Revisiting the Airline Business Model Spectrum:

The influence of post Global Financial Crisis and airline mergers in the US (2011-2013)

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Abstract

This paper re-examines the airline business model spectrum first proposed by Lohmann and Koo in 2013. The paper analyses the period of 2011–2013, where the US airline industry was no longer affected by the global financial crisis and after a few major US airlines went through a merging process. This study examines eight US carriers i.e. Alaska, American, Delta, Hawaiian, JetBlue, SkyWest, Southwest and United. These eight airlines were placed along a continuum of business models, i.e. full-service network carrier (FSNC), hybrid and low-cost carriers (LCC), as proposed in the incipient study by Lohmann and Koo (2013). Data from the airlines were used to delineate and review the indices labelled as ‘revenue’, ‘connectivity’, ‘convenience’, ‘comfort’, ‘aircraft’ and ‘labour’, forming the framework of the business model used. The results of this study continue to highlight the characteristics of each of the US carriers examined for the six proposed indices. A comparison is made between both studies, with the results suggesting that both convergence and divergence from the original FSNC and LCC positions in the spectrum occurred, with a tendency of merged airlines to move towards the FSNC end of the spectrum.

Keywords: Airline Business Models; Full Service Network Carriers; Hybrid Airlines; Low-Cost Airlines

1. Introduction

Conceptually, the embodiment of a business model is related to the organisational and financial architecture of an enterprise where it makes implicit assumptions about customers, the changing nature of consumer needs, behaviours in revenues and costs, and the likely responses of competitors (Teece, 2010). This notion applies to the airline industry where there are several existing business propositions (e.g. hybrid, regional, charter), in addition to the two main archetypes (low-cost carrier – LCC; full-service network carrier – FSNC) by utilising the most appropriate attributes of these business models in order to maximise the gains (or financial profits) in a dynamic industry environment.

Revisiting the airline business model spectrum shortly after it was first proposed has relevancy considering US airlines have since then endured two major impacting forces when the study first took place. As both the GFC and the period shortly after that was characterised by mergers among US-based airlines, with significant impact on how these airlines are operated and managed, studying the possibility of any potential shift of these airlines seem timely and relevant. When the airline business model spectrum was first proposed by Lohmann and Koo (2013), it highlighted a period (2008-2009) when the world's economy was in financial despair. Despite the innovative approach proposed by the model, the GFC has had a large impact on air transportation as the recession caused a downturn in the passenger market, notably among business travellers. Some studies (e.g. Franke and John 2011, Morrell 2011, Dobruszkes and van Hamme 2011) examined the impact of the GFC on the aviation industry highlighting the impacts on cargo, passenger and aircraft sales. These papers all identified the need for airline business models to react appropriately to the global recession. Furthermore, many US airlines consolidated, through mergers, to realise short and long term financial gains and market growth (Manuela and Rhoades, 2014), providing an opportunity to empirically analyse whether the airlines have shifted their positions along the continuum as a result of the GFC and mergers.

Building on the research that Lohmann and Koo (2013) conducted, this paper aims to update the airline business model spectrum using data for the period 2011–2013. The reason for the choice of the Lohmann and Koo framework is because their previous study used similar data for US carriers, which are mostly freely available on the internet. This fact allows for a comparison

between the results of their study and this paper. Other methods and regions would require access to paid data, in addition to not allowing a comparison with US airlines, whose merger processes were particularly relevant after the GFC. Also, within the two-year snapshot of the original analysis (2008-2009), the short time frame used and the impact of the GFC could have masked whether these airlines were cemented in a particular place along the spectrum or if they were moving towards a place of convergence. Focussing on the same airlines (where possible) provides the opportunity to examine whether business models are dynamic or static.

2. Literature Review

Airline business models

Of the many airline business models, the two most widely established categorizations are the FSNC and the LCC; which, over the 2000s, academic papers such as Gillen and Morrison (2003), Franke (2004) and Gillen and Gados (2008) have analysed. Both FSNCs and LCCs have been extensively defined in the literature (Dobruszkes, 2006, Lohmann and Lipovich, 2013, Whyte and Lohmann, 2015). Hence, further description about these two business models will not be provided in this paper; yet fewer publications exist highlighting the hybrid airline business model.

