

AVIATION
BENEFITS
BEYOND
BORDERS

Powering global economic growth,
employment, trade links, tourism
and support for sustainable
development through air transport

April 2014



The air transport industry is the global network of commercial aircraft operators, airports, air navigation service providers and the manufacturers of aircraft and their components. It is responsible for connecting the global economy, providing millions of jobs and making modern quality of life possible. The Air Transport Action Group (ATAG), based in Geneva, Switzerland, represents the full spectrum of this global business. ATAG brings the industry together to form a strategic perspective on commercial aviation's sustainable development and the role that air transport can play in supporting the sustainability of other sectors of the economy. ATAG's Board of Directors includes: Airports Council International (ACI), Airbus, ATR, Boeing, Bombardier, Civil Air Navigation Services Organisation (CANSO), CFM International, Embraer, GE Aviation, Honeywell Aerospace, International Air Transport Association (IATA), Pratt & Whitney, Rolls-Royce and Safran.

www.atag.org

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Introduction

This year marks the centenary of the commercial aviation industry. On 1 January 1914, when Abram C. Pheil, former mayor of St. Petersburg, Florida became the world's first fare-paying airline passenger, little would he know that 100 years and some 65 billion passengers later, air transport would play a leading role in shaping the lives of people all over the planet.



Michael Gill
ATAG Executive Director
Geneva, April 2014

In 2014, over three billion passengers will board an aircraft somewhere on earth. Some will be heading off on holiday, some will be travelling for business and others will be flying to see friends and relatives. However, every passenger we fly tells a much broader economic story. They will stay in hotels and rent cars, visit national parks and buy food from restaurants.

Tourism is fast becoming the world's number one industry and it is one that aviation is proud to help facilitate. The growth in the middle classes in the emerging economies of the world is being met with a similar boom in air transport, most keenly felt in the Asia-Pacific region. We urge governments in these high growth economies not only to create the environment for growth with liberalised traffic rules and by easing travel restrictions, but also to be mindful of the impact that a lack of planning can have for growth decades from now.

The role of air transport in world trade is also momentous. The high value and perishable goods being transported by cargo

airlines are of great importance for the jobs they support globally. And nearly all of us have personal electronic devices that were built using a global supply chain linked by air. Where would today's internet retailers be without the rapid delivery of their products to customers?

This is a fitting moment to pay tribute to all the men and women around the world who make aviation the industry what it is – from the flight crews who probably have the best view of any office in the world, to the ground teams and the mechanics and engineers who build and maintain the marvels of technology which passengers take for granted – air transport is a business that really gets into the blood.

When you look behind the scenes of our industry, the logistics and planning involved is mind-boggling. You only need to take a look at an airport baggage handling system, or a ramp controller's desk, or a cabin crew schedule to understand just how much of a multidimensional ballet plays out every day. Throw in adverse weather, political unrest and

the incredibly sophisticated technology we use and the collaboration that allows the industry to operate is all the more impressive.

And that's just the day-to-day. At the Air Transport Action Group, our mission is to bring the industry together to keep one eye on the future of aviation as well. Sustainability is all about protecting what we have for generations to come. We can be proud that our industry has such a proactive future vision. Whilst it has taken us 100 years to serve 65 billion passengers, another 65 billion passengers will take flight in the next 15 years. That is a stunning amount of growth, not just for the industry but for the economies we support.

The Air Transport Action Group's members are working in partnership to ensure that growth can take place efficiently, economically, environmentally and with as little congestion as possible. This will not be an easy task, but you can rest assured that there are people already working on it.

Here's to the next 100 years of flight!

Executive summary

Key facts and figures from
the world of air transport

Executive summary

Key facts and figures from the world of air transport

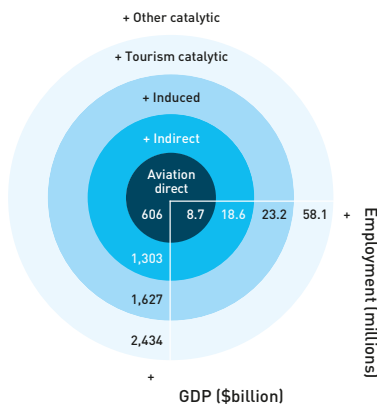
58.1

million

jobs supported by aviation worldwide¹

Beyond the industry

Aviation's global employment and GDP impact²



Direct employment:

470,000

Airport operators³
(work for the airport operator)

4,602,000

Other on-airport⁴
(retail, car rental, government agencies such as customs and immigration, freight forwarders and some catering)

2,272,000

Airline staff⁵
(flight and cabin crews, executives, ground services, check-in, training, maintenance staff)

1,203,000

Civil aerospace staff⁶
(engineers and designers of civil aircraft, engines and components)

195,000

Air navigation service providers⁷
(air traffic controllers, executives)

\$2.4

trillion

Aviation's global economic impact (including direct, indirect, induced and tourism catalytic)⁸

3.4%

of global GDP
is supported by aviation⁹

21st

If aviation were a country, it would rank 21st in size by GDP¹¹

3.6x

Aviation jobs are, on average, 3.6 times more productive than other jobs¹². By opening markets, enabling knowledge transfer and other catalytic effects, aviation also makes jobs in other sectors more productive.

These figures represent the benefits that aviation activities deliver to the global economy. They do not include other economic benefits of aviation, such as the jobs or economic activity generated when companies or whole industries exist because air travel makes them possible, or the intrinsic values that the speed and connectivity of air travel provides. Nor do they include domestic tourism and trade. Including these would increase the employment and global economic impact numbers several-fold¹⁰.

This report provides a global view of one of the most global industries. Oxford Economics analysed the economic and social benefits of aviation at a national level in over 50 countries and used the results of that assessment to build the most comprehensive global picture of air transport's many benefits. Working with partners across the industry, the Air Transport Action Group (ATAG) has expanded the analysis to build a unique view of the air transport system that provides jobs, trade, connectivity, tourism, vital lifelines to many remote communities and rapid disaster response.

Every day...

- » 8.6 million passengers
- » 99,700 flights
- » \$17.5 billion worth of goods carried

Air transport is a major contributor to global economic prosperity.

Aviation provides the only rapid worldwide transportation network, which makes it essential for global business and tourism.

It plays a vital role in facilitating economic growth, particularly in developing countries.

Airlines transport over three billion passengers annually with revenue passenger kilometres (RPK) totalling nearly 5.5 trillion in 2012.

Nearly 50 million tonnes of freight were carried by air in 2012, amounting to 185 billion freight tonne kilometres (FTK).

Air transport facilitates world trade, helping countries participate in the global economy by increasing access to international markets and allowing globalisation of production. The total value of goods transported by air represents 35% of all international trade.

Aviation is indispensable for tourism, which is a major engine of economic growth, particularly in developing economies. Globally, 52% of international tourists travel by air.

Connectivity contributes to improved productivity by encouraging investment and innovation; improving business operations and efficiency; and allowing companies to attract high quality employees.

2.97

billion passengers

carried by airlines¹⁴ (in 2013, it was 3.1 billion¹⁵)

5.4

trillion kilometres

flown by passengers (in 2013, it was 5.7 trillion)¹⁷

45

million hours

flown by IATA airlines in 2012¹⁸

37.4
million

commercial flights worldwide¹⁶ (in 2013, there were 36.4 million). Counting just scheduled airlines, there were 31 million flights in 2012³⁵

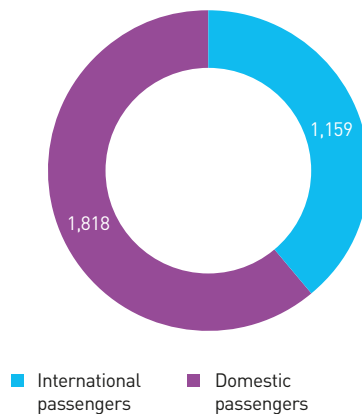
49,871

routes

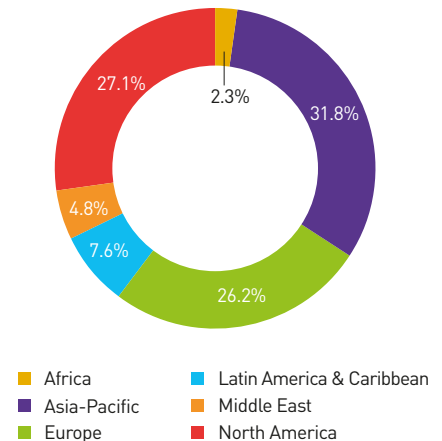
served globally¹³

Going places

Global passenger split, international / domestic, billions¹⁹

**Asia-Pacific in front**

Regional passenger traffic split²⁰



Aviation's global economic impact (direct, indirect, induced and tourism catalytic) is estimated at \$2.4 trillion, equivalent to 3.4% of world gross domestic product (GDP).

These figures do not include other economic benefits of aviation, such as the jobs or economic activity that occur when companies or industries exist because air travel makes them possible, or the intrinsic value that the speed and connectivity of air travel provides. Nor do they include domestic tourism and trade. Including these would increase the employment and global economic impact numbers several-fold.

Nearly 1,400 airlines operate a total fleet of over 25,000 aircraft. They serve almost 4,000 airports through a route network of several million kilometres managed by 173 air navigation service providers.

Air transport is a major global employer

The air transport industry generates a total of 58.1 million jobs globally.

It provides 8.7 million direct jobs: airlines, air navigation service providers and airports directly employ nearly three million people and the civil aerospace sector (manufacture of aircraft systems, frames and engines) employs 1.2 million people. A further 4.6 million work in other on-airport positions.

There are 9.8 million indirect jobs generated through purchases of goods and services from companies in its supply chain.

Industry employees support 4.6 million induced jobs through spending.

Aviation-enabled tourism generates around 35 million jobs globally.

