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investment management

AMITY INSIGHT

AVIATION

Ready for take-off!

PROFIT WITH PRINCIPLES

AMITY INSIGHT: AVIATION

By Neville White
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Since earliest times, mankind has sought to slip the bounds of Earth and reach for the skies. Mechanical flight was an obsession of medieval and renaissance thinkers, with some going so far as to design recognisable flying machines. Despite the yearning of Socrates, it is easy to forget that powered flight, in the modern sense, is barely a century old. The events at Kitty Hawk, North Carolina in 1903 when the Wright brothers achieved the world's first sustained heavier-than-air flight was the beginning of a remarkable journey that is still evolving, and which has made possible the reality of global travel for hundreds of millions of people.

In our earlier Insight on shipping (July 2015), we remarked that despite its omnipresence, modern shipping remained practically invisible. Aviation could not be more different having been embraced by a global population, connected by the 'jumbo jet'. In many ways it is the connecting power of aviation that has made the world a global village.

In this second Amity Insight to explore modern transport, we look at the complex economics of civil aviation from aerospace manufacturers and infrastructure providers to airlines, and consider some of the anticipated drivers for growth in a sector that appears to be powering ahead. We also look at the ethical issues arising for responsible investors, particularly safety and the environmental impact on climate. Finally, as ever, we look at the investment value chain, and reach some conclusions on whether airlines can ever be viewed as sustainable.

The air transport industry supports over 58m jobs worldwide, and contributes $2.4 trillion to global GDP[1] – we believe it is ready for take-off.

As always we hope you enjoy reading this Amity Insight and look forward to receiving your comments or feedback.

A SHORT HISTORY OF POWERED FLIGHT

In barely a century, aviation has developed from the cumbersome bi-plane of the Wright brothers that first heralded the age of powered flight, to the Boeing Dreamliner with a cruise speed of nearly 1,000km/h, a range of 15,190km and seating for between 242 and 335 passengers. Aviation developed quickly; the bi-planes of the First World War notably bore little resemblance to their successor fighter and bomber descendants just two decades later. Along the way, the invention of the jet engine (1930) would go on to revolutionise design, speed and capability for both military and civil aeroplanes. The first modern 'airliner' debuted in 1933 as a twin-engine passenger monoplane, but was soon followed by the first jet-powered commercial aircraft in 1949: the De Havilland Comet.

> "**Man must rise above the Earth** – to the top of the atmosphere and beyond – for only thus will he understand the world in which he lives."
>
> **Socrates (469-399BC)**

1. www.aviationbenefits.org/economic-growth

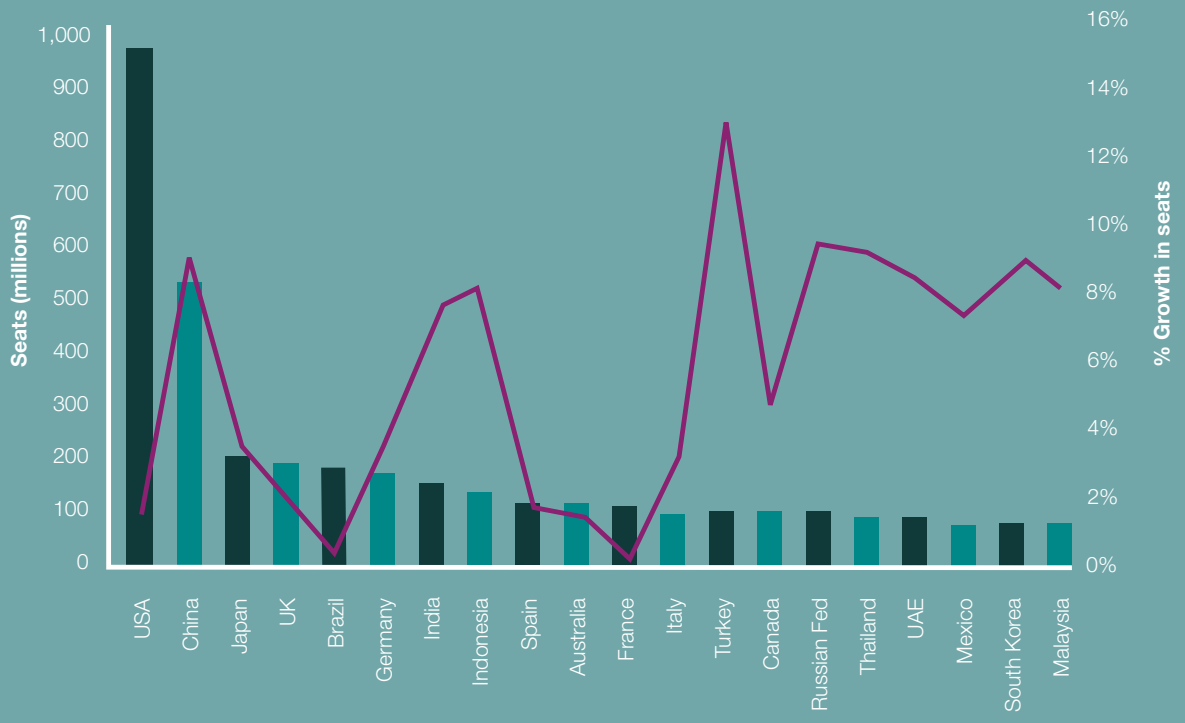
Now in its 8th iteration, the world's most famous 'jumbo jet' (the Boeing 747), was launched in 1969 and went on to become the wide-bodied aircraft of choice for the world's long-haul airlines, with over 1,500 rolling off the production line. For many decades, commercial (and military) aviation was the main preserve of the US giant, Boeing. However a European champion in the form of Airbus Group was created in 1969, and today Boeing and Airbus share the global market almost equally for narrow and wide-bodied aircraft that ply the world's short- and long-haul routes operated by over 1,300 airlines.

THE ECONOMICS OF AVIATION & GLOBAL OUTLOOK

In 2013 over 3 billion passengers were carried by the world's airlines[2]. Aviation was swiftly embraced as a convenient, fast and efficient way of connecting international capitals, eclipsing shipping as the only other realistic mode of international travel. Several million route kilometres marshalled by 173 navigation providers support the 20,910 aircraft in operation, serving the world's 3,864 airports[3]. Aviation generates around $600bn of GDP per year, which is forecast to rise to $1 trillion by 2026[4]. Whilst shipping continues to dominate volume trade, aviation, accounting for just 0.5% of world trade by volume, is nevertheless worth up to 35% by value or $6.4 trillion of cargo handled in 2014[5].

Aviation has seen sustained growth through all economic cycles. Whilst the US remains the country where the greatest number of passengers take-off, passenger growth is highest in the emerging markets of China, India, Indonesia, Turkey, Russia, Thailand and the United Arab Emirates.