Hybrid airlines

A hybrid airline combines different strategies of FSNCs and LCCs into its unique business model. JetBlue is an example of a hybrid carrier where its business model utilises a few hub airports similar to that of an FSNC, but that it operates its fleet on a point-to-point network analogous to that of an LCC (JetBlue, 2013). JetBlue also has many codeshare agreements with 39 partner airlines, allowing for customers to have greater connectivity to global destinations (JetBlue, 2013). While, on one hand, JetBlue has a mixed fleet of two aircraft types and offers a frequent flyer programme as FSNCs do, on the other hand, this airline has one of the lowest aircraft/employee ratios and a very high daily aircraft utilisation, similar to that of LCCs. Klopheus et al. (2012) further developed a method for examining European low-cost airlines that might be classified as hybrid airlines, suggesting that hybrid carriers have either dominating FSNC or LCC characteristics. Aer Lingus is a European example of a hybrid model as it offers flights on its trans-Atlantic network that resemble the services of FSNCs, but it has a different strategy to compete with LCCs, such as Ryanair, on its domestic and European networks.

Previous studies analysing hybrid business models include Lieberman and Asaba (2006), and Bell and Lindenau (2009) that have examined airline strategies that have blended and blurred the two basic business models. Such homogenization of business models was done through imitation where firms mirror each other's strategies to avoid falling behind. Nevertheless, airlines do take advantage of their individual operational capabilities to differentiate themselves in terms of pricing, product, fleet, network design and overall efficiency. Within the two mainstream business models, there is a myriad of airlines utilising the best of each model, differentiating themselves through labour costs, fleet structuring or even creating a subsidiary to realise profitable gains. Studies such as those developed by Gillen and Morrison (2003) and Franke (2004) have shown that these two widely accepted models have been competing through items such as price or product in their respective niches.

Business model framework

Mason and Morrison (2008) set out to establish a method for systematically comparing European airlines, albeit a difficult task considering the dynamic nature of the airline industry. By combining the various key components that make up the POA, defining the product relative to consumer preferences, Mason and Morrison (2008) conceptualised a business model framework applicable to airline business models. The application of the POA was used to distinguish business models among airlines that were previously considered in a general classification as LCCs. As one airline may be defined as the lead strategist in one component, other airlines may be forced to establish a different POA strategy. The research was further developed with the purpose of creating a framework for which business models within the airline industry can be classified and areas of similarities compared and whether convergence (or in some cases divergence) occurred over time (Daft and Albers, 2013, 2015). They highlighted the importance of identifying a firm's decision level processes covering functional and organisation layers which contribute to the value creation system, using five German firms (Lufthansa, Germanwings, Air Berlin, Germania and Condor). Lohmann and Koo (2013) then established a method for comparing business model strategies for airlines allowing for firms to be placed along a continuum between the two main classifications of LCC and FSNC.

The airline business model spectrum

In the airline business model spectrum, airlines (FSNC, hybrid and LCC) can be placed along a continuum between the two common discrete categorizations of FSNC and LCC. Daft and Albers (2013) analysed in their research how to methodically find a point of convergence for various European airlines in their business models. Both methods proposed by Lohmann and Koo (2013) and Daft and Albers (2013) utilise a classification system presented by Mason and Morrison (2008). More recently, Daft and Albers (2015) revisited their study of the five German airlines which supported that convergence occurred over time.

3. Methodology

The framework for this study was adapted from the POA of airlines applied by Mason and Morrison (2008) to six European carriers. Their studied focused on LCCs in Europe and consistently compared them against the best in class for the item that was benchmarked. Lohmann and Koo (2013) applied this analytical approach to their study comparing nine major US carriers' business models, benchmarking the POA variables to establish a spectrum where the airlines can be positioned. Six indices, described below, which came from Mason and Morrison's work, were grouped, comprising by a total of 20 different items. Detailed explanation on the composition of the six indices, "Revenue", "Connectivity", "Convenience", "Comfort", "Aircraft", and "Labour", has been done by Lohmann and Koo (2013) and there is no point in repeating it here.

The data were collected between September and December 2014. As per the Appendix 1, a total of 480 cells (eight airlines x three years x 20 items) with information was completed, with only ten cells where data were not reported or found in the public domain, accounting for two percent of the total cells. The same formulas (percent rank and standard deviation - SD) were used as per the original study to ensure that an accurate measure of the airlines placed along the spectrum. Table 1 presents the average benchmarked values for the six indices, which range between zero and one. In this study, the value 'zero' represents the LCC end of the spectrum and the value 'one' represents the FSNC end of the spectrum.

Table 1 Averaged benchmarked values for the six indices (2011 – 2013) – airlines listed according to the average index.

