Can Low-COST Long-haul Flight Operations be Profitable?

Hitherto, sustainably profitable low-cost operations can only be observed among short- to medium-haul airlines. Even though various carriers have launched attempts to extend the low-cost carrier (LCC) business model to long-haul flights (LHF, see the subsequent chapter for a definition), most of them failed before flight operations were initiated or went bankrupt after three to five years if flight operations started. However, the frequency with which new low-cost LHF airlines are founded is still considerable (see Tab. 1). Entrepreneurs as well as established airlines seeking new growth paths are among those in the industry that follow what seems to be a trial-and-error process in launching and operating LCC LHF airlines. This is not particularly surprising, since little systematic guidance on preconditions for and design options of a LCC LHF business model have been advanced. Rather, the scholarly literature has given only scant attention to the challenge of adapting the low-cost model to LHF, and the question of whether the low-cost long-haul model is economically viable has not been unanimously answered yet.

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This paper tries to bridge this gap and provides a profitability analysis for LCC LHF operations. We examine the essential business model related criteria for LCC LHF to actually "take flight" by using the following, original approach: Basic configurations of LCC and typical LHF products are discussed first. We then analyze potential revenue sources of ancillary services sales to passengers on LHF. Joining the identified revenue sources and their related cost components, we are finally able to set up a parametric framework to calculate profit margins for distinct scenario parameters. Based on our scenario analysis recommendations for the future potential of long-haul LCC operations are derived.

Table 1:
Selected long-haul LCC Airlines and Operations Status

Airline	Country	Year of starting LHF operations	Status
Laker Aiways´ Skytrain	UK	1977	Operations ceased in 1982
People Express	USA	1983	Operations ceased in 1987
Zoom Airlines	Canada	2002	Operations ceased in 2008
Civair	South Africa	-	Opartions had been planed for 2004
Oasis Airlines	Hong Kong	2006	Operations ceased in 2008
Jet Star	Australia	2006	In service
Air Asia X	Malaysia	2007	In service
Feel Air	Norway	-	Operation planed for 2011
Norwegian Air Shuttle	Norway	-	Operation planed for 2011

Low-cost Business Model and Long-haul Fights

Since a general and exact distinction between short- and long-haul business is hard to come by, we rely on industry convention that regard LHF as segments with a length of more than 3,000km that cannot be operated by standard narrow-body aircraft. For the so-defined flights we argue – different from most of the extant literature - that the cost savings patterns that put LCC at a cost advantage vis-à-vis their short-haul full service carriers (FSC) rivals (Doganis, 2006; Lawton, 2002), can be transferred, at least in part, to the long-haul segment. In order to systematically do so, we precede along the categories of the traditional route profitability analyses (RPA) and intentionally neglect overhead costs of an airline (Niehaus et al., 2009).

Hiring young flight staff, using secondary airports (that indeed can be identified within a 100km perimeter around the primary target destination at most metropolitan areas worldwide, e.g. Westchester Country Airport about 50km of New York), and avoiding expensive CRS (computer reservation systems) by using a internet based direct distribution is applicable for LCC long-haul operations in the same way as for short-haul LCC operations (Francis et al., 2007; Morrell, 2008; Wensveen et al., 2009). Furthermore, costs for onboard services such as beverages and catering that are included at traditional FSC can be compensated by putting them on sale.

In contrast, ATC (air traffic control) fees are principally not affected by the type of airline, but only by the flown flight distance. Fuel costs are practically affected by the airline type since LCC tend to use newer, more efficient aircraft fleets compared to the heterogenic fleets of FSC. To achieve cost savings, a LHF LCC thus has to improve unit cost degression particularly of such costs that are almost fixed for each flown kilometer by increasing earning capacity due to high seating density (at 30-31'' seat pitch) and single class configuration, which are already operated successfully by charter airlines like Condor or Corsairfly (Pels, 2008).

An overview of the cost components and their potential savings for LHF LCC is provided in Fig. 1. The listed ratings of cost advantages compared to FSC is based on a review of quantitative and qualitative cost data in the commercial airline industry. According to these findings we will elaborate an eligible set of potential ancillary revenue sources in the following section.