TOP 20 COUNTRIES BY DEPARTING SEATS

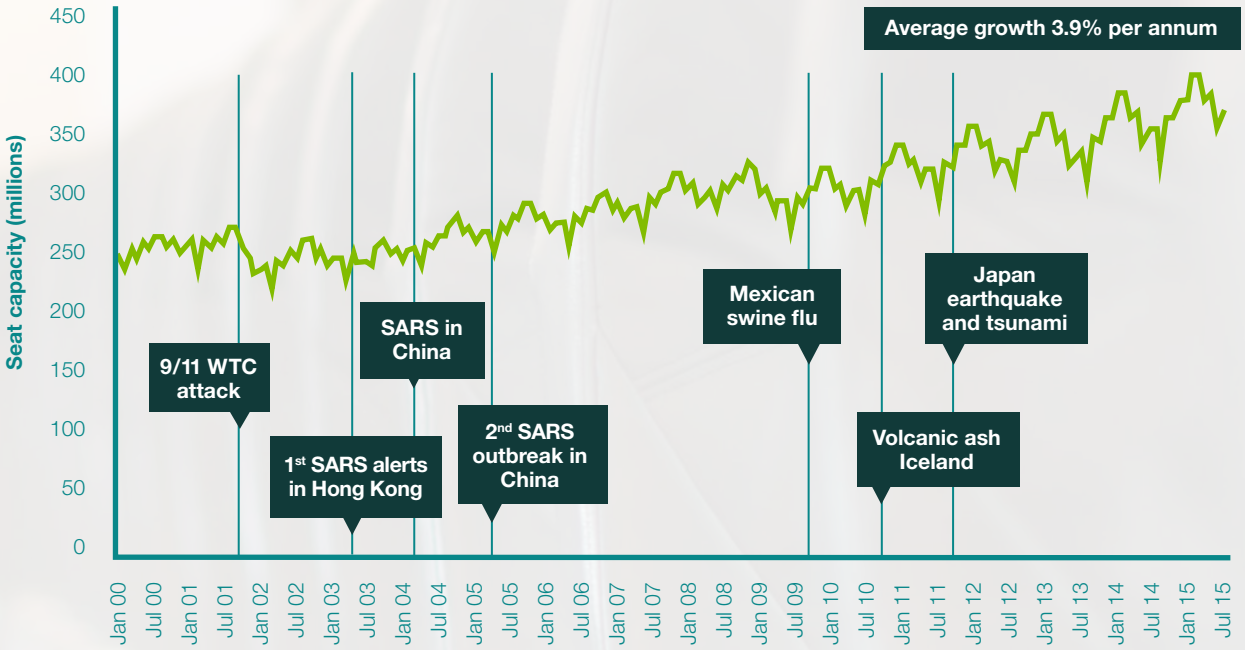


Source: IHS Economics, OAG, Airbus GMF2015

2. www.atag.org
3. Ibid.
4. Ibid.
5. www.atag.org and www.aviationbenefits.org

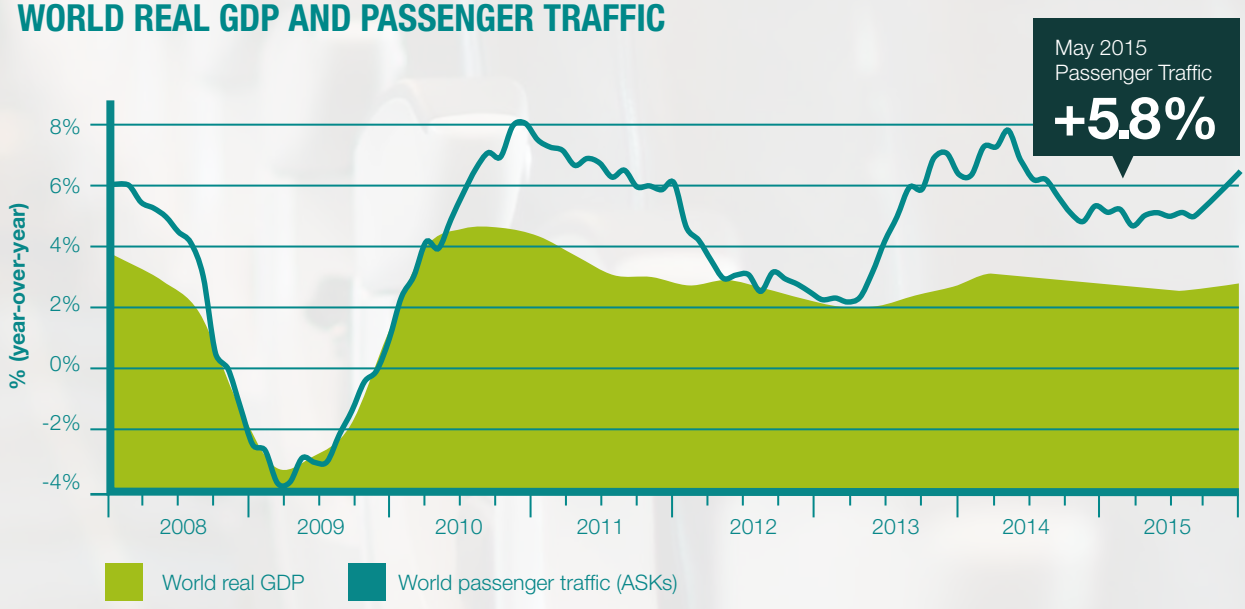
The two major aircraft manufacturers (Boeing and Airbus Group) have registered an increase in orders over the last three years – 3,331 aircraft in 2014 alone[6]; this confidence is based on passenger numbers that are expected to double by 2030 to reach 7.2 billion passengers[7]. Air travel has proven to be resilient to external shocks, with 85% growth in world air traffic since the 9/11 attacks in 2001[8].

GLOBAL SCHEDULED AIRLINE CAPACITY 2000-2014



Source: OAG Schedules Analyser

PASSENGER TRAFFIC IS OUTPERFORMING GDP GROWTH
WORLD REAL GDP AND PASSENGER TRAFFIC



Source: IHS Economics, OAG, Airbus GMF2015

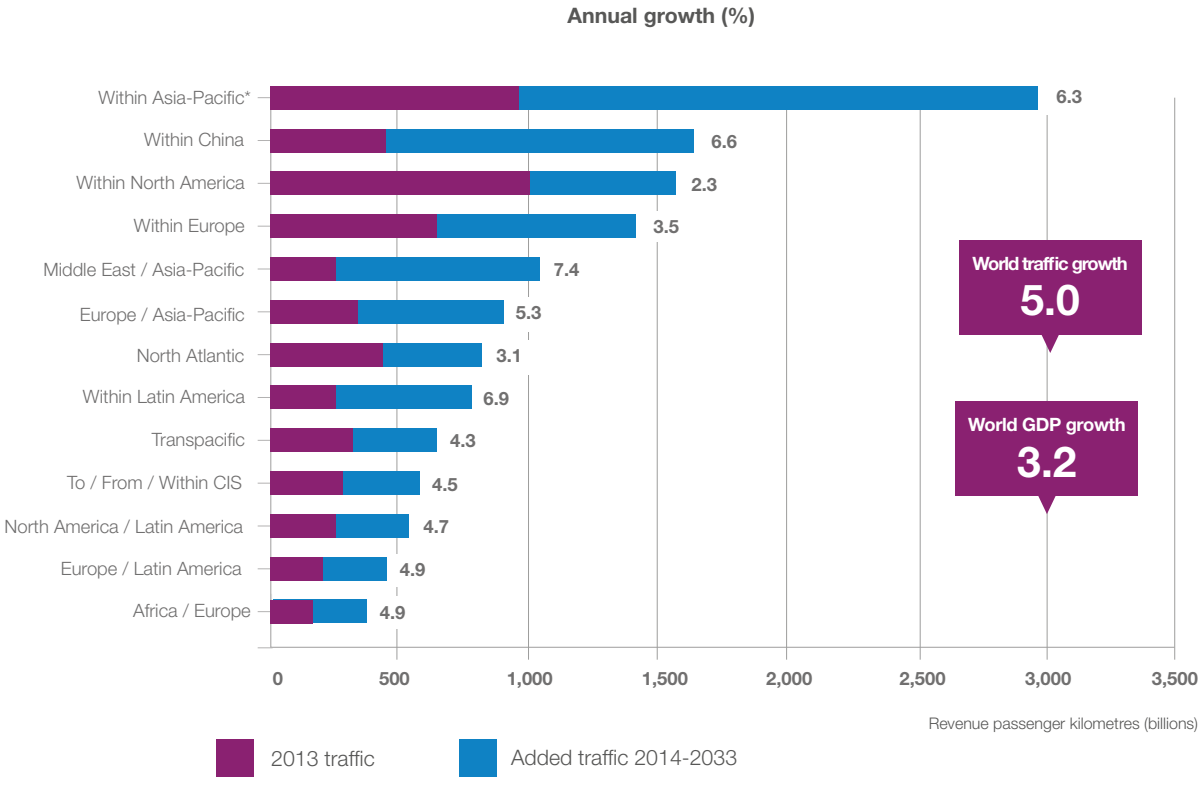
6. Boeing and Airbus Group orders www.boeing.com and www.airbus.com