Alaska	Hawaiian	JetBlue	Southwest	SkyWest	Delta	United	American	<i>SD</i>
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Revenue Index	0.37	0.50	0.24	0.39	0.15	0.91	0.75	0.74	0.27
Connectivity Index	0.38	0.25	0.53	0.58	0.45	0.46	0.61	0.74	0.15
Convenience Index	0.36	0.20	0.87	0.60	0.57	0.25	0.56	0.64	0.22
Comfort Index	0.33	0.44	0.37	0.54	0.47	0.57	0.71	0.71	0.14
Aircraft Index	0.36	0.50	0.27	0.15	0.59	0.83	0.69	0.71	0.24
Labour Index	0.37	0.33	0.18	0.37	0.65	0.58	0.80	0.74	0.22
<i>SD</i>	<i>0.019</i>	<i>0.129</i>	<i>0.258</i>	<i>0.171</i>	<i>0.177</i>	<i>0.243</i>	<i>0.090</i>	<i>0.041</i>	
<i>Average</i>	<i>0.36</i>	<i>0.37</i>	<i>0.41</i>	<i>0.44</i>	<i>0.48</i>	<i>0.60</i>	<i>0.68</i>	<i>0.71</i>

Data from this study came from multiple sources that are publicly available on the internet from SEC Filings of the 10-K Form, Annual Stock Reports, the US Bureau of Transportation Statistics (BTS), the Airline Data Project by MIT and Google maps. The reason for the data range of 2011 – 2013 was because the statistical data from the year of 2014 was not complete during the data collection process and the data from 2010 was not easy to discriminate as many of the mergers and consolidations of financial reports had begun. However, the average fare paid, for American, Alaska, Delta, Hawaiian and SkyWest, and the number of destinations, for SkyWest-ASA-ExpressJet, were obtained from OAG Worldwide Aviation Services analytical publication as these metrics were not easily found or reliable by public internet searches.

In 2010, the airline industry began to recover from the financial crisis. By 2011, air travel was again improving as the global and American economies have recovered. Also, in 2010, airlines such as AirTran and Southwest merged and consolidated their financial statements into the 10-K Form used for SEC filings. United was added to this study as Continental merged into their corporate structure and the latter no longer had data tracked. Likewise, Delta-Northwest and American-US Airways, each merged into ‘super’ carriers doubling their operations. However, American retained its individual SEC Filings from US Airways for the period of 2011 – 2013. As well, through research, it was identified that the BTS data no longer had discrete selections for US Airways (post-2013), Continental, Northwest and AirTran. The merger by parent company

SkyWest with their Atlantic Southeast Airlines (ASA) division with ExpressJet resulted in the creation of the largest regional airline in the United States.

4. Data Analysis

As per the results presented in Table 1, three airlines, i.e. American, Delta and United, were positioned closer to the FSNC model. With the exception of SkyWest, the remaining four airlines were found to be closer to the LCC model. SkyWest, being the sole regional carrier in the study, was placed at the mid-point of the spectrum. The results are consistent with LCCs achieving values within the six indices closer to 0 whereas the airlines considered FSNCs achieved values closer to 1. The SD for the top-ranked airlines (United and American) were 0.090 and 0.041 respectively, which showed that they conform to the consistency to the standard hypothesized relations of homogeneity within carrier groups (Lohmann and Koo, 2013).

Alaska was one of the few airlines analysed that did not merge or consolidate during the financial crisis in the latter part of the 2000s. Alaska was placed closest to a LCC model in this study, with an overall average of the six indices at 0.36. The reasons for this is that out of eleven items, Alaska ranked “best” in comparison to the other seven airlines towards the LCC end of the spectrum. Alaska had a notable departure and arrival punctuality, averaging 90.2% and 87.6% respectively, being 7.5% and 6.6% above the average of the remaining airlines. Of all airlines compared in this study, Alaska had the highest load factor (85.9%), 3.6% higher than the average load factor of the remaining group of airlines.

Hawaiian achieved a 0.37 overall average in the six indices with the two most leading indices being connectivity and convenience. Regarding connectivity, Hawaiian scored the lowest at 0.25, which is due to the short haul inter-island flights with low average sector flights it operates in the Hawaiian archipelago. For the Convenience Index, Hawaiian also scored the lowest average (0.20), mainly due to having the highest performance in departure and arrival punctuality, respectively 95% and 93%. Its operation, predominately out of non-congested airports with good weather conditions during the year long, facilitates this achievement which has been consistent for some years.

JetBlue obtained an average ranking of 0.41, with the lowest result (0.24) in the Revenue Index, which reflects the attributes of a LCC, with the highest result (0.87) in the Convenience Index. Despite having the lowest departure and arrival punctuality of the airlines in this study, due to predominantly operating from JFK, JetBlue scored well in the average distance to CBD centres. The average Labour Index over the study period was 0.18, which was the lowest of all airlines analysed in this study. This result was achieved due to a low number of employees per aircraft (outsourced or not) as well as personnel cost per ASM.