Air transport invests substantially in vital infrastructure

Unlike other transport modes, the air transport industry pays for a vast majority of its own infrastructure costs (runways, airport terminals, air traffic control), rather than being financed through taxation and public investment or subsidy (as is typically the case for road and railways).

In 2012, airports invested \$19.3 billion in construction projects, creating jobs and building new infrastructure.

The benefits to society of research and development spending by the aerospace industry are estimated to be much higher than in manufacturing as a whole – every \$100 million of spending on research eventually generates additional GDP benefits of \$70 million year after year.

Executive summary

1,397

Commercial airlines²¹

3,864

Airports with scheduled commercial flights²²
(there are 41,821 airfields in the world,
including military and general aviation²³)

173

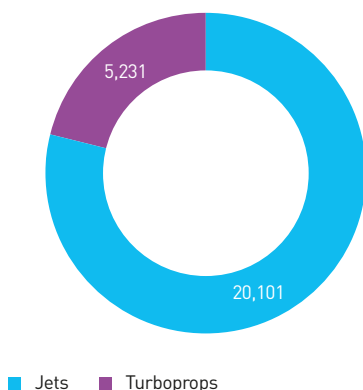
Air navigation service providers²⁴

25,332

Number of commercial aircraft in service²⁵

Jetting off

Aircraft in commercial service,
by type 2012²⁶



Air transport provides significant social benefits

Air transport contributes to sustainable development. By facilitating tourism and trade, it generates economic growth, provides jobs, improves living standards, alleviates poverty and increases revenues from taxes.

Increasing cross-border travel is a reflection of the closer relationships developing between countries, both from an individual perspective and at a country level. In the same way, eased restrictions on the movement of goods and people across borders facilitates the development of social and economic networks that will have long-lasting effects. This improved flow of people and goods benefits both the host and the originating countries, encouraging increased social and economic integration.

Air transport offers a vital lifeline to communities that lack adequate road or rail networks. In many remote communities and small islands, access to the rest of the world – and to essential services such as health care – is often only possible by air.

Aviation's speed and reliability are perhaps most immediately apparent in the delivery of urgently needed assistance during emergencies caused by natural disaster, famine and war. Air services are particularly important in situations where physical access is problematic.

Air transport is working to mitigate its environmental impact

Airline operations produced 689 million tonnes of carbon dioxide (CO₂) in 2012 (and 705 million tonnes in 2013), just under 2% of the total human carbon emissions of over 36 billion tonnes.

The aviation industry agreed in 2008 to the world's first set of sector-specific climate change targets. The industry is already delivering on the first target – to continue to improve fleet fuel efficiency by 1.5% per year until 2020. From 2020, aviation will cap its net carbon emissions while continuing to grow to meet the needs of passengers and economies.

By 2050, the industry has committed to reduce its net carbon footprint to 50% below what it was in 2005.

Companies across the sector are collaborating to reduce emissions using a four-pillar strategy of new technology, efficient operations, improved infrastructure and market-based measures to fill the remaining emissions gap.

Modern jet aircraft are 75% quieter than the first models that entered into service and each new generation of aircraft continues this downward trend.

Over 1,500 passenger flights operating partially on sustainable biofuels have taken place so far. It is expected that carbon reduction from moving to alternative fuels could be up to 80% compared with traditional jet fuel.

Air transport will continue to provide jobs

Forecasts suggest that, in 2032, there will be over 6.5 billion passengers and aviation will support 103 million jobs and \$5.8 trillion in economic activity.

However, if growth were to slow by just 1%, the total number of jobs supported by the air transport sector (including air transport supported tourism) would be over 12.4 million lower than the base forecasts and the contribution of the air transport sector to world GDP would be \$661 billion (2012 prices) lower, with an additional \$352 billion lost through lower tourism activity.

273

billion litres

of jet fuel used by commercial operators. This equates to 72.2 billion gallons, or around 220 million tonnes of Jet A-1²⁷

\$210

billion

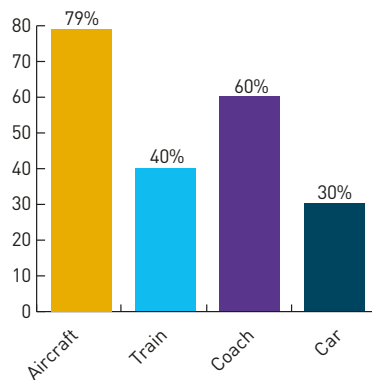
Amount the world's airlines paid for fuel (in 2013, it was \$211 billion)²⁸

79%

Average aircraft occupancy (in 2013, it was 80%)³⁰, much higher than other forms of transport

High occupancy

Airlines utilise more of their seats than other modes³¹



688,739,000

tonnes of carbon dioxide (CO₂)

emitted by airlines (in 2013, it was 705 million tonnes)²⁹. This is 2% of the global human emissions of 36 billion tonnes. Around 80% of aviation CO₂ is emitted from flights over 1,500 kilometres in length, for which there is no practical alternative form of transport

Climate targets

Improve 1.5%

Aviation will improve its fleet fuel efficiency by an average of 1.5% per annum between 2009 and 2020.

Stabilise

From 2020, net carbon emissions from aviation will be capped through carbon-neutral growth.

Reduce 50%

By 2050, net aviation carbon emissions will be half of what they were in 2005.

Environmental progress

The air transport industry has made significant progress in reducing its environmental impact:

CO₂ emissions per seat kilometre

▼ **70%+ since first jet aircraft.**

Perceived noise

▼ **75%+ since first jets.**

- » Over five billion tonnes of CO₂ avoided since 1990 through airlines spending \$3 trillion on 25,000 new aircraft.
- » The industry has invested in new technology, better operations and infrastructure improvements.
- » Civil aerospace spends \$20 billion per year on R&D, 70% for fuel reduction technology.
- » Sustainable aviation fuels could reduce CO₂ footprint by 80%, over 1,500 commercial flights have taken place so far.
- » Air traffic management modernisation could save millions of tonnes of CO₂.

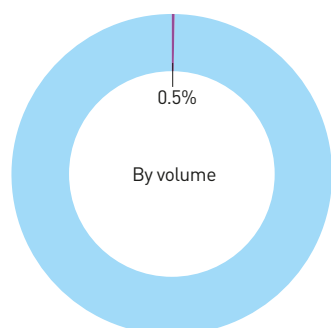
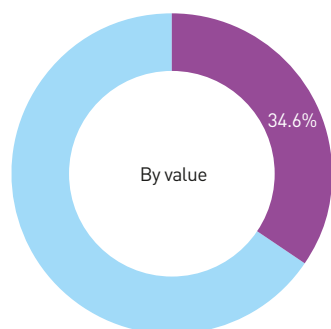
Executive summary

35%

Air transport carries around 35% of world trade by value and only 0.5% by volume³²

High value, time sensitive

Proportion of global trade transported by air³³



49.2

million tonnes

of freight handled by air in 2012 (in 2013, 49.8 million tonnes were handled)³⁴

185

billion

Scheduled freight tonne kilometres³⁵

\$6.4

trillion

Value of cargo handled by air in 2012³⁶

52%

of international tourists travel by air³⁷

Landing zone

Top 10 airports by passenger movements, millions, 2012³⁸

Rank	Airport	Passengers	Change
1	Hartsfield-Jackson Atlanta International Airport	95.5	3.4%
2	Beijing Capital International Airport	81.9	4.1%
3	Heathrow Airport	70.0	0.9%
4	Tokyo International (Haneda) Airport	66.8	6.7%
5	O'Hare International Airport	66.6	-0.1%
6	Los Angeles International Airport	63.7	3.0%
7	Charles de Gaulle	61.6	1.1%
8	Dallas Fort Worth International Airport	58.6	1.4%
9	Soekarno-Hatta (Jakarta) International Airport	57.8	12.9%
10	Dubai International Airport	57.7	13.2%



A global industry

Aviation's global economic, social
and environmental profile in 2012

A global industry

Aviation's global economic, social and environmental profile in 2012

An economic engine

Aviation is a vital part of the increasingly globalised world economy, facilitating the growth of international trade, tourism and international investment, and connecting people across continents.

Direct impacts

The aviation industry itself is a major direct generator of employment and economic activity – in airline and airport operations, aircraft maintenance, air traffic management, head offices and activities directly serving air passengers, such as check-in, baggage handling, on-site retail, cargo and catering facilities. Direct impacts also include the activities of civil aerospace manufacturers selling aircraft and components to airlines and related businesses.

The world's airlines carry over three billion passengers a year and 50 million tonnes of freight. Providing these services generates 8.7 million direct jobs within the air transport industry and contributes \$606 billion to global GDP³⁹.

Compared with the GDP contribution of other sectors, the global air transport industry is larger than the pharmaceuticals (\$451 billion), textiles (\$223 billion) or automotive industries (\$555 billion) and around half as big as the global chemicals (\$1,282 billion) and

food and beverage (\$984 billion) sectors⁴⁰.

In fact, if air transport were a country, its GDP would rank it 21st in the world, roughly equal to that of Switzerland and more than twice as large as Chile or Singapore.

The air transport industry worldwide directly generated an estimated 8.7 million jobs in 2012.

- » 2.3 million of those people (26% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 470,000 people (5% of the total) worked for airport operators (for example, in airport management, maintenance and operations).
- » 4.6 million jobs (53%) were on-site in airports, at retail outlets, restaurants, hotels, government agencies, etc.
- » A further 1.2 million jobs (14%) were employed in the manufacture of civil aircraft (including airframes, engines, systems and components).
- » Air navigation service providers employed an additional 195,000 people (2%).

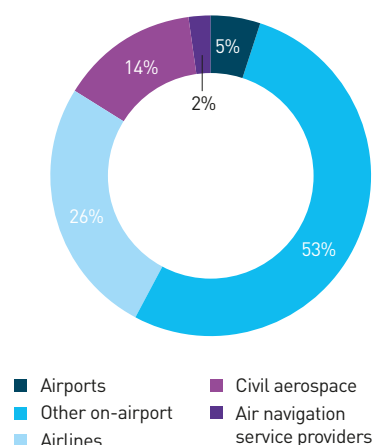
Air transport also has important 'multiplier' effects, which mean that its overall contribution to global employment and GDP is much larger than its direct impact alone.