Sources of Revenue

FSC gain their flight product related revenues almost solely through sold flight coupons. Following a product bundling strategy, these flight coupons (at least for longer flight distances) normally cover basic services like seat allocation, beverages and some kind of board entertainment, thus little additional revenues can usually be achieved by charging for extra services. In contrast, the flight product of LCC is mostly unbundled, both to enable lowest ticket prices for promotional use and to ensure additional non-ticket revenues (Gillen et al., 2003). By offering high profit margins, ancillaries significantly contribute to LCC's profits (Doganis, 2006).

Established LCC such as easyJet and Ryanair have shown that ancillary revenues of 6 to 8€ per passenger can be achieved, accounting for 8 to 13% of total revenues. However a careful configuration of a suitable service offer mix needs to take into account that passengers are selecting LCC primarily because of their low fares regardless of service quality compared to FSC. Basic revenues of the airline will be achieved by selling airway bills (freight transportation) and flight coupons (passenger transportation). Considering a suitable twin-engine widebody aircraft type (such as A330, B767, B777), which have significantly lower MRO and fuel cost compared to four-engine aircraft, 350 to 440 seats at 30'' seat pitch can be installed and up to 10t usable belly capacity will be available for additional freight transportation (Clark, 2007).

Service offers beyond flight coupons and airway bills are considered as additional revenue sources. Such services can for example cover pre-bookable seats, cross selling of products (e.g. rental cars, hotels and accommodation, tourist guides or international cell phone cards), or additional service offers that are related to the check-in processes itself. Charging for services that increase passenger comfort at airport terminals and facilities can also account for further revenues (e.g. priority waiting rooms and fast lanes for security control. The greatest potential for ancillary revenues, however, is related to the core transportation product (in-flight) as nearly all amenities which are normally provided as a bundle with this core transport service (at least on LHF) can be unbundled

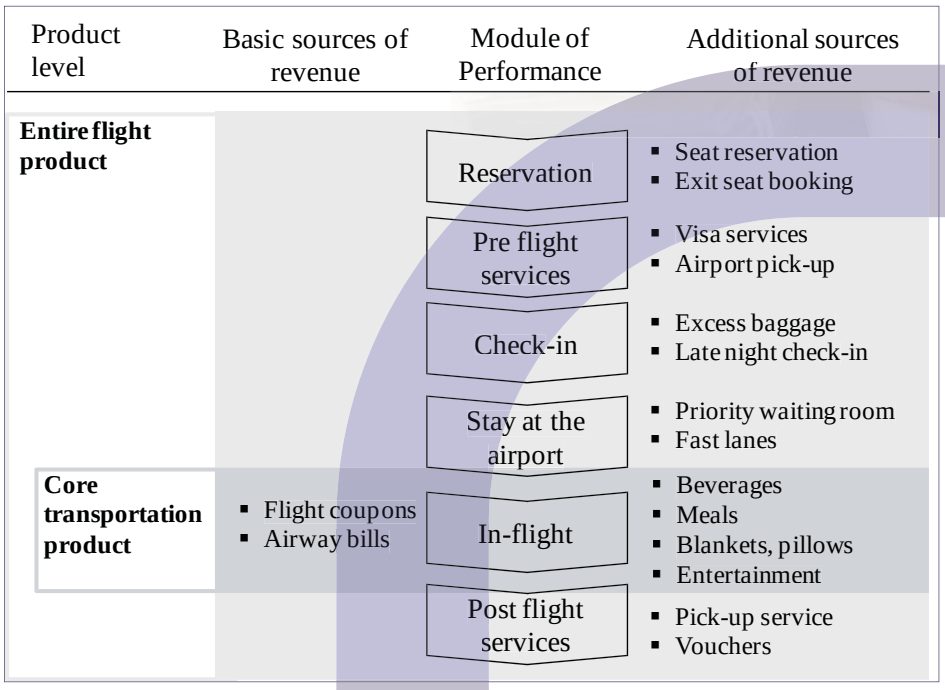
Figure 1: *RPA cost components (extract) and impact for LCC LHF product*