Southwest obtained an average of 0.44 in the six indices, placing the airline close to the middle of LCC and FSNC spectrum. They achieved 0.15 in the Aircraft Index, which was the closest to a pure LCC, mainly due to achieving 33.1% more than the average number of departures per day of the airlines in this study. Southwest also had a largely uniform fleet despite the addition of a different type (B717), which came with the acquisition of AirTran, albeit being phased out by the end of 2014 (Southwest, 2013). Southwest had a 0.37 average in the Labour Index, which was the same as Alaska (0.37) and higher than Hawaiian (0.33) and JetBlue (0.18). However, Southwest Airlines has 11% less 'full-time employees to aircraft ratio' than Alaska; 41% less than Hawaiian and 12% more than JetBlue.

Over the period 2011-2013, SkyWest had an average percent rank of 0.48 over the six indices analysed, placing this airline in the middle of the spectrum. The lowest of the six indices examined was in the area of revenue. The Yield RPM average over the three years was 9.30 (US\$ Cents), with an average CASM of 9.17 (US\$ cents). The average fare paid over the three-year period was \$202.43, which was higher than Alaska, JetBlue and Southwest. SkyWest also had the lowest average sector distance flown, with 519 miles, the lowest arrival punctuality average 75.6% and the lowest aircraft hours flown per day average of 8.47.

Amongst the six indices examined, Delta had an average value of 0.60. This airline had the highest average in the Revenue and Aircraft Indexes, respectively 0.91 and 0.83. Regarding the Revenue Index, Delta had the highest value amongst the eight airlines, with a three-year average of 14.62 (US\$ Cents) in CASM, and 16.35 (US\$ Cents) in Yield RPM. With the exception of the regional carrier SkyWest, Delta had the lowest aircraft hours flown per day, with a three-year average of 9.1. Delta also had the least uniform fleet of aircraft (24.62) of most popular aircraft type amongst the eight airlines examined.

United achieved a 0.68 average amongst the six indices, with a SD of 0.090, showing a strong conformity to the hypothesized model of a FSNC. United had the highest of the benchmarked indices in comfort and labour, respectively 0.71 and 0.80. With the exception of regional carrier SkyWest, United had the largest number of destinations amongst carriers with a three-year average of 369. United also presented the highest average sector with 1,891 miles, 86.4% above the average of all eight airlines. United also performed the lowest aircraft sectors (departures) per day, with a two-year average of 2.64, as in 2011 data were missing. United had the highest employee/aircraft ratio of all airlines at 125 and second largest personnel cost per ASM average at 3.77 which are attributes of FSNCs having more employees with less cross-functional duties.

Finally, American Airlines was placed closest to a pure FSNC on the spectrum with a 0.71 average amongst the six indices, with a SD of 0.041. American achieved the highest three-year average in network density amongst the FSNCs, with 11.36 departures per airport per day. This airline also presented the highest personnel cost per ASM, over the three-year period, with 3.91 (US\$ cents). Due to the large size of this carrier post-merger with US Airways, American had the lowest flight & cabin crew per total employee ratio (36.31), suggesting a significant number of administrative (non-flying) staff. With the exception of the regional carrier SkyWest, American Airlines had the lowest ASM per employee (2.42), 67.6% lower than JetBlue, with 3.77.

The line chart diagram (Figure 1) illustrates the concentration of indices where six of the eight US airlines were closely grouped. The most notable is the Connectivity Index where United, JetBlue, SkyWest, Delta and Alaska showed evidence of strong groupings with averages between 0.38 and 0.61. Regarding the Comfort Index, Delta, Southwest, SkyWest, Hawaiian, JetBlue and Alaska had averages ranging from 0.33 to 0.57, with an SD of 0.10. The remaining four indices of revenue, convenience, aircraft and labour were relatively spread along the spectrum between the attributes of best in class of FSNCs and LCCs amongst all eight airlines. SkyWest is ranked at the lowest end of the Revenue Index, whereas Delta was ranked at the highest. In terms of the Aircraft Index, Southwest, with 0.15, is closest to a single fleet type, whereas Delta, with 0.83, has the most diverse fleet with ten different models (Delta, 2013).