Indirect impacts

These include employment and activities of suppliers to the air transport industry – for example, aviation fuel suppliers; construction companies that build airport facilities; suppliers of sub-components used in aircraft; manufacturers of goods sold in airport retail outlets; and a wide variety of activities in the business services sector (such as call centres, information technology and accountancy). Over 9.8 million indirect jobs globally are supported through the purchase of goods and services by companies in the air transport industry. These indirect jobs contributed approximately \$697 billion to global GDP in 2012.

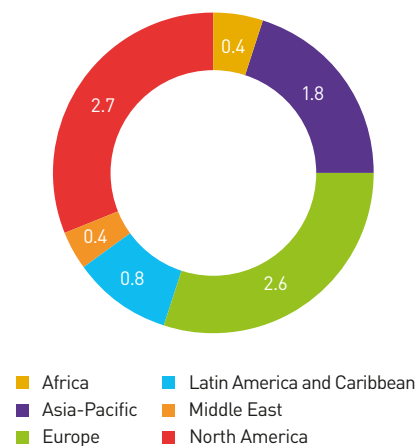
What we do

Direct employment by air transport by segment, 2012⁴¹



Where we work

Direct employment by air transport by region, millions, 2012⁴²



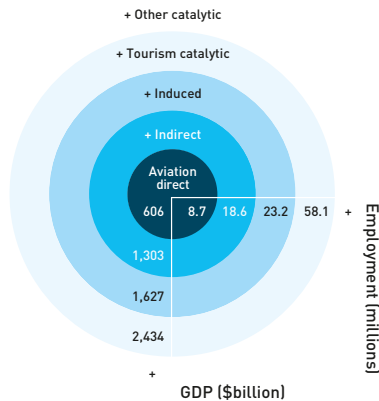
Induced impacts

The spending of those directly or indirectly employed in the air transport sector supports jobs in industries such as retail outlets, companies producing consumer goods and a range of service industries (such as banks and restaurants). Worldwide, nearly 4.6 million induced jobs globally are supported through employees in the air transport industry

The global air transport industry supports 58.1 million jobs worldwide and contributes \$2.4 trillion (3.4%) to global GDP

Beyond the industry

Aviation's global employment and GDP impact²



(whether direct or indirect) using their income to purchase goods and services for their own consumption. The induced contribution to global GDP is estimated at \$324 billion in 2012.

It's not just who's on board

Air transport's most far-reaching economic contribution is via its contribution to the performance of other industries and as a facilitator of their growth. These 'catalytic' or 'spin-off' benefits of aviation affect industries across the whole spectrum of economic activity.

- » Air transport is indispensable for tourism, which is a major engine of economic growth globally, particularly in developing economies.
- » Air transport facilitates world trade, helping countries participate in the global market by increasing access to international markets and allowing globalisation of production.
- » Air transport increases a country's connectivity which can help raise productivity, by encouraging investment and innovation; improving business operations and efficiency; and allowing companies to attract high-quality employees.

- » Air transport plays an especially pivotal role in just-in-time global manufacturing production and in speeding fresh produce from agricultural communities in developing economies to markets in the industrialised world.

These wider catalytic impacts are not included in this fairly conservative analysis, due to the difficulty of extracting the figures related to aviation from those relating to other sectors. The exception is the tourism industry, where reliable data exist on the flow-on impacts and these are explored below. However, there are a range of businesses outside of tourism whose economic models rely on the speed and reliability of air transport – Amazon.com and other e-commerce websites rely on the express delivery services made possible by aviation. Further examples are explored in this report.

Air transport stimulates tourism

Tourism makes a major contribution to the global economy. It directly contributed \$2 trillion to world GDP in 2012 and provided over 101 million jobs globally – 3.4% of total employment⁴³. By 2024, the World Travel & Tourism Council expects direct employment in the tourism industry to be more than 126 million people globally⁴⁴. When looking at the jobs and GDP supported through the indirect and induced impacts of tourism, the figures are a magnitude higher at 261 million jobs (8.7% of employment) and \$6.6 trillion, or 9.3% of the global economy⁴⁵. By 2024, tourism could support some 347 million jobs and \$11 trillion in GDP⁴⁶.

Aviation plays a central role in supporting tourism. Over 52% of international tourists now travel by air. Tourism is particularly important in many developing countries, where it is a key part of economic development strategies. In Africa, for example, the jobs of an estimated 2.5 million people directly employed in tourism are supported by overseas visitors arriving by air, representing 30% of all tourism jobs in Africa⁴⁷. In some island states, tourism can

INVESTMENT



Global aircraft programmes boost Asian high-tech industries

Today's commercial aircraft are a vital catalyst to high-tech skills development throughout the world. The Asia-Pacific region, which leads global air traffic growth, has also been particularly boosted by investment from major aircraft manufacturers.

Boeing's industrial footprint spans major Asia-Pacific economies and is expanding to meet increases in the company's commercial production.

More than 65 Japanese companies support Boeing programmes, accounting for more than 40% — about 22,000 direct and indirect jobs — of Japan's aerospace employment. Japan builds 35% of the 787 Dreamliner airframe and more than 20% of the 777. Boeing collaborates with Japanese industry and universities to develop advanced manufacturing technologies and other innovations that will benefit Japan's current and future workforce.

Chinese companies supply every Boeing commercial programme, from the vertical fin and horizontal stabiliser for Boeing's Next-Generation 737 and 747-8 to the rudder, wing-to-body fairing panels and other components for the 787. Meanwhile, the aircraft maker has trained more than 50,000 pilots, technicians, factory workers and other professionals in China's fast-growing aviation industry.

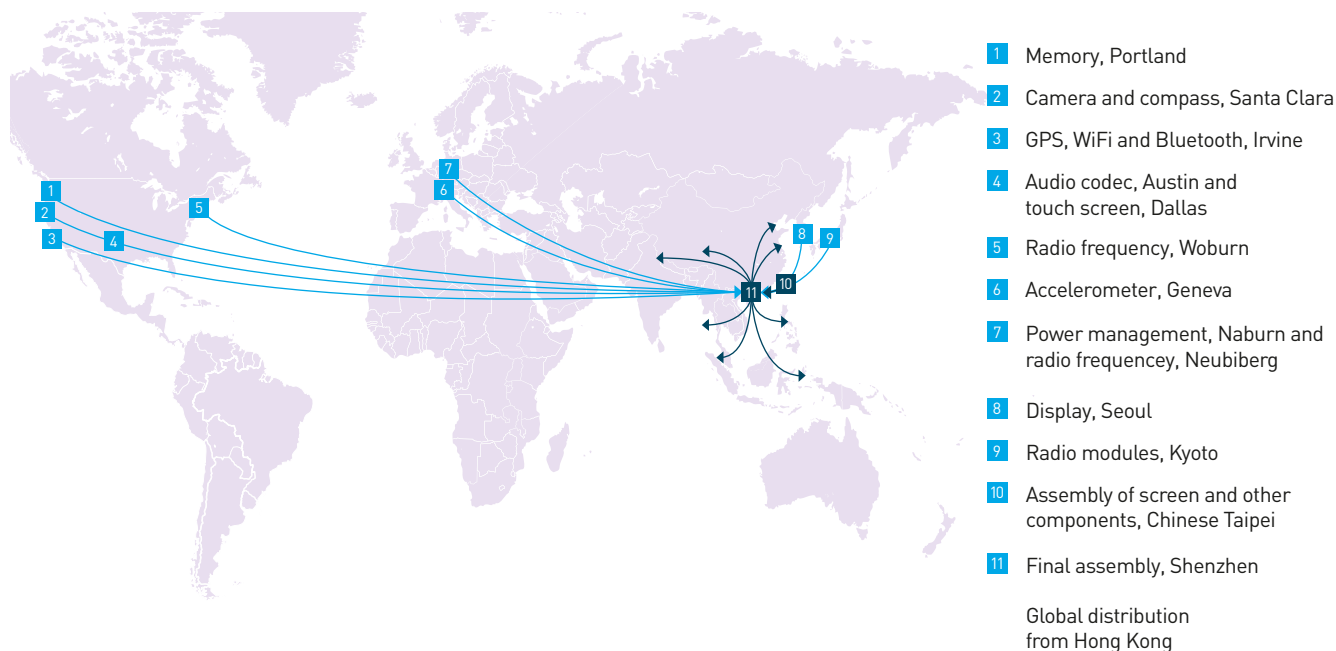
The US manufacturer continues to expand its South-east Asia supply chain. In 2013, Boeing and Hexcel Corporation expanded their joint venture Aerospace Composites Malaysia (ACM) by 40%. ACM, which makes flight surfaces for Boeing commercial aircraft, is expected to grow its workforce beyond the current 950 employees.

Boeing has a global logistics hub in Singapore for spares distribution, and supply chain management and technical support teams throughout South-east Asia. The plane maker also partners with Indonesia on commercial aviation safety, efficiency and industry development.

A global industry

Mobile parts

Apple's global supply chain for the iPhone is made possible by air transport⁵²



\$6.4 trillion of goods were transported internationally by air in 2012.

have an overwhelming influence on the national economy. St Kitts and Nevis, for example, relies on the industry for 25.9% of the economy and a quarter of its jobs. In some Caribbean countries, tourism provides one of the few means of economic growth⁴⁸.

The contribution of air transport to tourism employment and GDP:

- » Direct: 14.6 million direct jobs in tourism globally are estimated to be supported by the spending of foreign visitors arriving by air. This includes jobs in industries such as hotels, restaurants, visitor attractions, local transport and car rental, but it excludes air transport industry jobs.