7. www.iata.org

8. Airbus Global Market Forecast 2015-34 www.airbus.com

In the UK, one of the world's major aviation economies, the sector contributes 3.4% to GDP and supports nearly 1m jobs, with London Heathrow the 10th largest airport by aircraft movements[9]. Measured by aircraft movements, 8 out of 10 of the busiest airports are in the US (Chicago's O'Hare is officially the busiest airport in the world with 881,933 aircraft movements)[10]. However, measured by passenger numbers, London Heathrow eclipses Chicago with 73.4m passengers – the third busiest in the world[11].

There is consensus that aviation is on the cusp of a golden period of growth. The current global fleet of 20,910 aircraft is set to increase to around 42,180 by 2033; the vast majority of this growth will be narrow bodied short-haul aircraft[12]. Between 2014 and 2033 the industry expects 36,770 new aircraft to be commissioned worth $5.2trn – nearly 60% of this will be new capacity[13]. Growth in fleet, passengers and traffic are all confidently predicted to outstrip world GDP growth over the same period.



*Does not include travel within China

Source: IHS Economics

9. www.aci.aero
10. Ibid.
11. Ibid.
12. www.boeing.com Market Outlook 2014-2033
13. Ibid.

The highest growth is predicted to come from Asia-Pacific, particularly from internal traffic within China and the wider Asia-Pacific region.

The first and second generation Airbus fleets nearing the end of their working lives, means there is a substantial backlog of around 13,000 aircraft needed to replace ageing fleets. The US, markedly, has an 'inventory gap' of some 3,000 aircraft over the period 2013-2033[14]. Aviation is therefore marked by two compelling phenomena: new capacity coming from Asia and the emerging markets; and fleet replacement in Europe and the US. The dominant global asset will be single-aisle, short-haul aircraft which will make up 70% of the world's fleet by 2033, inevitably putting pressure on the need to consolidate long-haul models around a few scalable aircraft. It is worth reflecting that in 1993, over 73% of traffic was carried by airlines in Europe and the US. By 2033 this proportion will shrink to just 38% as Asia-Pacific and Middle East airlines begin to dominate[15]. The future looks increasingly like a low-cost, short-haul model of single-aisle aircraft.

ASIA-PACIFIC

$3.7bn earnings (2014); market liberalisation; growth of low-cost model; middle-class demographic; largest air travel market by 2033 (48% of all traffic to or from region) – 100m new passengers; 13,460 new planes to meet demand

CHINA

Among fastest growing markets; regulatory and policy reforms; low-cost model increasingly attractive; main growth – internal air passenger growth forecast at 6.9% – 16% international/65% internal/19% long-haul international; 6,020 new planes to meet demand

EUROPE

Projected growth in passenger airline market more modest (6.7% increase in passenger traffic in 2013 over 2012); 7,450 new planes required, mostly as replacement to installed capacity (nearly 80% single-aisle); consolidation expected

NORTH AMERICA

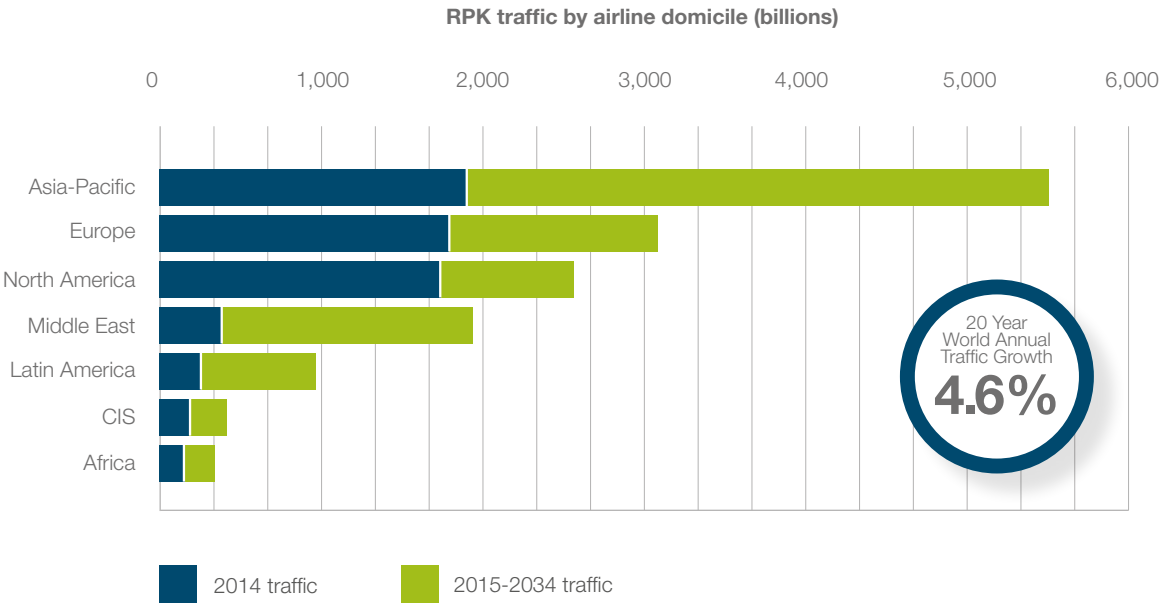
Passenger growth weak 2% per annum average; capacity has not kept pace with this; low-cost carriers overtaking network; Canada outpacing US; consolidation completed 75% traffic vested in 3 airlines and achieved record profitability; modest fleet increases from 6,650 to 9,120 by 2033, mostly inventory replacement

14. Ibid. 15. Ibid.

ASIA: A COMPELLING STORY FOR AVIATION GROWTH

As with shipping, Asia represents a compelling story for aviation. China's airlines surpassed 100m passengers per quarter for the first time this year[16], but domestic flights remain dominant at around 90% of all flight activity[17]. Both Boeing and Airbus predict that Asia will see the strongest growth, driven by rising GDP and a growing, affluent, middle-class. Boeing expects the fleet in China to surge to over 7,000 by 2034 from the 2,570 capacity in 2014[18]. In the next two decades, China alone is going to require 6,330 new planes worth $950bn[19]. Asia is also leading the way in airport infrastructure with Beijing the second busiest airport in the world by passenger numbers (87.7m in 2014/15)[20]. Airport investment is at its strongest in Asia and the Middle East with 35% of airport investment occurring in Asia[21]. We therefore expect to see more investment coming through as capacity lags passenger growth across the region.

ASIA-PACIFIC TO LEAD IN WORLD TRAFFIC BY 2034



Source: Airbus GMF2015

16. www.centreforaviation.com Chinese airlines growth forecast
17. Ibid.
18. Boeing forecast quoted at www.bloomberg.com/news
19. Ibid.
20. www.aci.aero/Data-Centre/Monthly-Traffic-Data/Passenger-Summary/12-months
21. www.centreforaviation.com; world's biggest airport construction projects >500bn

ANATOMY: AIRPORTS, MANUFACTURING, AIRLINES

In this section of the Insight, we take a closer look at the key parts of the aviation sector.