Figure 1: Airline Business Model Spectrum Line Chart (2011-2013)

5. Discussion and comparative analysis

The overall results provided from observing the best in class of the eight airlines examined, using the same benchmarking methodologies proposed by Lohmann and Koo (2013), provide evidence that there has been a change in the position from the original to this updated study. The original study was done at the peak of the GFC and just before the mergers of many US carriers. However, in this study, evidence shows that the same airlines from the original study are finding ways to remain competitive with their business model by changing their index in revenue, connectivity, convenience, comfort, aircraft or labour.

Source: Lohmann and Koo (2013)

Figure 2 compares the average benchmarked values for this study and the one developed by Lohmann and Koo (2013). In one hand, Figure 2 shows that four airlines (Alaska, Delta, Hawaiian and JetBlue) decreased their position in the spectrum getting closer to the LCC model.

Among these airlines, Delta was the only one that merged with another carrier (Northwest Airlines), whereas the others did not merge during the period between the two studies. On the other hand, of the three airlines moving towards the FSNC side of the spectrum – i.e. American, Skywest and Southwest, all of them were involved in a merger during the period between the two studies.

Figure 2: Benchmarked Value changes between 2008-2009 study and 2011-2013 study

In terms of the individual airlines, the following highlights are worth mentioning:

- Alaska Airlines was the only airline that decreased their overall average in all six indices and changed its position along the continuum by 32% from 0.53 to 0.36. Alaska was also one of the three airlines (the other two were Hawaiian and JetBlue) in this study that did not merge with another carrier. As passenger markets improved after the GFC period, Alaska increased its load factors by approximately 9%. Departure and arrival punctuality, another key attribute of LCCs, increased 8.4 and 7.4 %, respectively, between the timeframe of the two studies.

Employee/aircraft ratio dropped 10% between the two studies;

- Delta Airlines decreased its position by 9%, notably due to decreases in connectivity, convenience and labour. This change is noted partly due to unreliable data from the original study. Compared to the other airlines (American and United) which were closer to the FSNC end of the spectrum, Delta had a decrease of 36% in connectivity whereas, American had an 11% increase and United had a 14% increase;
- Hawaiian Airlines declined in four (connectivity, convenience, aircraft and labour) of the six indices with an overall average change of 21%. However, Hawaiian increased in the Comfort Index by 109% with decreases in load factor and 'enplaned pax/flight and cabin crew member' between the two studies;
- JetBlue only changed by 5% between the two studies from 0.43 to 0.41. The most notably change identified was in the Labour Index with a decrease of 53% from 0.38 to 0.18. This change was most noticeably from the increase in fleet size between the two studies by 25% in a post-GFC market. The total number of employees between the two studies increased by an average of 3% showing and increase in productivity of employee to aircraft ratio;
- American Airlines increased its position along the continuum by 9% from 0.65 to 0.71, indicating it is closely following the FSNC archetype. The two indices that decreased were aircraft and labour, despite the merger with US Airways. The newly merged American flew 4.5% fewer sectors per day and decreased its 'personnel cost per ASM' by 8.6% between the two studies;
- SkyWest increased by 6% when comparing the two studies, but it declined in four (revenue, connectivity, comfort and aircraft) of the six indices. The most notable change was in the Labour Index in which it increased by 283%, from 0.17 to 0.65 with the merger of ExpressJet into the SkyWest company. This notable change between the two studies was due to the increase in 107% in the number of employees (FTE) while aircraft numbers only raised 67%;
- AirTran merged into Southwest Airlines after the first study, allowing for the latter to deviate from its original LCC model. With this merger, Southwest announced its first international destinations using destinations created from AirTran, usually a characteristic of FSNCs. Southwest also acquired a second aircraft type which changed from their single fleet type business model. As a result, Southwest increased its position along the continuum by 4% to 0.44.

The impact the mergers had on the airlines post-2009 showed an increase in their position closer to the FSNC end of the business model spectrum. This shift was the result of an increase in the Revenue Index for all airlines that merged, except for SkyWest, which decreased by 67% due to a reduction in its unit cost and yield. In the Connectivity Index, four of the five merged airlines increased their positions toward the FSNC end of the spectrum except, for the Delta/Northwest merger with a decrease between the two studies by 36%. This pattern was attributed to a reduction in the number of destinations and average sector miles. Of the three airlines that did not merge, all decreased their average in the six indices between the two studies.

What can be identified by the individual airlines (Alaska, Hawaiian and JetBlue) that did not merge is that in a post-recession recovery, these airlines moved towards the LCC side of the spectrum. These three airlines also experienced an increase in passenger revenue by 15.5%, 15.6% and 28.9% respectively as the airline industry saw a recovery in the travelling market. This increase benefited all three airlines as they have a considerably smaller fleet of aircraft than the other airlines examined, and without gaining market growth through merger expansion.