- » Indirect: A further 13.4 million indirect jobs in industries supplying the tourism industry are supported by visitors arriving by air.
- » Induced: These direct and indirect tourism jobs supported by air transport generate a further 6.9 million jobs in other parts of the economy, through employees spending their earnings on other goods and services.

Including direct, indirect, and induced effects, air transport supports 35 million jobs within tourism, contributing around \$807 billion a year to world GDP.

Contribution to world trade

As an important facilitator of international trade, aviation promotes global economic growth and development. Forecasts suggest that the world's economies will become even more dependent on international trade over the next decade. World trade is expected to nearly double, rising at more than twice the

rate of global GDP growth, with China, India and other emerging markets leading the way.

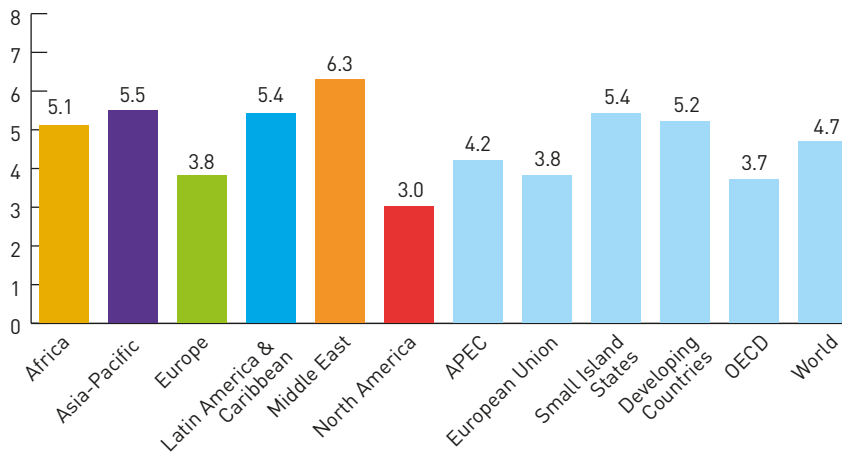
Compared to other modes of transport, air freight is fast and reliable over great distances. However, these benefits come at a cost. Consequently, air freight is mostly used to deliver goods that are light, compact, perishable and have a high unit value.

Today, air transport is a vital component of many industries' global supply chains, used primarily for the transfer of time-sensitive goods. Rapid delivery is particularly important to businesses whose customers are running streamlined production processes or who need urgent delivery of spare parts for machinery and equipment. High-value, lightweight and sensitive electrical components are transported by air from manufacturing facilities all over the world to be assembled.

Exporters of perishable products such as food and flowers (many of whom are located in developing countries) can only reach export

Emerging fast

Projected annual growth rate for international traffic by region, 2012 – 2032⁵⁵



markets by air, providing steady employment and economic growth to regions that benefit from such trade. For example, it is estimated that 1.5 million livelihoods in Africa depend on such exports to the UK market alone⁴⁹. In Kenya, 90,000 jobs (and 500,000 livelihoods) depend on the cut flower industry, which supports 1.6% of the national economy, generating around \$1 billion in foreign exchange each year⁵⁰. The pharmaceutical industry also relies on air transport for delivery of time-sensitive medical supplies, particularly vaccines⁵¹.

These key characteristics of air freight are most apparent in the data on the modes of transport used in world trade. While accounting for less than 0.5% of the tonnage of global trade, air freight makes up over a third of the value of international trade.

Passenger air services' role in international trade

Passenger air services are also vital for international trade development. While technologies such as videoconferencing can be very helpful, many companies still consider face-to-face meetings essential for winning new business and developing client relationships. A recent survey⁵³ of over 2,200 business people found that 87% rate face-to-face meetings as essential for 'sealing the deal,' and nearly all (95%) agreed that such meetings are key to success in building long-term

relationships. More than half (52%) said that restrictions on the numbers of flights they take for work would hurt their business.

In other recent surveys, corporate executives estimated that 28% of current business would be lost without in-person meetings. Further, they estimate that roughly 40% of prospective customers are converted to new customers with an in-person meeting compared to 16% without⁵⁴.

Paying our way

Unlike other transport modes, the air transport industry pays a vast majority of its own infrastructure costs (runways, airport terminals and air traffic control), rather than these being financed through taxation and public investment or subsidies (as is typically the case for road and railways). In addition, companies in the air transport industry make significant tax payments to national treasuries. Aviation infrastructure costs are funded through user charges (passengers and airlines) and airport commercial revenue. User charges, which totalled \$92.3 billion in 2011⁵⁶, are generally included in the price of the airline ticket or paid by passengers.

User charges are designed and applied specifically to recover the costs of providing facilities and services for civil aviation⁵⁷. These include the costs of providing airports and air navigation services, including appropriate amounts for cost of capital and depreciation

INVESTMENT



New aircraft: more jobs and cleaner production

Every time a new aircraft programme is announced, the economic and industrial ripples spread throughout the world.

As production ramps up for the latest aircraft from Airbus, the A350 XWB which first flew in June 2013, the number of people joining the programme worldwide as direct and indirect suppliers grows almost daily. When it reaches its full production rate, this single aircraft will account globally for 34,000 direct and 68,000 indirect jobs, or 102,000 in total.

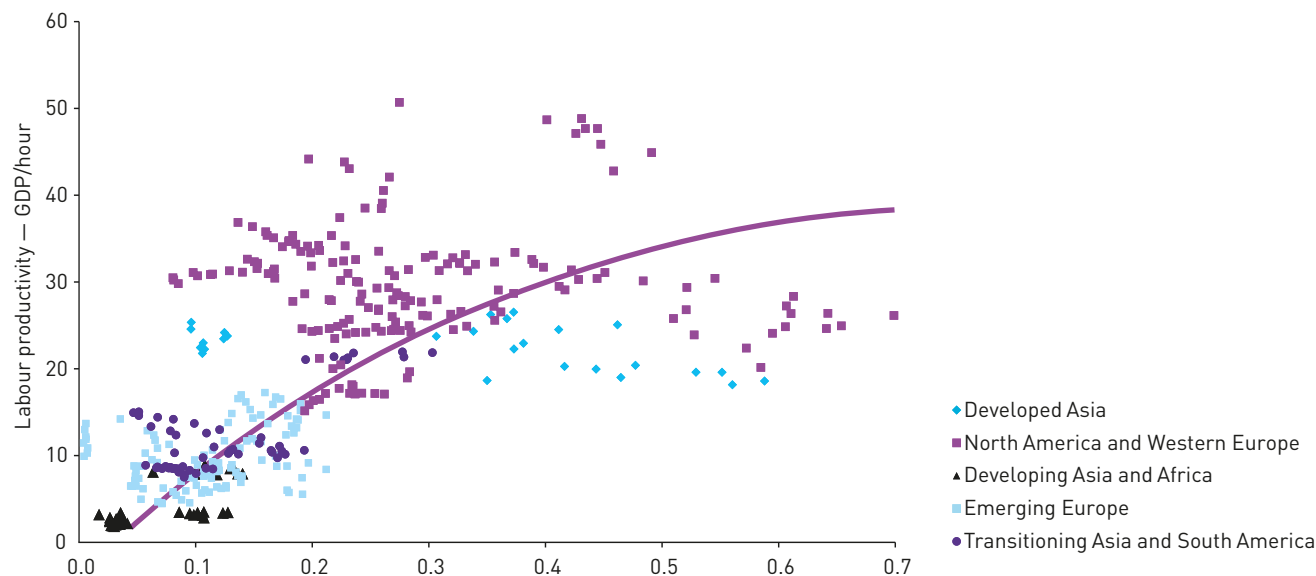
At the start of 2014, 12,000 people were already working full-time on the project even though the first deliveries are not scheduled until the end of 2014. Around 1,500 will be employed on the final assembly line in Toulouse once production reaches peak levels. But this is the final stage in a vast production chain which stretches around the world. The aircraft, like all modern planes, is a truly global product — so even though the company is headquartered in France for example, 40% of Airbus procurement spending on components and materials for all programmes goes to companies in the USA.

As well as adding jobs, skills and investments, the new aircraft will also boost cleaner production methods. Environmental criteria are important elements when selecting suppliers and environmental requirements are introduced in contractual agreements. This means more composite and fewer aluminium structures — advanced materials account for 53% of the aircraft — new paint with fewer solvents and more energy-efficient manufacturing processes. At the A350 XWB final assembly, 22,000m² of solar panels will produce the equivalent of 55% of the total energy needs to power the production processes.

A global industry

Working connections

Connectivity and labour productivity⁶⁵



of assets, as well as the costs of maintenance, operation, management and administration. In some cases, airport user charges are offset by airport commercial revenues that result from the provision of airport facilities. In 2012, airports worldwide spent around \$19.3 billion on capital expenditure on new infrastructure⁵⁸, building new capacity to meet demand growth, improving existing facilities to increase efficiency and building energy-efficient terminals. For example, the Port Authority of New York and New Jersey has announced infrastructure works at two of its airports, La Guardia and Newark, which between them will generate 2,000 construction jobs and over \$500 million in regional economic activity in the 16-month projects⁵⁹.

In contrast, while road users pay fuel duties and vehicle excise taxes, most governments invest in new highways and in road maintenance. While some countries have different approaches, user charges are typically not applied except in the form of a toll charge on some highways.

In many parts of the world, rail services are also heavily subsidised by national, regional or local governments. Between 2007 and 2009 in Europe, state aid for rail services amounted to nearly \$58 billion a year, compared to \$440

million for aviation (funds used in most cases for commercially unviable services to remote communities)⁶⁰. The cost of rail infrastructure is also state funded. For example, the latest high speed rail line in the UK is expected to cost taxpayers some \$67 billion when fully completed⁶¹.

Whilst high-speed rail provides a very efficient replacement for air services between heavily populated cities within four hours travel time, the need to connect mid-sized cities that cannot support high-cost high-speed rail infrastructure will mean air transport always has a role to play. Highly efficient turboprop aircraft can be ideal for such scenarios and in fact, 83% of turboprop flights are between destinations less than 500 kilometres apart⁶². Of course, for distances over 1,500 kilometres, air travel becomes a vital link.