RPA	Advantage compared to FSC	Impact for LCC LHF product	
Flight revenues		see section 3	
./. Direct variable costs			
Passenger related costs			
Catering	++	charging for services	
Passenger fees	++	use of secondary airports	
Passenger insurance	-	no	
Booking and reservation costs	+	only online distribution, no interlining	
Other (e.g. FFP awards)	+	FFP only offered on charge	
Flight related costs			
Handling fees (for aircraft)	++	use of secondary airports	High seating density to improve cost degression
Landing fees (for aircraft)	++	use of secondary airports	
ATC fees	-	no	
Fuel	+	use of fuel efficient aircraft	
Crew travel costs	++	no	
Variable maintenance costs	+	young communal aircraft	
Other (e.g. fuel hedging)	-	no	
./. Direct fixed costs			
Fixed maintenance costs	+	young single type fleet	
Crew costs	++	minimum cabin crew	
Aircraft insurance	-	no	
Aircraft depreciation	-	no	
Other (e.g. station costs)	-	no	
= Profit Contribution 2			

and be sold separately on a LCC LHF. Taking into account the extended duration of a LHF, demand for such services tends to be highly valued by passengers.

Additional revenues can be generated even after the actual flight has landed. Such services could be individualized for each destination and include airport pick-up services with certified taxis, vouchers for restaurants and priority luggage drop. Compared to traditional LCC, demand for these services is likely to be higher, since destinations of LHF are naturally located in more distant, and thus very often also quite different (foreign) socio-cultural areas, thus increasing passengers demand for assistance upon arrival after several hours of travel.

Figure 2: *Revenue schema of the LCC LHF product*



Scenario Setup of LCC LHF

After our assessment of both cost and revenue components of a LCC LHF product we set up a parametric scenario framework to calculate profit margins for distinct scenario parameters. Parameter ranges will be indicated for customer demand as well as viable sales prices for airway bills, flight coupons and ancillary service offers. We base our assumptions on observable market data; as part of the RPA we will also indicate related costs based on expert interviews with experienced airline managers and available performance statistics and technical specifications.

Basic sources of revenue and related costs

The design of the core flight product and thus the basic revenues of selling flight coupons and airway bills will strongly depend on the choice of a certain aircraft type. A suitable aircraft type has to serve ranges of 5,000 up to 9,500 km while offering a considerable payload. The twinjet, medium sized A330-200 meets both range and seat capacity requirements while at the same time being of younger age than the comparable B767 and having a lower list price than the B777.

In a single class cabin layout the A330-200 can carry 386 seats at a 9-seat abreast configuration with 30'' seat pitch when relinquishing the middle section business class galley and middle section lavatories.

For our further considerations we will assume a flight distance of 6,200km (equivalent to 8.5 block hours), which represents an average of most long-haul trunk routes worldwide. This distance matches, for example, the high demand London – New York as well as Düsseldorf – New York routes. We will use the latter exemplarily for our further considerations, as it represents a high-density route that has significant potential to enable a regular point-to-point LCC operation.

With regard to seat load factors (SLF), LHF generate higher SLF compared to short- and medium-haul flights, irrespective of the airline business model. European airlines have reached average SLF of about 80% on their LHF due to aggressive off-selling within their lower economy booking classes. In addition, FSC are able to feed their LHF, which in contrast is not possible for non-hub LCC operations. However, by offering an observable price difference on LHF compared to flight tariffs of FSC, a LCC can generate and absorb price sensitive demand. For our calculation we will consider a SLF range of 65-80%, which represents a sound average SLF of currently observable performance on regular operated LHF.

For sustaining a perceivable price differentiation to available FSC tariffs, we set up the maximum LHF LCC ticket fare for a round trip ticket at least 20% below the lowest available fare of any FSC competitor. Taking into account revenue management logics of FSC, however, the perceived gap will usually be higher since promotional base price tickets of FSC are generally limited to a small quota. Considering our selected DUS-NYC city pair, the cheapest available FSC round trip tariffs start at around 400€, and the average economy class ticket fare is 550€ (average fare for 2010). Thus our lowest promotional one-way base fare is 100€ and the maximum fare is 220€.