Of the five airlines in this study that did merge, what can be identified is that they shifted their position along the spectrum closer to the FSNC side. With the exception of SkyWest, the remaining four airlines (American, United, Delta and Southwest) all increased their Revenue Index. Three (American, United and Southwest) of the five airlines increased their average in the Connectivity Index as network and market growth came from merger expansion. As FSNCs are primarily identified in this study through its revenue and connectivity indices, Southwest post-merger had 22 and 23 % change respectively. Southwest also operated a single fleet type and with the merger moved to a multiple fleet type, also a characteristic of FSNCs, this caused a shift in the corporate strategy resulting Southwest to increased its position along the continuum by 4% to 0.44. This pattern suggests that airlines merging tend to shift towards the FSNC with an increase in overall operation and corporate size. Whereas, the airlines that did not merge shifted along the spectrum towards the LCC end of the spectrum.

6. Conclusion

The aim of this paper is to update and enhance the airline business model spectrum first proposed by Lohmann and Koo (2013) and in particular, examine how airlines reacted to the GFC and the merger of many airlines. Some airlines (Alaska, Hawaiian and JetBlue) were able

to adapt after the GFC period – one characterised by a decline in leisure and business traffic, in addition to the merger of a number of airlines – by shifting their position closer to the LCC end of the airline business model spectrum. The remaining airlines, which moved towards the FSNC end of the spectrum, adapted to changes through mergers in order to increase their market share and to reduce competition.

Both the GFC and the trend in airline mergers emphasizes the need for airlines to adapt their business models to survive the turbulent times faced by the airline industry. This was evident through the study of eight airlines and how they changed their position along the business model spectrum when compared to the original study proposed by Lohmann and Koo (2013). By using the items in the six indices of categories of the POA framework, and applying a normalized value ranking to determine a best in class attribute, the airline business model spectrum can determine whether airlines are shifting their position along the spectrum between the two main archetypes of FSNC and LCC. Over time, this will allow future studies by airline practitioners and academics to determine an area of convergence or divergence as suggested by Daft and Albers (2013, 2015).

Future studies should focus on understanding how business models can be impacted by industry and economic changes and how they evolve and reposition themselves along the spectrum. The airline industry is very dynamic, hence understanding how airlines react to changes will allow analysts to predict what best business models are likely to be expected in the future.

Nevertheless, there is an overall expectation that with the consolidation of the US carriers in large corporations - a similar trend identified in Europe - in the future airlines are more likely to shift towards the midpoint of the spectrum. Niche hybrid airlines identifying a combination of attributes to position themselves in the middle of the spectrum, rather than at the extremes. Of particular relevance for future studies is to use the proposed model to better define what constitutes a hybrid airline.

References

Barrett, S., 2004. How do the demands for airport services differ between full-service carriers and low-cost carriers? *Journal of Air Transport Management* 10, 33-39.

- Bell, M., Lindenau, T., 2009. Sleepless nights. *Airline Business* 25, 70-72.
- Daft, J., Albers, S., 2013. A conceptual framework for measuring airline business model convergence. *Journal of Air Transport Management* 28, 47-54.
- Daft, J., Albers, S., 2015. An empirical analysis of airline business model convergence. *Journal of Air Transport Management* 46, 3-11.
- Delta Annual Report (2013). Annual Report to Shareholders. Retrieved from http://ir.delta.com/files/doc_downloads/Annual%20mtg/DAL%2012.31.2013%2010K_v001_p656x9.pdf
- Deutsches Zentrum für Luft- und Raumfahrt (D.L.R.), 2008. Analyses of the European air transport market – Airline Business Models. (EU contract number: TREN/05/MD/S07.74176).
- Dobruszkes, F., 2006. An analysis of European low-cost airlines and their networks. *Journal of Transport Geography* 14, 249-264.
- Dobruszkes, F., van Hamme, G., 2011. The impact of the economic crisis on the geography of air volumes: an empirical analysis. *Journal of Transportation Geography* 19, 1387 – 1398.
- Franke, M., 2004. Competition between network carriers and low-cost carriers – retreat battle or breakthrough to a new level of efficiency? *Journal of Air Transport Management* 10, 15-21.
- Franke, M., John, F., 2011. What comes next after recession? – Airline industry scenarios and potential end games. *Journal of Air Transport Management* 17, 19-26.
- Gillen, D., Gados, A., 2008. Airlines within airlines: Assessing the vulnerabilities of mixing business models. *Research in Transportation Economics* 24, 25-35.
- Gillen, D., Morrison, W., 2003. Bundling, integration and the delivered price of air travel: are low cost carriers full service competitors? *Journal of Air Transport Management* 9, 15-23.
- Graf, L., 2005. Incompatibilities of the low-cost and network carrier models within the same airline grouping. *Journal of Air Transport Management* 11, 313-327.