Stimulus for greater productivity

Arguably, the largest economic benefit of increased connectivity comes through its impact on the long-term performance of the wider economy through enhancing the overall level of productivity. A rise in productivity in firms outside the aviation sector comes through two main channels: through the effects on domestic firms of increased access

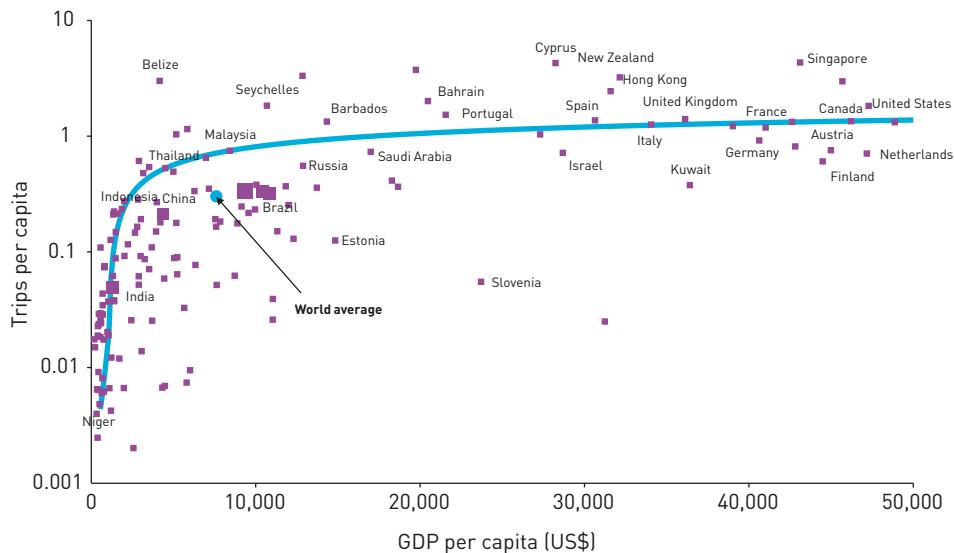
to foreign markets and increased foreign competition in the home market; and through the freer movement of investment capital and workers between countries.

Improved connectivity:

- » opens up new markets, boosts exports and at the same time increases competition and choice in the home market from foreign-based producers, encouraging firms to specialise in areas where they possess a comparative advantage;
- » can drive down costs and prices for firms that have a comparative advantage (such as innovative products and services), benefiting domestic consumers in the process;
- » opens domestic markets to foreign competitors, which can also be an important driver for reducing unit production costs, either by forcing domestic firms to adopt best international practices in production and management methods or by encouraging innovation;
- » can benefit domestic customers through competition by reducing the mark-up over cost that firms charge their customers, especially where domestic firms have hitherto enjoyed some shelter from competition.

Who's on board?

Propensity to travel, 2012⁷⁰



Improved connectivity can further enhance an economy's performance by making it easier for firms to invest outside their home country, which is known as foreign direct investment (FDI). FDI necessarily entails some movement of staff: whether for technical know-how, management oversight, or servicing and meeting customers. Increased connectivity also allows firms to exploit the speed and reliability of air transport to ship components between plants in distant locations, without the need to hold expensive stocks of inventory as a buffer.

Less tangibly, but just as important, improved connectivity increases passenger traffic and trade. This, in turn, can lead to a more favourable environment for foreign firms to operate in – greater links to the outside world often drive a more conducive global business environment. In a survey of 625 businesses in five countries, respondents considered the absence of good air transport links to be one of the major determining factors in not making an investment. On average, 18% of firms reported that the lack of good air transport links had affected their past investment decisions. Of the investments that were affected, 59% were made in other locations with better air services, 18% went ahead anyway, but with significantly higher

costs, while in 23% of cases no investment was made⁶³.

Measuring the impact on productivity

A number of recent studies have attempted to quantify the long-term impact on a country's GDP that results from an improvement in connectivity. This is not straightforward. Given that the supply-side benefits of connectivity come through promoting international trade and inward investment, any impact is likely to manifest itself gradually over time. This protracted adjustment makes it very challenging to disentangle the contribution that improved connectivity has had on long-term growth from the many other factors that affect an economy's performance. This issue is reflected, however, in the wide range of estimates that studies have reached for connectivity's impact on long-term growth.

Based on a conservative estimate⁶⁴, a 10% improvement in global connectivity (relative to GDP) would see a 0.07% per annum increase in long-run GDP. Given the increase in global connectivity due to air transport over the last couple of decades, Oxford Economics estimates this impact to be worth over \$200 billion to global GDP.

Analysis shows a strong positive relationship between higher connectivity

SKILLS DEVELOPMENT



GE makes major skills investment in India

Developing ever-more fuel-efficient aircraft is one of the most competitive technical challenges in today's aerospace world. Companies are searching the globe for the most talented engineers and research scientists to give them that vital competitive edge which will translate into billions of dollars of new orders.

Some are doing more than searching. The John F. Welch Technology Center in Bangalore, India, is aircraft engine manufacturer GE's first and largest integrated, multidisciplinary research and development centre outside the United States. Over 4,500 scientists, researchers and engineers are working there on developing a range of new concepts within the aviation, energy and related businesses.

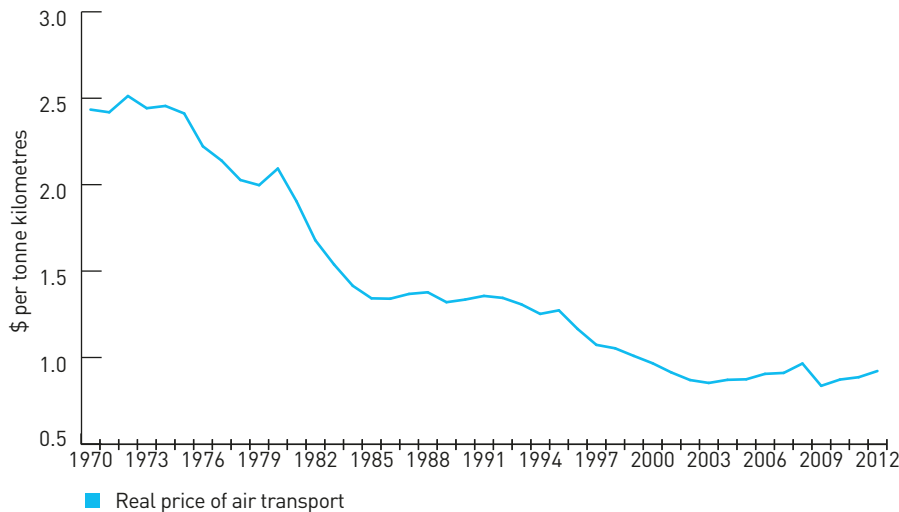
GE opened the \$175 million research centre in 2000. Since then, the centre's research scientists have produced a number of vital technology breakthroughs. They have made a major contribution to developing an advanced combustor system which reduces emissions of oxides of nitrogen and improves fuel burn efficiency by 20% over legacy designs. The new combustor features in the GENx engine, which powers the new Boeing 787.

The centre has benefitted greatly from local access to India's huge resource of highly-trained personnel and now has over 1,000 patent applications to its credit. The centre works closely with the four other GE facilities that form the GE Global Research network, comprising facilities in the US, Germany, China and Brazil. In addition, GE is also investing in a \$200 million manufacturing plant due to be opened at Chakan, near Pune, in 2014 to build a range of aviation and turbo machinery components for the global market.

A global industry

Peanuts for peanuts

World airfare in real terms, 1970 – 2012⁷⁰



to the global network – as a proportion of GDP – and labour productivity. Developing and transitional economies typically have low connectivity relative to their GDP and also relatively low labour productivity. At the top right of the chart on the previous page are the developed Asian, North American and European economies with high levels of connectivity and labour productivity⁶⁵.

Innovation

Air transport is a technology-advanced industry heavily involved in the production of high-specification products which drives research and development in a number of areas. This focus on research and innovation across the sector not only leads to more efficient aircraft technology and operational practices – with associated environmental benefits – but also helps build research capacity at universities and skills across society. The benefits to society of research and development spending by the aerospace industry are estimated to be much higher than in manufacturing as a whole – every \$100 million of investment into research eventually generates additional \$70 million in GDP year after year⁶⁶.

There is concern from aerospace industry leaders about the future threat of a lack

of science, technology, engineering and mathematics graduates entering the labour pool. This is prompting resources to be focused on encouraging the next generation of engineers.

Research conducted for the Aerospace Industries Association (AIA) suggests that aerospace contributes almost \$100 billion in export sales to the USA's economy and every dollar invested in aerospace yields an extra \$1.50 to \$3 in economic activity. The influence that aerospace has on the rest of the USA's high-tech economy is also considerable.

This explains why organisations such as AIA actively highlight initiatives to recruit and retain high quality workers, both to create new aerospace-centric jobs and maintain the current levels of activity.

The cost of air travel

A key driver in the growth of passenger traffic has been the steady decrease in the real cost of air travel. Since 1970, the real cost of air travel has been reduced by over 60%, through deregulation of the aviation market in the 1980s, the development of more fuel-efficient aerospace technologies and the introduction of low cost carriers. It is now more affordable for more of the population to travel by air.

In the United States, for example, the cost

of a return flight from Boston to Los Angeles fell by 89% between 1941 and 2012, whilst the flight time is nine hours (and 11 stops) shorter⁶⁷.

Supporting social development

People and businesses use air transport for many reasons. Individuals rely on it for holidays and visiting friends and family; while businesses use air transport for meeting clients and for the speedy and reliable delivery of mail and goods, often over great distances.