Concerning cargo demand we consider a conservative range of 1,200-1,800kg for chargeable airway bills, corresponding to the average of about 3,000kg belly cargo, which is typically transported on long-haul routes. In the same way we assume a range of 1.60-2.50€ revenue per charged kg freight, which refers to the highly competitive cargo capacity market. Our conservative assumptions reflect imbalanced flows of goods that hamper higher average cargo revenues.

On the cost side, assumptions can be estimated more precisely, particularly regarding fuel costs as a major cost driver. Considering our 6,200km flight leg the A330-200 will burn around 56,000l fuel which represents costs of 20,000€.

In the same way, MRO (maintenance, repair, overhaul) costs are calculated based on manufacturer and operator data of the A330-200, as MRO activities and tasks are clearly defined by strict authority regulations. Adjusted to a 6,200km flight leg MRO costs will account for around 8,000€.

Crew costs are significantly lowered compared to FSC by hiring young staff and reducing the number of cabin staff for the

A330-200 to eight. Taking airline salary statistics as a basis, costs for flight deck and cabin crew of a LHF LCC are estimated at 11,000€ per adjusted 6,200km flight leg including travel expenses.

Like crew costs, also airport landing and passenger fees offer cost saving advantages to LHF LCC if secondary airports are used. In this case the average charge lies at around 8,000€, including landing charges as well as passenger and aircraft handling fees.

By exclusively relaying on online distribution, costs for selling tickets will mostly be driven by credit card fees, which have to be ceded to the respective payment service providers. For our case of a fully loaded A330-200, these costs will not surpass 500€ per flight.

The remaining cost components that are immediately related to the core flight product are ATC fees, insurance premium and depreciation costs. These components are only marginally affected by the LCC business model. Tab. 2 gives a summary of all mentioned components.

Additional sources of revenue and related costs

A first source of additional revenues is offering reservation services such as selling seat pre-allocation and exit seats. Considering industry approaches for charged reservation services, we assume a price range of 5-10€ at which customers are willing to pay for a pre-allocated seat. Considering the average flight time of 8.5 hours and seating configuration within our proposed A330-200 cabin layout, we assume that 20-35% of all booked passengers are willing to pay extra to avoid unpopular middle seats or to ensure sitting together with partners, colleagues or family.

When examining the sales price for exit seats within the airline industry and average of 30€ per flight leg can be observed. Thus, for selling exit seats we consider a conservative price range of 25-30€ while we – taking into account industry experiences – assume an average of 4-6% of booked passengers willing to pay this price for extra leg space.

Prices and demand for pre- and post flight services are hard to predict, since there are little industry information available and revenues are generated through online cross-selling by external partners that pay commissions to the airline. Based on information of related online distribution platforms, we assume revenues of 50€ per passenger that is generated by 2-4% of all booked customers, and a commission rate of 4-6%.

Based on performance measures within the airline industry additional baggage revenues can be calculated well. Setting up a price range of 10-14€ per kg excess baggage we assume that 15-35% of all passengers will carry about 2-4kg of excess baggage beyond the free baggage limit of 17kg.

Concerning further revenues related to the check-in process (e.g. priority check-in and boarding) as well as services related to the stay at the airport, sales prices are accumulated and based on price and demand presumptions of established LCC. We will assume a conservative average demand of 8-10€ for 5-10% of booked customer.

Finally the revenue contribution of in-flight services has to be considered. Viable prices for offered services (namely drinks and meals, blankets, pillows, newspapers and magazines, as well as a portable entertainment system) are based on observable prices within the airline industry and related studies concerning passenger´s willingness to pay (see Tab. 2).

Concerning costs caused by the additional services, onboard catering costs of a fully loaded A330-200 will account for about 1,900€. We summarize price and demand assumptions as well as costs (adjusted to a fully loaded aircraft) in Tab. 2. By setting up scenario ranges we are subsequently able to calculate profit margins of a LCC LHF for distinct parameters within the indicated value ranges in order to provide a first step into assessing LHF LCC economic viability.