- Holloway, S., 2008. *Straight and Level: Practical Airline Economics* (3rd ed). Burlington, VT, Ashgate Publishing Ltd.
- JetBlue Annual Report (2013). Annual Report to Shareholders. Retrieved from <http://investor.jetblue.com/investor-relations/financial-information/reports/annual-reports.aspx>
- Klophaus, R., Conrady, R., Fichert, F., 2012. Low cost carriers going hybrid: Evidence from Europe. *Journal of Air Transport Management* 23, 54-58.
- Lieberman, M., Asaba, S., 2006. Why Do Firms Imitate Each Other? *The Academy of Management Review* 31, 366-385.
- Lohmann, G., Koo, T.R., 2013. The airline business model spectrum. *Journal of Air Transport Management* 31, 7-9.
- Lohmann, G., Lipovich, G. 2013. Low cost carriers in South America. In: Gross, S., Lück, M. (eds.), *Low Cost Carriers Worldwide*. Surrey and Burlington: Ashgate, 79-96.
- Manuela Jr., W., Rhoades, D., 2014. Merger Activity and Short-Run Financial Performance in the US Airline Industry. *Transportation Journal*, Vol. 53, 345-375.
- Mason, K.J., Morrison, W.G., 2008. Towards a means of consistently comparing airline business models with an application to the 'low cost' airline sector. *Research in Transportation Economics* 24, 75-84.
- Morrell, P., 2011. Current challenges in a "Distress" industry. *Journal of Air Transport Management* 17, 14 -18.
- OAG Worldwide Aviation LLC, 2014. *Selected Airlines (Average Fare Paid and Total Number of Destinations)*. Retrieved March 2015.
- Pels, E., 2008. Airline network competition: Full-service airlines, low-cost airlines and long-haul markets. *Journal of Air Transport Management* 24, 68-74.

Southwest Annual Report (2013). Annual Report to Shareholders. Retrieved from
<http://southwest.investorroom.com/index.php?s=120>

Teece, D., 2010. Business Models, Business Strategy and Innovation. *Long Range Planning* 43, 172-194.

Whyte, R., Lohmann, G., 2015. The carrier-within-a-carrier strategy: An analysis of Jetstar. *Journal of Air Transport Management* 42, 141-148.

Appendix 1

Product and organizational data for the six indices (airlines listed alphabetically).