AIRPORTS

In 2000, nine of the world's busiest airports by passenger volumes were in Europe and the US, with only Tokyo making the top 10. In 2015, this had fallen to six, with Beijing (2nd), Dubai (5th) and Hong Kong (8th) joining Tokyo in the world's busiest airports[22]. Beijing entered the top 10 in 2006 and is now the second busiest airport by passenger numbers after Atlanta in the US. Traffic can also be looked at from the perspective of aircraft movements, which changes the concept of 'busiest' considerably. For example, Chicago O'Hare has the greatest number of aircraft movements, but is ranked 6th in terms of passenger volumes. Heathrow is ranked 4th busiest by passenger numbers (73.6m), but only 10th by the number of aircraft movements. London is the largest aviation market in the world by some margin. London Heathrow is the UK's only 'hub' airport, with 185 direct destinations and accounting for 80% of all UK long-haul[23]. The airport also accounts for a quarter by value of UK exports; 95% of the global economy is within reach of a direct flight from Heathrow. In the regulated UK market, the aeronautical fees an airport can charge are fixed. Since privatisation, the sector has been an innovator in turning airports into 'shopping malls with parking for aircraft'. Today, Heathrow makes 63% of its income from fixed fees and 37% from non-aeronautical income such as rents, car parking, advertising and hangar rent[24]. In 2014, Heathrow's income nudged £2.7bn, of which £1.7bn arose from fees it charges airlines. Car parking fees alone raised £99m in 2014[25].

MANUFACTURERS

The UK is a global leader in aerospace manufacturing, with a 17% global share, and the largest supplier in Europe and the largest outside of the US[26]. The sector was worth £27.8bn in 2013, 91% coming from exports, mainly specialising in complex, high-end components and construction[27]. Engineering excellence is found in companies such as Rolls Royce and BAE Systems. The aerospace manufacturing sector is fairly evenly split 50/50 defence/civil, but is symbiotically entwined. Rolls Royce is the primary supplier of engines to the civilian market, but is also a major defence contractor to the aero and marine sectors. The sector is interesting however as it is key to delivering the expected growth out to 2033. By 2032 it is estimated new or replacement aircraft will be needed on a huge scale: 29,000 civil airliners, 24,000 business jets, 5,800 regional aircraft and 40,000 helicopters[28]. Manufacturing inevitably comes back to the two industry behemoths: Boeing and Airbus Group, with combined revenues of $164bn in 2014[29]. The civilian market is more or less equally split between them, with notable third players (BAE, Bombardier and Embraer) struggling to gain market share. The overall sector is highly concentrated between a few first-tier manufacturers and a very large tail of second-tier suppliers. In 2013, the top 20 aerospace companies had combined revenues of $452bn[30] however, for EdenTree the sector is largely non-investible owing to the high defence exposure.

22. www.aci.aero; Ibid.
23. www.heathrow.com
24. www.heathrow.com. 2014 Annual Results
25. Ibid.
26. House of Commons Library The Aerospace Industry: Statistics & Policy www.researchbriefings.files.parliament.uk
27. Ibid.
28. Ibid.
29. Annual Reports Boeing Inc. Airbus Group
30. House of Commons Library The Aerospace Industry: Statistics & Policy www.researchbriefings.files.parliament.uk

AIRLINES: THE WORLD'S GLOBAL OMNIBUS

Passengers flew over 5 trillion route kilometres in 2014[31]. The most obviously investible and visible part of the aviation value chain is therefore its airlines. There are over 13,000 airlines flying currently, constituting a variety of models including 'flag carrier' or 'network' airlines, low-cost, charter, regional, business and executive, cargo and freight. Despite the number, just 250 airlines account for over 80% of total air traffic[32]. Global commercial airlines achieved revenues of $733bn in 2014, with scheduled passenger numbers exceeding 3.3bn[33]. The International Air Traffic Association (IATA) reports industry costs of $699bn of which fuel made up a third[34]. The 33.6m flights in 2014 had an average break-even load of 64%, with 79.7% achieved[35]; however, the economics of flying can be uncertain and volatile.

Pressure on 'legacy' network models has led to considerable consolidation and the growth of new low-cost models such as Norwegian and Ryanair. The US dominates, both in passenger numbers and in fleet size, occupying the first and second slots by passenger volume, and the top five slots for fleet size. In Europe, Lufthansa flies the most passengers (106m), with Air France-KLM ranked 4th (87.3m) and IAG – owner of British Airways and Iberia-ranked 5th (77.3m)[36]. In terms of fleet size the three dominant US players (American, Delta and United) have a combined fleet of 4,038 aircraft, dwarfing the three European majors (1,241)[37]. Europe, unlike the US, has significant excess capacity, with 17 airlines competing for market share compared to 10 in the continental US. Over 53% of traffic is concentrated in just six airlines, suggesting further consolidation is overdue (IAG's takeover of Irish flag carrier, Aer Lingus, is further evidence of this).

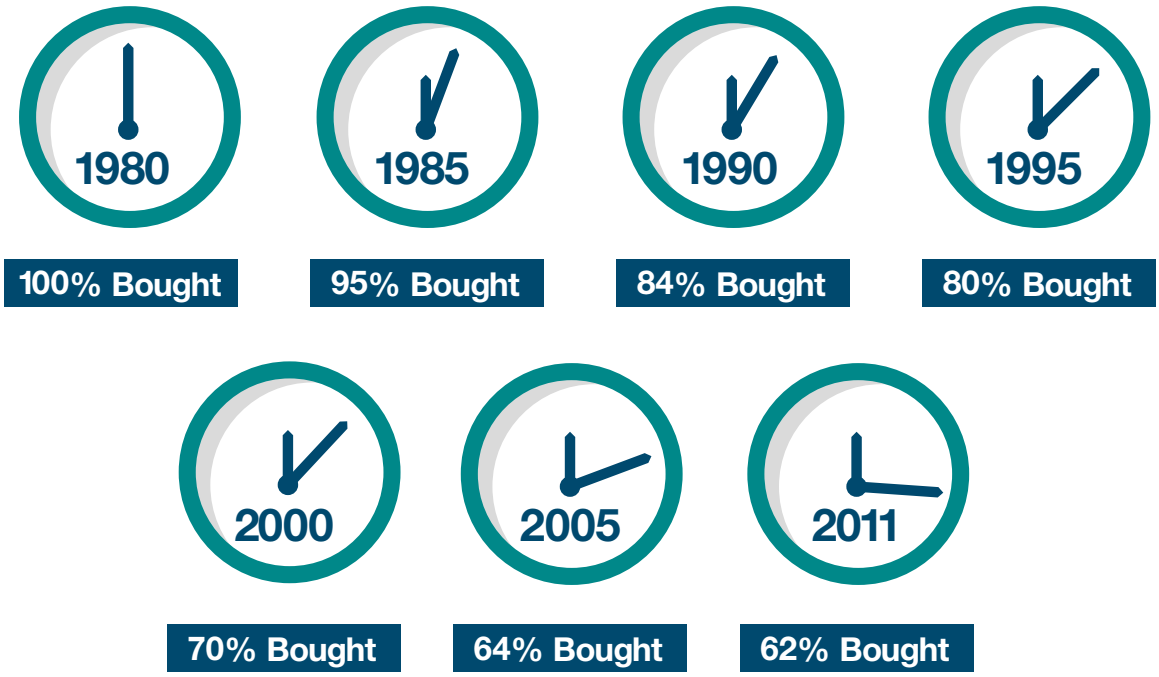
OWN, LEASE OR RENT?