Table 2: *Parameter value ranges and costs*

Revenue parameters			Costs	
Parameter	*Value range*		*Cost componet*	*Value*
Capacity	386 Seats		Fuel	20.000 €
Seat load factor	65-80 %		Maintenance costs (variable + fix)	8.000 €
Average airway bill price	1.60-2.50 €		Cockpit + cabin crew (incl. travel expense)	11,000 €
Average cargo freight	1,200-1,800 kg		Landing and passenger fees (aircraft + passanger)	8,000 €
Average extra baggage	2-4 kg		Distribution costs (Credit card fee)	500 €
Commission rate for bef. and aft. flight services	4-6 %		Depreciation	5,700 €
			ATC	3,500 €
	Unit Price	*Demand*	Insurance (aircraft + passenger)	250 €
Seat reservation	5-10 €	20-35 %	Onboard services (Catering + IFE, etc)	1,900 €
Extra space seat	25-30 €	4-6 %	ICT (for advanced booking systems)	200 €
Pre- and post flight services	50 €	2-4 %		
Excess baggage	10-14 €/kg	15-35 %		
Further check-in services	8-10 €	5-10 %		
Blanket	2-5 €	10-20 %		
Pillow	2-5 €	10-20 %		
Meal	8-10 €	30-50 %		
Drink	5-7 €	65-80 %		
IFE	14-18 €	15-20 %		
Newspaper and magazines	2-3 €	10-15 %		

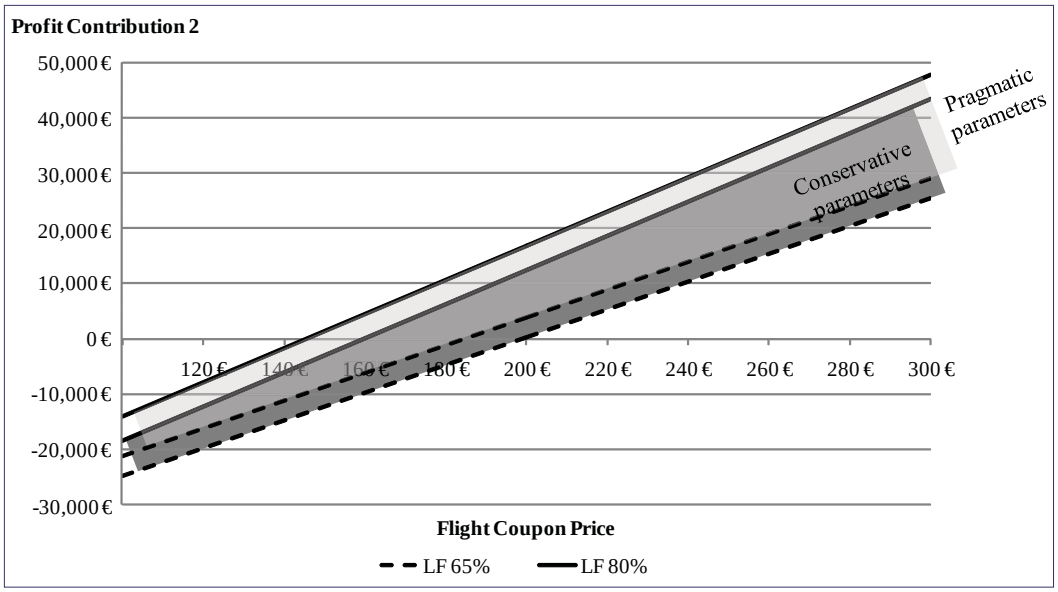
Profitability calculation of the LCC LHF business model

Since our analysis concentrates on flight leg related considerations, we use the airline specific route profitability analysis (RPA) to calculate the profit contribution level 2 (PC 2) that covers direct variable as well as direct fixed costs, whereas overhead costs for sales and administration are excluded.