One of the most important economic benefits generated by air transport is the intrinsic value generated for its consumers, passengers and shippers. With its speed, reliability and reach, there is no close alternative to air transport for many of its customers. This means that many are likely to value air services more highly than simply the price they are willing to pay for the ticket. But this added value will vary from flight to flight and from consumer to consumer, making it difficult to measure⁶⁹.

A conservative estimate from Oxford Economics shows this additional benefit to be about a third of a passenger's typical airfare. The additional benefits are even higher for



air freight shippers, reflecting the lack of alternatives to the speed and reliability of air transport.

Visiting friends and relatives

A measured rise in the number of travellers visiting friends and relatives reflects modern family demographics (with families spread over the world) and an increasingly globalised workforce. It further indicates stronger cross-border ties at both the individual and country level.

This is particularly visible within the European Union, where the free movement of goods and people between its member states has developed social and economic networks that have long-lasting effects. It also brings benefits to both the host and originating countries in the form of increased social and economic integration. The free movement of goods and people has also helped provide the cohesion and links needed to develop a regional identity and ensure the continued development of the European Union.

Labour mobility, which is a key contributor to long-term economic performance, is enhanced by air travel as it allows migrants to return home more often and allows friends and family to visit them in their new home. Also, once migrants return home, they have

established new social (or family) networks in their country of stay, which will be more easily maintained via air travel. Diasporas can be an important source of trade, capital, technology, and knowledge for countries of origin and destination. According to the United Nations, more than 230 million people live outside their country of birth⁷¹.

One specific way in which air travel benefits economies is by strengthening the contact between migrants and their country of origin. Labour mobility is likely to encourage migrants to send money home and even to use trips home as an opportunity to take money across borders. For some countries, particularly in the developing world, these so-called 'remittances' are an important source of revenue.

Although remittances are sometimes interpreted as a sign of large emigration from a country, with possible negative effects such as a 'brain drain', studies that attempt to look at the overall effects of remittances find that they significantly benefit the recipient economies:

- » According to the World Bank, in 2012 official remittances were up to three times the level of official development assistance flows to developing countries⁷², reaching an estimated \$401 billion⁷³.

TOURISM



Sustainable tourism revitalises Cape Verde economy

For many years, life for the 500,000 inhabitants of Cape Verde, a chain of 15 volcanic islands situated in the Atlantic Ocean 460 kilometres west of Senegal, was tough. Droughts, soil erosion, poor agricultural conditions and a lack of drinking water forced many inhabitants to earn their living abroad. Even today, more than 80% of the country's food has to be imported.

But thanks to the efforts of the hotel and aviation industries, Cape Verde's economy has been turned around in the last few years. The islands have invested in sustainable tourism projects and this has revitalised the previously fragile economy. According to an African Development Bank report in 2013, tourism and ancillary activities remained the driving force of the economy in 2012, accounting for around 30% of GDP and 90% of total exports. Tourism, the main driver for economic growth, has successfully tapped into natural resources such as biodiversity, landscape and the environment. The growth continues: in 2013 tourism revenues were up 27% over the previous year.

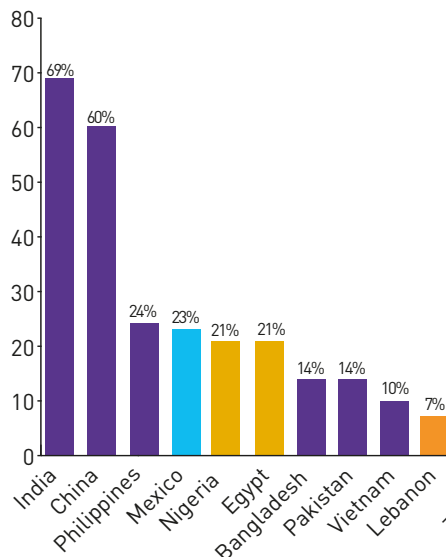
Major enhancements to Sal and Praia Airports on the largest islands, plus new airports in Boa Vista and Sao Vicente, have helped make the islands an exciting new tourist destination for visitors from America and Europe; and have allowed thousands of Cape Verdeans to stay on the islands to earn a decent wage, rather than having to travel overseas.

The islands have also become some of the global leaders in renewable energy, working towards generating at least 50% of electricity from renewable sources by 2020.

A global industry

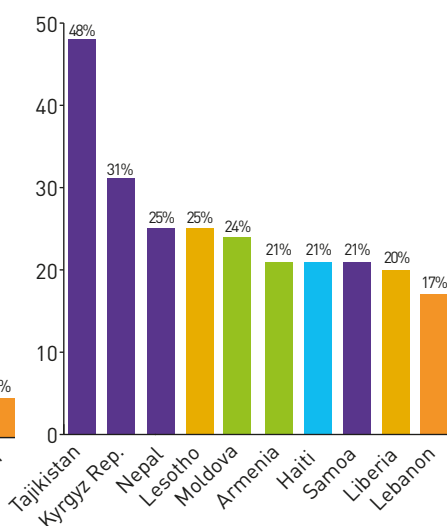
Thanks, Western Union

Top 10 countries by total remittances, 2012⁷⁵



Reliant on family

Top 10 countries by remittances as a % of GDP, 2012⁷⁷



Sign up

Pilot and technician requirements, 20-year forecast⁸⁰

Region	Pilots	Technicians
Africa	16,500	15,900
Asia-Pacific	192,300	215,300
Europe	99,700	108,200
Latin America	48,600	47,600
Middle East	40,000	53,100
North America	85,700	97,900
CIS ⁸¹	15,200	18,000
World	498,000	556,000

- » There is evidence that remittances rise during crises, natural disasters and conflicts, thereby contributing to the stability of the home economy. For instance, remittances to Indonesia rose during the 1997 Asian financial crisis⁷⁴.
- » International remittances reduce the level and depth of poverty. According to World Bank research, a 10% increase in international remittances from each individual migrant will lead to a 3.5% decline in the share of people living in poverty⁷⁵.
- » Each dollar of remittances generates \$3 or more additional economic activity as money is spent to build or improve housing, on locally produced goods or invested in equipment and small businesses⁷⁶.

Highly skilled workforce

Jobs in air transport cover a wide range of activities and skills. These include:

- » skilled work by technicians building and maintaining aircraft;
- » a diversity of technical engineering jobs from aircraft and engine design to component production;
- » air traffic control and airspace design planning;
- » logistics for airlines and airports;
- » complex information technology systems on board aircraft and in areas such as baggage handling systems design;
- » service industry support jobs such as chefs in catering companies;
- » creative positions in design and marketing;
- » customer services occupations in airline ticketing, check-in, cabin crew and retail;
- » manual labour on airfields;
- » air traffic controllers and pilots;
- » emergency response personnel at airports; and
- » leadership, management and executive roles.

As this list indicates, many roles in the air transport sector require a highly qualified workforce and a significant amount of training. Value-added per employee in the air transport sector (direct employees, excluding non-airside activity at airports) generates 3.6 times as much value-added per employee than the economy as a whole – indicating a more productive workforce. This is particularly true for the large populations of Asia-Pacific, Africa and Latin America. In addition, growth in the aerospace sector is helping to drive innovation and skills development in

countries that have not normally been associated with aircraft manufacturing.

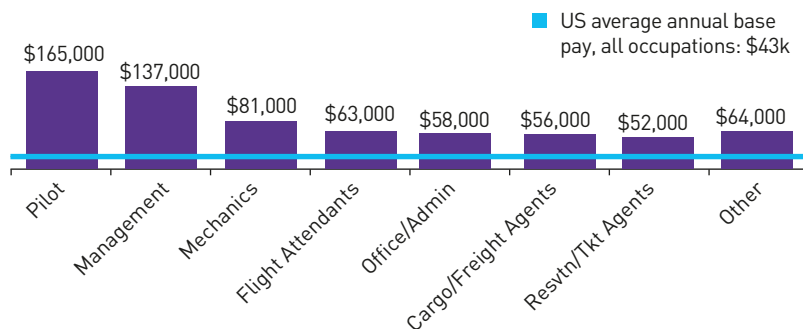
Such investment by companies across the world is vital to help grow the industry, as well as for customer service. For example, aircraft engine maker CFM International must support an ever-growing fleet that today includes more than 26,000 engines delivered to airlines and the company has invested in training locations around the world. Just in China, the Aircraft Engine Maintenance Training Center, Guanghan City, has trained more than 10,000 mechanics since it opened in 1996. Through this school, CFM not only supports a highly skilled Chinese workforce enhancing the country's aviation safety, but also demonstrates that sustainability goes beyond just products and technology.

CFM also provides a showcase with Sichuan Services Aero Engines Maintenance Company (based in Chengdu, China) a world-class engine overhaul facility, in partnership with Air China, on how an aircraft engine business can be a catalyst for global growth. In addition to a highly skilled 300-person workforce, the facility also supports a network of Chinese sub-contractors.

With the projected growth in air traffic and in order to replace industry professionals retiring over the next decades, there will be

Getting paid

Wages and benefits for USA scheduled airlines, 2011⁷⁸



a need to recruit and train thousands of new staff for jobs across the sector. Whilst some on-airport occupations are not specialist aviation jobs (such as retail), there are a number of positions across the sector that require skill sets specific to aviation. Airports Council International (ACI) is working with the International Air Transport Association (IATA) and International Civil Aviation Organization (ICAO), as well as a number of universities to build professional skills in the industry. Importantly, through the ACI Fund and Developing Nations Airports Assistance Programme, they are also working on developing skills in emerging economies, training over 1,500 staff members who can pass on those skills to colleagues at their home airports⁷⁹.

Airlines project a need for more staff, particularly in highly skilled roles such as pilots and maintenance technicians. Civil aerospace companies are working to develop science, technology, engineering and maths skills in the education system, as they forecast a need for the future engineers and designers of aircraft.