Aviation is capital intensive, with the book price of a Boeing 737-70 series retailing at $55-69m[38]. Although airlines rarely pay the book price, cash is only an option for profitable airlines or state owners with deep pockets. A combination of leased and owned aircraft is therefore the norm. Typically airlines use finance to order aircraft and these are then leased back on a three-five year cycle. Approximately a third of the world's fleet is rented compared to nil in 1980[39]. The IAG fleet, for instance, is almost 50/50 owned and leased[40]. Unsurprisingly, the largest owners of aircraft are global lessors: GE Capital Aviation Services (2,150 aircraft), and International Lease Finance Corporation (1,031 aircraft)[41].

Airlines have made for volatile investments over significant time periods. The industry is capital and cost intensive, with only marginal profitability.

In 2014, global airlines made just $33.9bn of operating profit on revenues of $733bn; net profit was just $16.4bn, a margin of 2.2% or $4.94 per passenger[42]. Profitability is concentrated in the US which achieved $11.2bn profit in 2014, 70% of the total[43]. European airlines made just $3.3bn in profit[44]. Network carriers have struggled to improve margins given their older fleets, legacy employment practices and pension deficits. Their short-haul business has been undercut by low-cost models such as easyJet, with younger, more fuel-efficient fleets, zero debt, and no restrictive labour practices. The low-cost model struggles to work long-haul, but even here, over capacity on a limited number of profitable routes has eroded margin, and is becoming undercut by capital rich Middle Eastern airlines such as Qatar Airways and Emirates.

31. www.aviationbenefits.org
32. www.iata.org IATA represents 250 airlines comprising 84% of global air traffic
33. Ibid.
34. Ibid.
35. Ibid.
36. Ibid.
37. www.financeonline.com World Airline Fleets: Top 10 Aviation Armadas with Most Airplanes
38. Quoted on www.boeing.com
39. The Economist 'Aircraft Leasing: Buy or Rent?' 21.01.2012
40. www.iairgroup.com Annual Report 2014
41. www.gecas.com and www.ilfc.com
42. www.iata.org
43. Ibid.
44. Ibid.



AIRLINES: VOLATILE ECONOMICS

Airline pricing and profitability is a fragile and complex matrix of variables including scheduling (route, timing and competition), slot availability, turnaround time and idling, labour practices, fuel costs and passenger load. Network flag carriers in this environment have struggled to remain viable: both Air France-KLM and Lufthansa have been loss-making. IAG is profitable after consolidation and aggressive cost-cutting. Network airlines have also failed to benefit from falling oil prices, as unlike their low-cost peers they have historically hedged future fuel costs, but to their detriment.

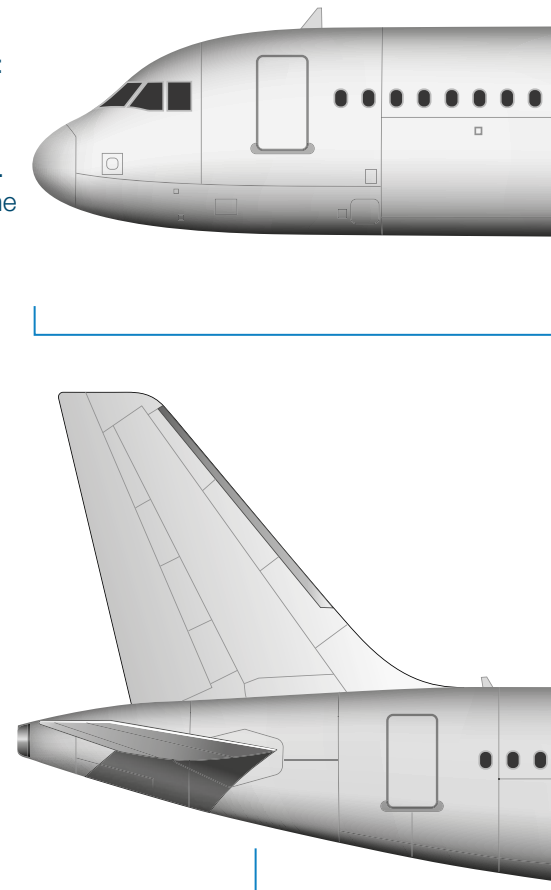
A Low-Cost Revolution in the Skies:
Deregulation has initiated far-reaching revolution in airline business models. Southwest Airlines, founded in 1971, became the first successful low-cost carrier, replicated in Europe by Ryanair (1985) and easyJet (1995). The model could not be more different from the national 'flag-carriers', predicated on a fast turnaround (typically 30 minutes or less), no frills (the passenger pays for all on-board extras), adept at charging for practically everything, e.g. seat choice, higher seat density, smaller toilets, narrower aisles, few restrictive practices (typically zero-hour flexible contracting), the use of secondary airports incurring lower fees, and real time pricing to reflect supply and demand. Low-cost airlines typically fly with a single manufacturer which reduces pilot and maintenance costs: Ryanair uses only Boeing, easyJet only Airbus. The highly successful model is growing: in Europe they represent 36% of the aviation market, but 58% in SE Asia[45]. Ryanair passenger numbers dwarf Air France-KLM and IAG, and in Europe are only smaller than Lufthansa.

45. European Low Cost Mkt Share: www.telegraph.co.uk 27.08.14; SE Asia quoted at www.economist.com 17.05.14

THE ANATOMY OF AN AIRLINE

The economics of aviation are fascinating and not for the faint-hearted, with the margin between profit and loss often wafer thin. EasyJet is Europe's 5th largest airline by passenger numbers (65.3m[46], flying 226 Airbus across 675 routes)[47]. The company reported its revenue per seat to be £63.31 in 2014, with profit before tax of £8.12 or £6.29 post-tax. However, it achieved an average pay load of 90.6% – among the highest in the industry. Total costs per seat (£55.19) include fuel (32% of costs) and labour (12% compared to 30% for a typical network airline). The biggest single cost (ex-fuel) is airport charges and ground-handling[48].

The secret to low-cost airlines is finding ways to innovate additional revenues, whether this is paying to choose a seat, 'speedy boarding' or cabin re-configuration. Keeping the aircraft in the air as much as possible is the ultimate way to sustainable profit; delays impact profit immediately. Comparing a low-cost model such as easyJet with a network carrier is instructive, and illustrative of how airlines can deliver profit: Lufthansa flies only 271 routes, but has a fleet of 595 aircraft to fulfil it. Whilst easyJet employs fewer than 10,000 people across the Group, Lufthansa employs nearly 55,000[49]. Low-cost airlines have been successful because of innovation: the company is now accelerating its use of Big Data to cut costs still further and improve efficiency. All 1.5bn hours flown by the airline will be analysed to cut its toll of overnight delays – data analytics may ultimately mean spare aircraft held in case of emergencies become a thing of the past (easyJet has 7-8, IAG over 20)[50]. As an investment, easyJet has been notably successful: floating in 2000 at 310p, the share price is now in the range £16-18, valuing the company at around £7bn. For investors, choosing the right airline is as key as it is for customers!