In total, 28 revenue parameters can be varied within their predefined ranges. However, to manage the number of permutations we consider two basic scenarios at which we vary distinct parameters. Our conservative scenario represents a minimum both in demand numbers (65% SLF, 1,200kg belly cargo load) and enforceable average unit prices for flight coupons (100€) and airway bills (1.60 €/kg) as well as ancillary services. In this case of conservative parameter setting, costs of 55,174€ come with revenues of 30,470€, representing a PC 2 loss of 24,705€ per flight leg (Fig. 3).

Even ancillary revenues of 3,460€ that represent 11.4% of total revenues cannot fill the gap between earnings and costs. Due to the dependence of ancillary revenues on SLF, higher ancil-

Figure 3: *Comparison of conservative and pragmatic case scenario*



lary contributions are hindered by the small basis of consumers onboard in the conservative case scenario. Due to its high leverage compared to ancillaries, the ticket price highly impacts the profitability and ratio of ancillary and total revenue. To reach the breakeven point in our conservative case scenario, the average flight coupon price needs to increase to nearly 200€. In contrast, considering an average SLF of 80% while keeping all other parameters constant, an average flight coupon price of 200€ would lift PC 2 to 12,479€.

However, an average SLF of 80% tends to overestimate realistic demand patterns, while the ancillary parameters tend to underestimate the demand for amenities. We therefore adjust our parameters within the predefined ranges in a more pragmatic case to reflect observable average performances of a dedicated route during a fiscal year (see comparison of parameter setting in Tab. 3).

Considering our pragmatic case setting, for a fixed flight coupon price of 182€ PC 2 will be positive for each SLF above 65%. The ticket price of 182€ meets our requirements of leaving a 20% price gap compared to the average ticket fare of FSC competitors, since it offers further potential of 38€ until the maximum price limit is reached. Ancillary revenues in the pragmatic case setup will account for around 13% of the total revenues, and significantly improve profitability.

Assuming a top range SLF of 80%, PC 2 would reach 12,058€ at which ancillaries would contribute 7,237€. In contrast, assuming the same SLF of 80% and an average flight coupon price 100€, PC 2 deflates to around -13,000€. When excluding ancillary revenues, PC 2 would even fall to -20,000€. Despite the ancillary revenue contribution, however, the achievable average flight coupon price, which is immediately linked to the demand at the respective city pair, will – as for the traditional LCC and FSC – be the most critical determinate for the profitability of a LHF LCC business model.
Belly cargo can account for up to 1,900-2,600€ in addition to flight coupon earnings and ancillary revenues, depending on the chosen parameter values. In any case, the belly cargo contribution of 4-6% is lower compared to the other revenue sources. However, considering our pragmatic case setting (65% SLF, 182€ flight coupon price), the cargo contribution of 2,560€ is the critical factor that lifts PC 2 above the breakeven point. Thus, for low passenger load factors, the belly cargo contribution is suited to relax the profitability situation of the long-haul LCC.

Discussion and conclusion

The aim of this paper was to assess the principal profitability of regular long-haul LCC operations. By conducting a detailed parametric scenario analysis for a LCC LHF product we were able to calculate profitability conditions for distinct cases. Based on qualitative and quantitative data, our findings suggest that a profitable regular operation can be possible. The study illustrates that the inclusion of revenue considerations leads to quite different recommendations than previous studies. Gaining additional revenues by unbundling the product of a LHF is an important measure to compensate low basic earnings of selling low-fare flight coupons, which have to be significantly cheaper compared to the lowest promotional FSC fare. Depending on the average flight coupon price, ancillary revenues can contribute up to 16% of the total revenues. Compared to the industry average contribution of about 8.8%, the importance of ancillaries is much higher for a long-haul LCC. However, ancillary revenues are only one component within the product framework of a long-haul LCC.