As part of an investment drive in education in Brazil, aircraft maker Embraer's specialist Education and Research Institute inaugurated a new unit of the Embraer High School in

2013, a model school focused on academic excellence for students coming from the public school system. In 2014, the second class of 120 students entered the school, totalling 240 students during this second successful year of operation. The Colégio Embraer – Casimiro Montenegro Filho Unit was built in the city of Botucatu, where Embraer also has a plant in Brazil. The new school, with a \$2.5 million investment from Embraer, functions like the first unit in São José dos Campos, which has already graduated 2000 students since its inception in 2002 and has remained among the best in São Paulo state rankings. The school's pupils have regularly achieved 100% approval in Brazilian college entrance exams, with more than 80% of them going to top ranking public universities.

A lifeline to communities

For areas of the world with non-existent or poor road infrastructure, aviation is the community's lifeline. In the Russian, Canadian and Scandinavian far north, and in many other remote communities and small islands, access to the rest of the world and to essential services such as health care is often only possible by air.

Over 1,000 communities in northern Russia are inaccessible by road; the number

AID LIFELINES



Aviation community supports Typhoon Haiyan victims

When Typhoon Haiyan hit the central Philippine islands in November 2013, almost 13 million people's lives were changed overnight. Vast quantities of emergency supplies were urgently needed in locations which were cut off from land links or scattered across some of the country's 7,100 islands.

Some things only aviation can do. The United Nations maintains a network of Humanitarian Response Depots with a global hub at Dubai International Airport and regional hubs around the world, including Subang in Malaysia. Within a few days, more than 1,000 tonnes of relief and support supplies – tents, kits for newborn babies, hygiene kits and mobile storage units – had been flown to the Philippines by the World Food Programme from Dubai, Malaysia and Italy.

Meanwhile the global aviation community also moved quickly to support the relief effort.

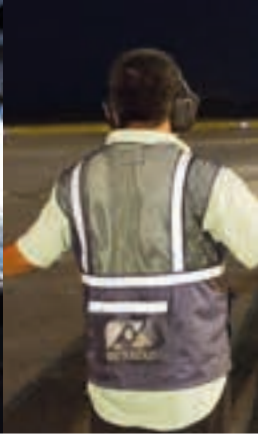
Japan Airlines made an immediate \$100,000 donation and provided free transport of relief goods and aid personnel from Japan to Philippines. Air Asia too provided free flights for relief workers. FedEx flew tonnes of supplies on its freighter aircraft. British Airways sent a 747 full of aid to the area. United Airlines set up a partnership with AmeriCares, American Red Cross and Operation USA, offering an immediate donation and a one-time mileage bonus to airline customers who donated to the relief.

The Airbus Corporate Foundation organised a series of relief flights from Toulouse. One of these, a mission with Philippine Airlines, used the delivery flight of the airline's new aircraft, loaded with 19 tonnes of water sanitation equipment and food from Action Contre la Faim.

After the hurricane, Philippines Airlines partnered with Boeing and World Vision to ferry 18,000 kilograms of tarpaulins and rope on a 777-300ER delivery flight from Seattle to the Philippines. The supplies, including 69 kilometres of rope and 3,000 tarpaulins, filled about 75% of the cargo hold on the aircraft.

A global industry

An economic engine...



...that supports social development





Apprenticeship scheme captures young talent

British Airways (BA) recruits between 120 and 200 apprentices each year and over the coming decade plans for 1,400 new young apprentices to join the airline. Through the scheme, BA offers apprentices the opportunity to be paid to work while gaining and refining the essential skills they need to launch their careers. Apprentices enter disciplines such as engineering, business support, world cargo, operations, financial services, information technology, project management and at the head office, gaining nationally-recognised qualifications and workplace training in a dynamic and challenging industrial environment.

In 2012, a total of 120 apprentices entered the engineering industrial programme, a three year apprenticeship which is run in conjunction with four colleges – Brooklands, Farnborough, Kingston and Uxbridge. The first year, in full-time college, is spent gaining theoretical and practical skills in aircraft maintenance, with four weeks experience at Heathrow. Fixed term contracts are then awarded to successful applicants, in which they will work four days a week at Heathrow and spend one day per week in continuing college work.

In partnership with Uxbridge College, BA launched two IT apprenticeship courses in 2012, one in software engineering and a second in IT operations, aimed at finding 'the IT talent of the future'.

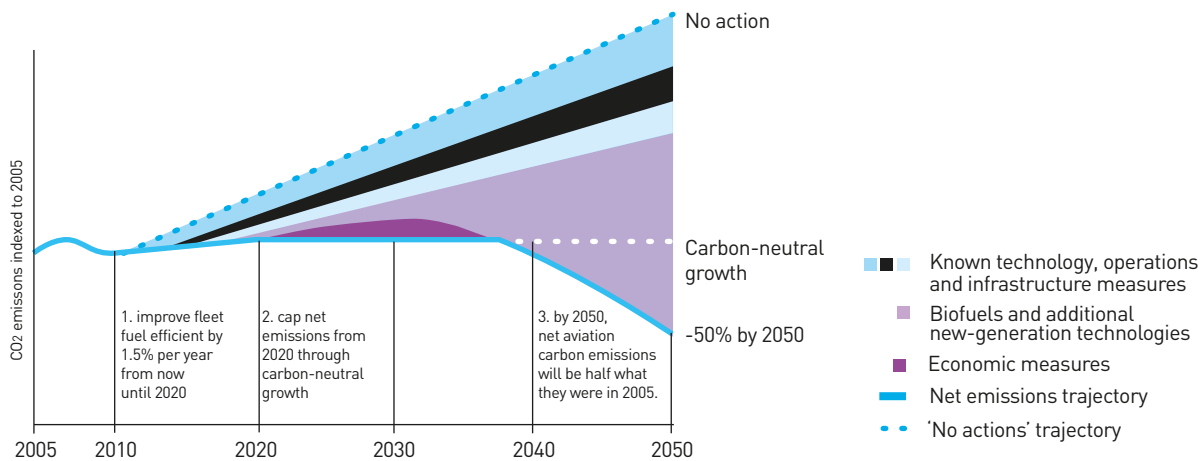
In addition to the apprenticeship initiative, BA's Community Investment Team has welcomed more than 80,000 local school children through its Community Learning Centre. The centre helps to prepare children for the workplace in many ways, including language training, developing customer service, IT skills, general workplace behaviours and an understanding of the environment.



A global industry

Planning ahead

Mapping out the industry commitments



in Alaska is more than 200. Throughout Norway, thanks to an extensive network of regional airports and airline services, 99.5% of the remote population is able to travel to Oslo and back on the same day; around 400,000 patients are transported annually on scheduled flights between their homes and hospitals. Small island states across the world rely on air transport to do business, connect to education and healthcare and provide access beyond the sporadic and infrequent boat services that would otherwise be their only connection with the world. In countries such as Indonesia, spread across 6,000 inhabited islands, air transport is relied upon for contact between communities and business links.

Helping in times of need

Aviation's speed and reliability is perhaps most immediately apparent during times of natural or humanitarian emergency. Air services play an essential role in assistance to regions facing natural disasters, famine and war. They are particularly important in situations where access is a problem, delivering aid, search and rescue services and medical supplies. Whilst some of these efforts are undertaken by military or specialist air services, a great deal of the

support is provided by the commercial air transport system. Airports become staging points for rescuers and relief supplies, cargo deliveries and refugee transfers. Airlines also assist with the evacuation of people stranded by natural disasters.

Environmental leadership

Sustainable growth calls for us to meet today's needs without depleting the resources needed for future generations, or causing undue environmental degradation. The industry is conscious of aviation's environmental impacts and its contribution to climate change. Efforts to minimise these play an important role in aircraft design and engine manufacturing. Furthermore, every aspect of current operations both in the air and on the ground is being examined to see how the industry can be made cleaner, quieter and more carbon-efficient.

Airline operations produced 689 million tonnes of carbon dioxide in 2012 (and 705 million tonnes in 2013⁸²), 2% of the total human carbon emissions of over 36 billion tonnes⁸³. Around 80% of all aviation emissions are from flights over 1,500 kilometres, for which there is no

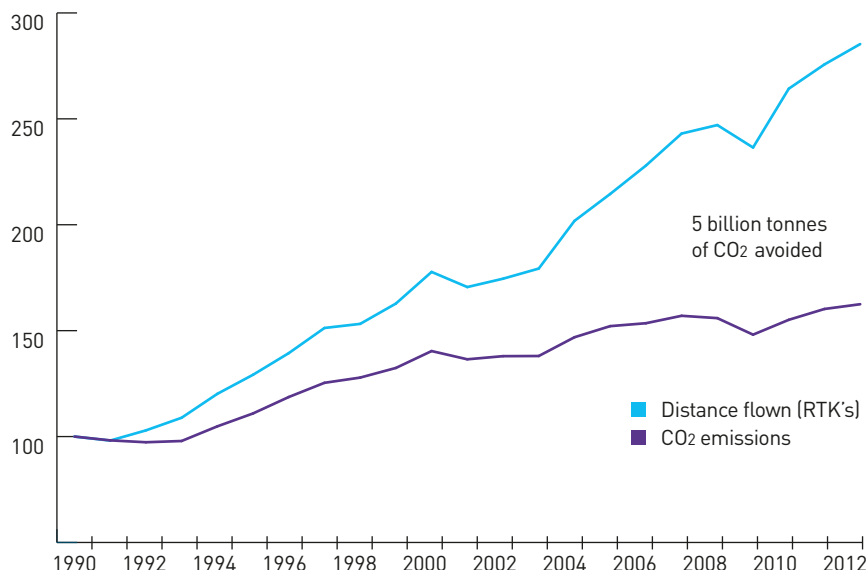
practical alternative transport mode. All industries, governments and individuals have a responsibility to reduce their carbon output and with aviation, the incentive is two-fold. Not only can aviation reduce its environmental footprint, but with airlines spending \$210 billion on fuel in 2012 (31% of an airline's operating cost⁸⁴), the industry has a very good reason to reduce fuel consumption and has very aggressive programmes in place to do just that.