Maximum speed: 850km/h
Take-off speed: 285km/h
Thrust per engine: 285km/h

46. www.iata.org and www.easyjet.com annual passenger traffic figures 12 month rolling
47. www.easyjet.com Annual Report 2014
48. Ibid.
49. www.lufthansagroup.com
50. www.ft.com 'EasyJet deploys 'big data' to tackle delays and cut costs' 17.11.15

THE AIRBUS A320-200: THE SHORT-HAUL WORKHORSE OF CHOICE

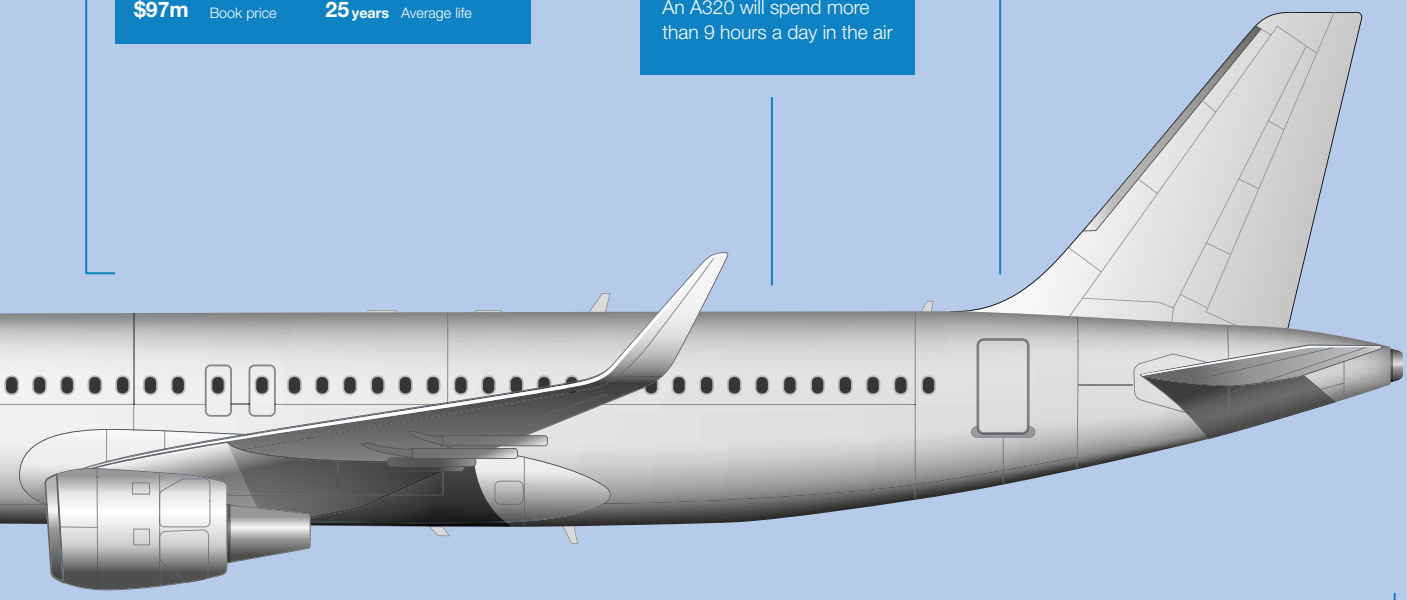
A320 series

12,390	Orders	**250**	Operators
6,531	In operation	**40m**	Flight hours
$97m	Book price	**25 years**	Average life

9 Hours+

An A320 will spend more than 9 hours a day in the air

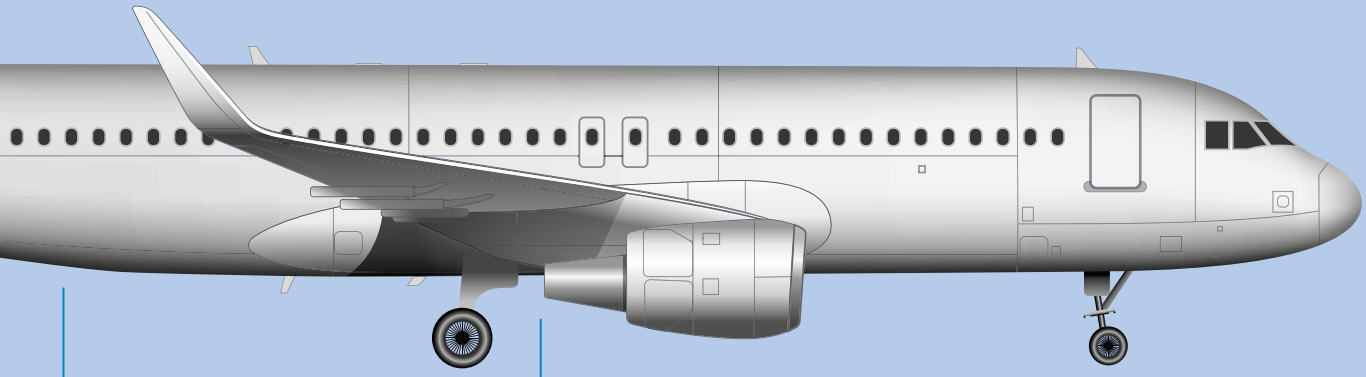
Total seating capacity:
168-180



Length:
37m

Height:
11.8m

Wing span
34.1m



8 take-offs & landings each day

Payload: 16.6 tonnes
Range: 6,100m
Cruising height: 12,131m (39,800ft)

6 Crew — **2** Pilots — **4** Cabin

ETHICAL ISSUES FOR RESPONSIBLE INVESTORS

Aviation is a global success story, with over 5 trillion route passenger miles flown in 2014. The industry also supports a variety of specialist engineering, military and service sector enterprises across the world.

However, aviation also presents several environmental and social impacts which are of interest to the ethical and responsible investor. Here we look at three: employment, safety and climate change.

LABOUR AND EMPLOYMENT

Aviation is people intensive, and unsurprisingly human capital is a key issue for responsible investors. Low-cost models have transformed legacy employment practices with flexible approaches to hiring, whilst network carriers are still often crippled by poor industrial practices and high costs; strike action at Air France-KLM over the introduction of efficiencies and cost savings has cost the company €250m. The model of many low-cost operators is one of zero-hours contracts with one in six European aviators said to have 'atypical' contracts. Many of the newer employment practices affect younger workers: typically 40% of pilots under 30 are now 'self-employed'. Some have gone further and made this 'business as usual': at Ryanair 70% of pilots are self-employed[51]. BA's cabin crew and pilot costs, even after restructuring, are around 20% and 50% higher respectively than easyJet or Virgin Atlantic[52].

For responsible investors, new business models, whilst successful and profitable, may create a tension between commercial imperatives and safety. Precarious working arrangements may have a negative effect on the health of pilots, given the additional burdens that atypical contracts potentially infer. It is noticeable, that for network airlines, labour is a major cost; for low-cost airlines it is much more marginal in the overall cost structure: whilst at Norwegian, labour represents 17.4% of costs, 12.4% at easyJet and 9.5% at Ryanair, they constitute 32.1% of costs at SAS Group, 30.1% at Air France-KLM and 22.8% at Lufthansa[53]. The industry displays complex occupational health challenges given the safety regime. High stress, fatigue, unseasonal shift patterns, long-working hours and time zone displacement are just some of the issues.

