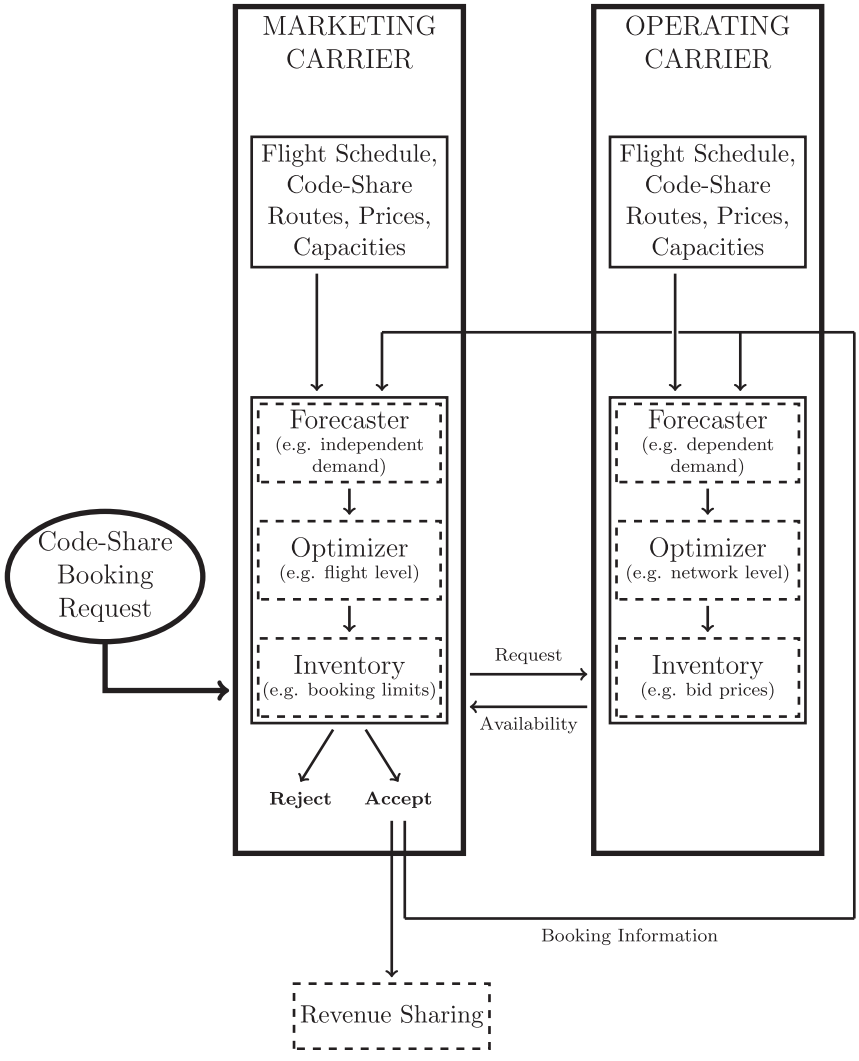

Fig. 1. Code-share revenue management process in practice.