Index	Item	Alaska Airlines (AS)			American Airlines (AA)			Delta Airlines (DL)			Hawaiian Airlines (HA)		
		AS11	AS12	AS13	AA11	AA12	AA13	DL11	DL12	DL13	HA11	HA12	HA13
Revenue	Unit Cost (per ASM) (US\$ cents) - Operating Expense	11.87	12.09	11.77	14.26	14.20	13.67	14.12	14.97	14.77	13.54	12.48	12.05
	Yield RPM (US\$ cents)	13.26	13.45	13.33	14.19	14.83	15.26	15.70	16.46	16.89	14.60	14.49	14.22
	Operating Revenue per sector	27472	29109	30696	35704	37387	37827	42097	44034	43347	23597	25008	27678
Connectivity	Average Fare paid (US\$) - Including Ancillary	184.80	196.80	198.56	272.19	281.38	298.63	297.81	307.29	304.92	188.22	207.37	221.83
	Network Density - Average Departures per	7.05	6.82	7.07	11.49	11.34	11.24	6.46	---	7.18	7.99	7.39	7.62
	Total Number of Destinations (31 Dec)	61	64	65	160	160	166	356	---	333	24	29	28
	Average Sector (Miles)	1104	1159	1180	1429	1304	1310	902	894	879	548	544	581
	Top 5 Airport Location - Avg. dist. from nearest	12.17	12.17	12.17	14.19	14.83	15.26	15.70	16.46	16.89	14.60	14.49	14.22
Convenience	Departure Punctuality (within 15 mins) (%)	90	89	91	79	80	78	84	88	86	95	95	95
	Arrival Punctuality (within 15mins) (%)	88	88	87	78	77	78	82	87	85	93	93	93
	Load Factor	85.2	86.6	86.1	82.0	82.8	83.1	82.1	83.8	83.8	84.3	83.2	81.5
Aircraft	Enplaned Passengers per cabin crew member	4247	4166	4309	3690	3747	3795	3754	3952	4171	4912	4571	4397
	Aircraft Hours flown per day	10.50	10.70	10.60	9.70	9.50	9.60	9.30	9.00	9.10	9.28	8.97	9.44
	Uniformity of Fleet (% most popular aircraft type)	100.00	100.00	100.00	32.89	31.76	38.28	21.94	25.80	26.11	43.24	40.00	38.30
	Aircraft Sectors (departures) per day	3.64	3.52	3.51	3.02	2.95	2.98	2.97	3.19	3.22	5.18	4.76	4.54
Labour	Enplaned-Pax / Total employee	150691	149150	150379	141516	140822	138759	144537	160332	160073	234033	210583	211037
	Employee / Aircraft	75.56	74.02	72.47	109.46	105.13	95.85	101.15	102.60	104.65	116.59	109.02	111.68
	Personnel Cost per ASM (US\$ cents)	3.74	3.69	3.58	4.13	4.08	3.54	3.49	3.73	3.88	2.67	2.57	2.54
	Flight & Cabin Crew / Total Employee (%)	46.96	48.37	48.16	35.04	35.75	38.15	38.07	39.54	36.67	40.87	42.25	42.98
	ASM / Employee (000)	2.97	3.07	3.20	2.32	2.36	2.57	2.52	2.65	2.56	2.78	2.99	3.20
Index	Item	JetBlue Airways (B6)			SkyWest Airlines (OO)			Southwest Airlines (WN)			United Airlines (UA)		
		B611	B612	B613	OO11	OO12	OO13	WN11	WN12	WN13	UA11	UA12	UA13
Revenue	Unit Cost (per ASM) (US\$ cents) - Operating Expense	11.23	11.49	11.71	10.10	9.20	8.20	12.41	12.85	12.60	13.15	14.12	14.31
	Yield RPM (US\$ cents)	13.29	13.55	13.87	10.00	9.50	8.40	15.12	15.64	16.02	14.29	14.38	14.56
	Operating Revenue per sector	18478	18802	19254	1929	2451	2259	11880	12550	13482	---	54242	58087
Connectivity	Average Fare paid (US\$) - Including Ancillary	154.74	157.11	163.19	205.63	194.23	207.43	141.90	147.17	154.72	269.56	275.70	---
	Network Density - Average Departures per	9.55	9.65	9.44	7.97	7.23	5.92	---	38.35	37.47	---	4.99	4.99
	Total Number of Destinations (31 Dec)	70	75	82	484	543	675	---	97	96	370	375	362
	Average Sector (Miles)	1066	1067	1068	521	512	525	664	708	705	1844	1895	1934
	Top 5 Airport Location - Avg. dist. from nearest	7.34	7.34	7.34	16.54	15.36	15.40	10.52	8.02	10.68	15.32	15.32	15.32
Convenience	Departure Punctuality (within 15 mins) (%)	76	80	77	80	80	78	83	85	77	81	77	79
	Arrival Punctuality (within 15mins) (%)	73	79	74	77	77	73	83	85	78	79	77	79
	Load Factor	82.4	83.8	83.7	79.3	80.7	81.2	80.9	80.3	80.1	82.8	82.9	83.8
Aircraft	Enplaned Passenger per cabin crew member	5864	6188	6079	8235	9304	8686	6492	6844	7007	---	2900	2819
	Aircraft Hours flown per day	11.70	11.80	11.90	8.40	8.40	8.60	11.20	10.90	10.80	10.70	10.60	10.50
	Uniformity of Fleet (% most popular aircraft type)	71.01	70.56	69.07	36.61	36.02	34.35	87.39	87.32	90.29	33.95	33.90	36.65
	Aircraft Sectors (departures) per day	3.96	4.02	3.99	5.27	5.28	5.28	5.17	5.36	5.29	---	2.67	2.61
Labour	Enplaned-pax / Total employee	155934	160746	156843	76279	79037	80029	182738	193052	195816	---	130333	128828
	Employee / Aircraft	60.61	58.74	56.81	25.16	24.39	24.25	65.03	66.08	65.93	124.11	125.36	125.54
	Personnel Cost per ASM (US\$ cents)	2.54	2.61	2.65	4.68	3.14	3.08	3.63	3.71	3.86	3.49	3.73	4.11
	Flight & Cabin Crew / Total Employee (%)	43.87	44.23	45.41	36.81	34.83	37.99	43.28	42.68	42.39	36.02	35.85	36.41
	ASM / Employee (000)	3.63	3.79	3.89	1.34	2.06	2.14	2.66	2.79	2.91	2.52	2.42	2.41