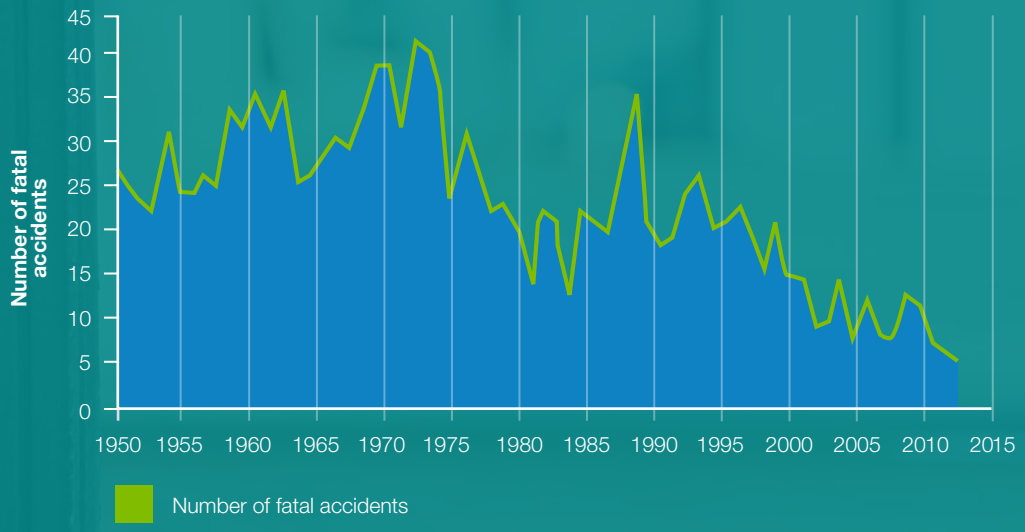
51. www.rte.ie Quoted on RTE News 13.02.15 (see also the Guardian 21.10.15 'Sky High: Who'd be an Airline Pilot Today?')
52. www.ft.com FT 'Lufthansa rides out strikes on new flight path' 01.12.15
53. www.centreforaviation.com European Airline Labour Productivity CAPA Rankings 2013

SAFETY

Safety is the pre-eminent concern for manufacturers and airlines, and modern commercial aviation is exceptionally safe. International Air Transport Association statistics show the number of accidents each year in global aviation is a miniscule fraction of the millions of flights that take off and land safely. An assessment of 425 global airlines awarded top safety rankings to 137 including BA, Lufthansa and Aer Lingus[54].

In the 1980s a fatal accident occurred approximately every 140m miles flown[55]; a ten-fold improvement since then means that today a fatal air accident occurs every 1.4bn miles flown. A ten-year average (2002-2012) showed there have been 34 fatal accidents a year, with Asia, Africa and the CIS (Commonwealth of Independent States) the riskiest areas for air safety[56]. 2014-15 have been untypical years for safety, with the two Malaysia Airline disasters and the German Wings accident being caused by terrorism or actual or presumed pilot sabotage. There is a significant differential between the world's best and least safe airlines. The odds of being involved in an accident in a top 39 airline is 1 in 10,000,000, however the odds reduce markedly to 1 in 500,000 for airlines ranked in the bottom 39 for air safety[57]. The majority of fatal accidents (47%) are caused by pilot error, the same as in the 1950s[58]. However, unlike the 1950s, the technical superiority of today's aircraft means they are more likely to survive critical weather events than their predecessor aircraft. Weather now accounts for just 6% of attributed fatal accidents[59]. Mechanical failure – perhaps owing to increased technical complexity however, accounts for 22% of accidents[60]. Europe has one of the best safety records and maintains a list of airlines banned from entering EU airspace owing to their not meeting internationally recognised operational safety standards. The latest list effectively bars 219 airlines from the EU, the majority from Africa (109) and Asia[61].

NUMBER OF FATAL ACCIDENTS



Source: PlaneCrashInfo.com

54. www.airlineratings.com World's Safest Airlines 2015
55. www.icao.int and www.caa.co.uk
56. www.icao.int
57. www.airlineratings.com
58. www.planecrashinfo.com
59. Ibid.
60. Ibid.
61. www.ec.europa.eu/transport List of Air Carriers Banned from Operating within the EU June 2015

ETHICAL ISSUES FOR RESPONSIBLE INVESTORS

CLIMATE CHANGE

Aviation is responsible for 2-3% of all human induced carbon emissions, emitting 705m tonnes of CO_2 in 2013[62]. It is conservatively thought to account for about 12% of all transportation emissions[63]. Without intervention, aircraft emissions could reach 15% of global GHGs by 2050 given growth projections. Aviation is, in any case, the fastest growing source of GHGs and generates as much CO_2 as all human activity in Africa! In addition to CO_2, aviation is responsible for emitting water vapour, NOx, SOx and hydrocarbons. Slow to respond to the challenge of climate change, the industry is now placing emphasis on technology, particularly cleaner and younger fleets. Lowering fuel burn by reducing aircraft weight has a significant impact on CO_2 generated. The ultimate goal is to 'decouple' growth from emissions. This will be a challenge given growth forecasts and expected capacity expansion at airports such as London Heathrow.

Engine technology has evolved considerably. British Airways has been found to be among the least fuel efficient airlines flying the trans-Atlantic route, largely because the age of its fleet is a factor[64]. Improvements in fuel efficiency of 0.8% pa to 2050 is viewed as credible based on evolving airframe and engine design[65]. Carbon intensity under this scenario would reduce by about 30%[66]. Biofuel is another potential lever and is being pioneered by KLM-Air France. A cumulative carbon intensity reduction of 35% by 2050 would allow up to 55% more movements, equating to passenger growth of around 60% between 2014 and 2050[67]. The industry has coalesced around achieving 1.5% annual efficiencies in fuel, carbon neutral growth from 2020, and a net reduction in aviation carbon emissions of 50% by 2050 (relative to 2005 levels)[68]. Ultimately to reach more ambitious targets, some constraint may be necessary. The 'greenest' airlines are those with the youngest fleets: easyJet, Ryanair and Norwegian achieve impressive fuel efficiency based on fleets with an average age of 6-7 years. The worst are those with ageing or obsolete fleets. There is only so far design can go however: ultimately further, deep reductions will require a step-change in thinking.

> "**Climate change** is the most urgent sustainability challenge facing our industry."
>
> **IAG Annual Report 2014**

A NOTE ON KEROSENE

Kerosene is a variant distillate of crude oil and is the main component of aviation fuel, an otherwise highly specialised cocktail of over a thousand chemicals. The Convention on International Civil Aviation (CICA) in 1947 exempted air fuel from taxation, in order to stimulate a nascent industry in the aftermath of the Second World War. The 'anomaly' awards an effective subsidy to airlines of around £10bn annually in the UK, and one that is unavailable to any other form of commercial transport, be it road, rail or sea. Calls for reform have not reached international consensus: the US and Australia are opposed to any reform of the CICA Article on tax, whilst the EU is keen to see reform. Aviation's anomalous tax position has frustrated its inclusion in the EU Emissions Trading System (ETS), which the US has called 'illegal'. Aviation has similarly been excluded from international climate agreements. Without the continuing tax subsidy, it is doubtful that some airlines would be viable. All of the major transnational oil exploration and production companies refine crude into aviation fuel and provide services to the aviation industry at airports globally.

62. www.atag.org
63. Ibid.
64. www.ft.com 'BA and Lufthansa fuel use in spotlight' 17.11.15
65. www.aviationbenefits.org
66. www.icao.int Aviation's Contribution to Climate Change
67. Ibid.
68. www.iata.org Climate Change Policy & Targets

THE INVESTMENT VALUE CHAIN

Aviation has a diverse value chain encompassing manufacturers, airports infrastructure, airlines, support services, engineering and technology. Although some areas of the sector are not investible, owing to the extensive defence exposure (manufacturers and engineering), the sector otherwise remains a diverse and vibrant arena in which to seek investment returns.

From airports infrastructure companies such as the Spanish airports group, Aena, to the world's airlines, to niche high-end engineers such as Porvair and Zodiac Aerospace, there is a breadth and depth often not encountered in other areas.