Table 3: *Comparison of conservative and pragmatic case parameters*

Conservative parameters			Pragmatic parameters		
Revenue Sources	***Parameter value***		***Revenue Sources***	***Parameter value***	
Average airway bill price	1.60 €		Average airway bill price	1.60 €	
Average cargo freight	1,200 kg		Average cargo freight	1,600 kg	
Average extra baggage	2 kg		Average extra baggage	3 kg	
Commission rate for bef. and aft. flight services	4 %		Commission rate for bef. and aft. flight services	5 %	
	Unit Price	***Demand***		***Unit Price***	***Demand***
Seat reservation	5,00 €	20 %	Seat reservation	8,00 €	30 %
Extra space seat	25,00 €	4 %	Extra space seat	29,00 €	5 %
Pre- and post flight services	50,00 €	2 %	Pre- and post flight services	50,00 €	4 %
Excess baggage	10.00 €/kg	15 %	Excess baggage [€/kg]	12,00 €	29 %
Further check-in services	8,00 €	5 %	Further check-in services	9,00 €	8 %
Blanket	2,00 €	10 %	Blanket	3,50 €	15 %
Pillow	2,00 €	10 %	Pillow	3,50 €	15 %
Meal	8,00 €	30 %	Meal	9,00 €	40 %
Drink	5,00 €	65 %	Drink	7,00 €	77 %
IFE	14,00 €	15 %	IFE	16,00 €	18 %
Newspaper and magazines	2,00 €	10 %	Newspaper and magazines	2,50 €	13 %

Even though our RPA was based on LCC-typical seat load factors, the question where sufficient demand to regularly fill the respective long-haul point-to-point capacity exists was intentionally not considered. Extant studies doubt such demand, in particular at smaller (or secondary) airports. According to our presumption of a regular flight operation that likely requires at least one flight frequency per day, an interesting city pair would have to offer demand of at 7,026 passengers per week to fill the offered base load capacity of 65% on the A330-200. For example, our suggested city pair DUS-NYC comprises a catchment of more than 18 million people on the DUS side, and nearly 19 million on the NYC side. We thus suggest that it is possible to identify markets that offer sufficient point-to-point demand potential without dedicated feeder traffic (according to Maertens, 2010).
Our study is a first step into broadening and deepening our understanding of long-haul LCC operations and, of course, has limitations. Our results are based on dedicated scenario configurations. However, there are obviously certain other configurations (e.g. by selecting other aircraft types) that should be considered for designing a long-haul LCC.

Practically, it remains unclear as to why the principally feasible conditions for profitable operations that result from our analysis have not yet resulted in a surge of successful (i.e. profitable) LHF LCC. Even though we need to speculate on the reasons, we offer three observances that, in our view, could have contributed to the previous LHF LCC failures: First, and most important, many of the failed LHF LCC operated routes that were at least on one end serving a major international airport that served as a hub for at least one large FSC (e.g. Oasis: HKG and LGW, Zoom: YYZ, YVR, CDG and AMS) instead of using available secondary airports in the close neighborhood (Morrell, 2008). Both, higher landing fees and direct competition of FSC which can offer high frequencies might have been destructive – especially since the hub FSC was also able to selectively reduce fares on the one (or few) competing route(s). Second, ultra high capacity outdated aircraft (e.g. Boeing 747) were used that do not necessarily succeed in realizing the projected and required lower unit costs, that are in principle possible on such large aircraft. Third, and related to this issue, most of the yet failed LHF LCC did not consequently implement the product unbundling idea and refrained from exploiting ancillary revenue sources where possible. We offer these observations, but simultaneously need to stress that additional research is necessary to support or reject them as potential factors that led to the demise of LHF LCC.

Given our analysis, however, and the still active interest and attempts to establish LHF LCC, we expect that sooner or later the right combination of strategy, structure and external environment will lead to the establishment of various LHF LCC. Especially the growing markets in India and China which generate a significant potential of a price conscious but mobile “visiting friends and relatives” customer base might provide an early answer as to where these business models might emerge sooner rather than later - the success of Air Asia X and Jet Star might be seen as indicators for these developments. Assuming a broad expansion of long-haul LCC also beyond these markets, the established FSC are likely to get under increased competitive pressure. For evading similar consequences as in their recent experiences with continental LCC competitors, FSC will need to proactively reshape their long-haul product and cautiously prepare for new entrants on some of their most cherished markets. Future research and practice will show if establishing long-haul LCC operations are likely to aggravate extant tendencies for an amalgamation of the FSC and LCC business model.

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