Below we consider some of the potential areas and companies open to investment, and we focus on three: Aena, BBA Aviation and Porvair.

THE INVESTMENT VALUE CHAIN

Airports Group: Aena

Aena is the world's leading airports group by numbers of passengers. It manages 46 airports in Spain and another 15 internationally (including London Luton Airport), handling 206.4m passengers in 2014 and 1.8m movements[69]. The company is majority owned by the Spanish state, with a 49% free-float. In 2014, the company achieved revenues of €3.2bn, up 8% on 2013 and an operating profit of €479m[70]. 65% of revenues are derived from airport fees and tariffs, however non-aeronautical income grew strongly to €643m[71]. The company has strong sustainability credentials with environmental priorities that include noise abatement, land-use, optimising energy use and emissions reduction. The company has a particularly strong commitment to installing renewable energy sources at its airports. Since it floated in February 2015, the stock has performed strongly.

Specialist Services: BBA Aviation

BBA, whose roots go back to 1879, is focused on end-to-end flight support including refuelling, engine repair and ground-handling. It is present at over 230 locations operating in the private jet and commercial sectors. 75% of revenues arise in the US, with the majority centred on servicing the business sector[72]. The company is a specialist operator of airports and services to the executive market. 2014 saw revenue growth of 3% to $2.2bn with operating profit of over $200m[73]. The company regularly achieves margins of 8-9% and yields of nearly 4%. BBA is strongly cash generative with recurring revenues in a high-margin area of aviation (executive travel), which has held up well (sales of new jets are up year-on-year). The company scores well for sustainability with targets for the reduction of GHG emissions, energy use and water. Given it operates in a critical safety environment, the company has a commendable health and safety record with over 70% of sites achieving a nil injury rate[74].

Niche Engineer: Porvair

Porvair is a specialist filtration and environment group, which designs, develops and manufactures specialist filtration for a range of markets. These are high-end, safety critical components that need regular replacement on all of the world's commercial aircraft. Aviation is one of the company's core end-markets, accounting for 15% of revenues[75]. Porvair's filters are not easily replicable, and airframe manufacturers require stringent, safety tested performance. It is therefore a key supplier to both Boeing and Airbus. Porvair's product portfolio is highly geared towards environmental sustainability given they also design filters for marine and pollution detection and nuclear decontamination. The company saw revenues rise 23% in 2014 to £104m, with operating profit up 10% at £9.2m[76]. The company is held in the Amity UK Fund.

69. www.aena.es
70. Ibid. 2014 Annual Results
71. Ibid.
72. www.bbaaviation.com BBA Aviation corporate profile
73. Ibid. 2014 Annual Results
74. Ibid. BBA Annual Report 2014
75. www.porvair.com; 2014 Annual Results
76.Ibid.

VIEW FROM THE TOP

Aviation is on a growth trajectory. There is consensus that air traffic growth in Asia coupled with ageing fleets in the developed markets of Europe and the US will contribute towards a significant backlog of new aircraft being required in the next 10-15 years.

Asia-Pacific, if projections are correct, will account for 36% of RPK (revenue passenger kilometres) by 2034. Whilst US RPK is projected to decline from 25% in 2014 to 17% in 2034, it will nevertheless have a backlog of nearly 3,000 aircraft, spearheading growth in aircraft replacement. The value chain is not a 'nice-to-do'; there is very little airlines can cut back on if it impacts airworthiness or safety. The value chain is, by turns, fragmented and regional with only a few global players. Whilst manufacturing is broadly non-investible for us, there is ample investment quality in engineering and technology. Airports infrastructure is ripe for consolidation or privatisation as a means of delivering much needed investment, such as the recent flotation of a minority stake in Aena of Spain.

As a house, we gain exposure from quality investments across the value chain, but we have avoided airlines on environmental grounds. We will refine this to allow investment on a case-by-case basis, potentially investing in the most sustainable airlines, and which deliver superior shareholder returns.

Decoupling emissions from growth is going to become a key challenge for an industry suffering over-capacity and indebtedness. Low-cost airlines have proved that profitability is possible but have, in so doing, disrupted long-accepted models of fixed employment. We will therefore need to balance all of the ESG (environmental, social and governance) risks with the investment proposition before taking flight!

Ketan R Patel
CFA, Associate Fund Manager

WHY EDENTREE?

- Over 25 years of experience of socially responsible investing (SRI)
- Funds that are both positively and negatively screened
- An investment team with a wealth of experience spanning many years
- A comprehensive in-house SRI research function
- An independent panel that reviews investment decisions
- A robust, socially responsible investment process
- A pride in our independent analysis. We're not afraid to adopt contrarian positions and are in favour of long-term investment horizons
- A consideration of the preservation of capital as our primary responsibility, preferring absolute returns over relative performance
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- Avoidance of companies materially involved in alcohol production, gambling operations, pornographic and violent material, tobacco production, testing animals for cosmetic or household products, supporting oppressive regimes or strategic weapon production
- Actively seeking out companies with a record of involvement and good performance in terms of business practices, community relations, corporate governance, education, environmental management, healthcare, human rights, labour relations and urban regeneration

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OUR PEOPLE

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FE ALPHA MANAGER 2014 SUE ROUND

Sue Round
Director of Group Investments and Senior Fund Manager

Sue is the UK's longest-serving retail SRI Fund Manager. She launched the Amity UK Fund 27 years ago – pioneering our Profit with Principles investment approach. She is also AA rated by Citywire as of November 2015.

Neville White
Head of SRI Policy and Research

Neville is in charge of our Socially Responsible Investing team. His extensive experience includes being responsible for managing global corporate governance proxy voting for CCLA Investment Management.

FE ALPHA MANAGER 2015 ROBIN HEPWORTH

FUND MANAGER OF THE YEAR AWARDS 2015 WINNER GLOBAL EQUITY

citywire SELECTION

Rob Hepworth
Chief Investment Officer and Senior Fund Manager

Rob has previously been voted Investment Week's Fund Manager of the Year and has been recognised as one of Citywire's top 10 Fund Managers of the past decade. This places him in the top 10% of all UK Unit Trust and OEIC Managers.

Ketan Patel CFA
Associate Fund Manager

Ketan began his career on the equity derivatives trading desk at JP Morgan, before moving to Insight Investment as a Global Healthcare Analyst. Ketan leads the team's company research, supporting the Fund Managers' investment decision-making. He has been a CFA Charterholder since 2009.

citywire +

Chris Hiorns CFA
Fund Manager

Chris has worked at EdenTree since 1996. He started as a Graduate Trainee and worked as an Investment Analyst before being appointed as the Fund Manager for the Amity European Fund in 2007 and the Amity Sterling Bond Fund in 2008.

Phil Harris
Fund Manager

With over 25 years' experience in UK small and mid-cap company sectors, Phil joined EdenTree in 2015 to run the UK Equity Growth Fund. He focuses on growth small-caps and previously specialised in corporate activism.

Peter Cameron CFA
Associate Fund Manager

Peter is an experienced Equity Analyst, having worked in both the Quant solutions and SRI performance and portfolio risk teams at Aviva. He holds a Master's degree in Corporate Governance, and is a CFA Charterholder.

Esmé van Herwijnen
SRI Analyst

Esmé holds a Master's degree in Sustainable Business from Toulouse Business School and gained experience in ESG research from Sustainalytics and PIRC. She supports our SRI team with company screening, proxy voting and engagement.

NOTES

How to contact us

We hope you have found this Amity Insight interesting and useful. If you have any questions, or would like to know more about our responsible investment, in-house research and analysis, please get in touch.

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