It was with confidence that the aviation industry collectively agreed in 2008 to the world's first set of sector-specific climate change targets. The industry is already delivering on the first target – to continue to improve fleet fuel efficiency by an average of 1.5% per year until 2020. From 2020, aviation will cap its net carbon emissions while air traffic continues to grow to meet the needs of passengers and economies. By 2050, the industry has committed to reduce its net carbon footprint to 50% below what it was in 2005.

These targets will be reached using a range of different efficiency opportunities and by working collaboratively with the support of governments. The industry has a collective four pillar strategy for reducing its climate change impact:

Widening gap

Efficiency increases in air transport, indexed to 1990⁸⁴



01 Technology

Air travel has always relied on advances in efficiency. The very nature of flight dictates that aircraft must be as light as possible; and fuel is heavy. Airline economics dictate that costs have to be reduced; and fuel is expensive. Since the beginning of the jet age, aircraft have reduced fuel use per passenger kilometre by well over 70% and these efforts continue. In fact, compared to those first jets, aircraft can now either carry two and a half times as many passengers or fly two and a half times further for the same aircraft take-off weight. Of the estimated \$20 billion spent each year on research by aircraft and engine manufacturers⁸⁵, more than 70% is used for measures that will improve fuel efficiency.

This research and technology includes new aircraft construction materials, aerodynamic components and new airframe designs. These efforts are most dramatically displayed in the step-change improvements made when new generations of aircraft enter service – typically each new aircraft is between 15% and 25% more fuel-efficient than the model it replaces. Airframe manufacturers are currently at a peak of new aircraft model introductions, working with engine makers to deliver new ultra-efficient models such as the Boeing 787 Dreamliner and 747-8, Bombardier CSeries,

ATR600, Embraer E2-Jet and Airbus A380 and A350 XWB already, or due to enter service in the next few years.

But it is not just brand new models that can reduce fuel burn – aircraft types in service already are routinely modified to increase efficiency. The two largest aircraft manufacturers have model upgrades due to enter service, with Airbus' A320neo and Boeing's 737 MAX set to provide further step-changes in performance. In March 2014, Embraer rolled out the first E175 aircraft featuring a range of aerodynamic improvements that reduce fuel burn compared to the previous production aircraft. The modifications include the introduction of new wingtips, systems optimisation and streamlining of aerodynamic surfaces. The modified E175 aircraft recorded impressive results during several months of performance trials, with fuel consumption on a typical flight 6.4% lower than the original E175.

Sustainable alternative fuels

The industry is also making significant progress to develop sustainable alternative fuels for aviation. From a virtual dream in 2007, to regulatory approval being granted for passenger flights in 2011, the development of alternative aviation fuels has shown

TRADE



Airlines – key links in the pharmaceutical supply chain

For the global pharmaceutical industry, transporting vaccines and medicines to where they are needed is a delicate process. Many drugs, particularly life-saving vaccines, need to be used quickly and transported in a strict temperature-controlled environment. In fact, over \$250-billion worth of temperature-sensitive medicine is sold each year.

According to the Seabury Group, 0.5 million tonnes of pharmaceutical products are transported by air every year – against 3.5 million tonnes by sea. But the value of this air freight is around \$213 billion against the \$56 billion value of sea freight – and it is increasing every year by around 6% a year.

Aviation is often the only choice to deliver these supplies where they are needed. The World Health Organisation (WHO) estimates that over 20 million children are under-vaccinated and remain at risk of being infected by vaccine-preventable diseases, but by 2015, some 4-5 million child deaths a year will be prevented by immunisation programmes.

According to WHO in its Global Vaccine Action Plan 2011–2020: As new vaccines (for example, against dengue and malaria) become available and underutilised vaccines (for example, those against cholera, human papillomavirus, rabies, rotavirus, rubella and typhoid) are administered more widely, supply and logistics systems – already burdened – will face an even greater need for innovations.

Cargo airlines and logistics companies continue to invest heavily in temperature-controlled air-freight depots at airports so these life-saving vaccines and medicines can be sped swiftly to the point of greatest need.

A global industry

remarkable progress in recent years. Over 1,500 passenger flights have taken place so far and the consensus is that the lifecycle carbon saving from moving to alternative fuels could be up to 80% over that of traditional jet fuel.

The types of feedstock being investigated for alternative aviation fuels include non-food crops that can be grown in areas which do not impact food crops or water use, innovative use of by-products such as household waste, excess gases from industrial processes and the waste from agriculture and forestry, and micro-algae. The aviation industry took careful note of the negative impacts that came about when the first generation of biofuels was deployed in road transport, and is determined not to repeat those mistakes.

The major challenge now remains the production of large quantities of sustainably-produced alternative fuels at a commercially-competitive cost to airlines. Current prices indicate these cost around three times as much as conventional jet fuel. This is expected to fall as production capacity is increased beyond the current small-scale projects.

02 Operations

Those aircraft already in the fleet can also be made more efficient as new technologies and materials are developed. Adding wing tip devices to the end of an aircraft's wings has saved over 15 billion litres of jet fuel so far, with the devices being retro-fitted to over 5,000 aircraft⁸⁶. New generations of winglet – the 'split scimitar'⁸⁷ from Aviation Partners Boeing and the 'sharklet'⁸⁸ from Airbus – have between them sold over 2,500 pairs for installation on new aircraft. On one airline alone, the introduction of these devices is expected to reduce emissions by 645,000 tonnes of CO₂⁸⁹.

Another area providing significant savings is weight reduction through new cabin configurations, lightweight seats and new equipment. By replacing its cargo containers with new lightweight versions, one South American airline will cut CO₂ emissions by 10,000 tonnes a year⁹⁰. At least eight airlines

have given their pilots iPads which can replace heavy paper charts. On one airline alone, this will reduce emissions by 3,600 tonnes a year⁹¹.

A number of airports and airlines are trialling the use of 'green departures', allowing pilots to take-off and climb to the optimal cruising altitude in one smooth, continuous ascent. This is in contrast to the traditional method of climbing to the cruising altitude in several steps. By using this new departure method at Copenhagen Airport, some 10,000 tonnes of fuel and 32,000 tonnes of CO₂ were saved in one year alone⁹². And airlines are also working on new procedures for moving aircraft on the ground – either taxiing to the runway on one engine, or utilising new devices to drive the aircraft using electric power, rather than engine power.

New fuel-saving procedures for approach routes into airports are being trialled, especially continuous descent operations (CDO), where an aircraft undertakes a gradual, continuous, approach with minimum thrust – rather than via the conventional series of stepped descents. Savings of up to 150,000 tonnes of fuel a year, or 500,000 tonnes of CO₂, could be made in Europe alone if CDO approaches were more widely adopted⁹³. The noise footprint of a CDO is also smaller than conventional approach procedures.

03 Infrastructure

The next generation of air traffic management (ATM) network-enabled technologies are based on the Single European Sky ATM Research programme (SESAR) in Europe and the Next Generation Air Transportation System (NextGen) programme in the USA. They will impose efficiency by maturing and implementing ATM technologies and procedures.

Satellite-based and on-board precision navigation systems allow air navigation providers to re-design airspace and procedures. These allow aircraft to fly optimal fuel- and time-saving routes, no longer needing to zig-zag over land-based navigational aids into and out of airports.

These new departure and arrival routes have reduced departure delays by more than 2.5 minutes per flight at Atlanta Hartsfield Airport⁹⁴ since their introduction. Annual fuel savings are estimated at \$34 million, with cumulative savings of \$105 million from 2006 through 2008⁹⁵.

The €2.1 billion⁹⁶ investment in the Single European Sky could deliver a 12% reduction⁹⁷ in environmental impact alone as it saves between 8 and 14 minutes of flight time, 300-500 kilograms of fuel, and 948-1,575 kilograms of CO₂ per flight⁹⁸. The USA's Federal Aviation Administration (FAA) estimates that NextGen will reduce delays by 35-40% in 2018 compared with today's systems⁹⁹. And every minute of delay saved also means a reduction in fuel use. SESAR and NextGen will enable air traffic control to evolve further, freeing the aircraft to fly at its most efficient profile possible while achieving new levels of safety in the air and on the ground.

By working together with airlines, airports and manufacturers, air navigation service providers are developing common procedures to ensure aircraft are flying the most efficient route through take-off, cruise and landing. As part of the SESAR programme, a project called TOPFLIGHT has demonstrated that using all the tools available to ANSPs, including continuous climb and flexible airspace, can save around half a tonne of CO₂ per flight¹⁰⁰. On the same routes, Canadian ANSP NavCanada has recently launched a joint venture with satellite provider Iridium to use data signals for surveillance of flights over the busy North Atlantic. This will be a major step in allowing more active management of this airspace which sees 1,200 flights a day, with NavCanada estimating savings of some 328,000 tonnes of CO₂ annually, through being able to use the most optimal routes and altitudes¹⁰¹.

Flexible routes can also be deployed, allowing pilots and airline operations teams to take advantage of the very latest weather



and wind data to plot the most efficient flight path, sometimes altering course mid-flight to save even more fuel. The iFlex project led by IATA reduced flight-time by up to 17 minutes when deployed on the Atlanta to Johannesburg route, saving up to seven tonnes of CO₂ per flight.

The challenge now is to take the results of these various projects and make them an everyday occurrence across the network.

04 Market-based measures

Despite progress by the industry on reducing its emissions through the first three pillars, they will not be sufficient to meet the goal of carbon-neutral growth from 2020. Therefore, at least for a period of time, there will be a need to turn to a market-based measure to meet that cap on aviation's CO₂ emissions. The industry has argued since 2008 that any market-based measure for air transport must be global in scope, to reflect the global nature of the industry.

The standard approach for dealing with greenhouse gas emissions from most parts of the global economy is enshrined in the United Nations Framework Convention on

Climate Change (UNFCCC)¹⁰², of which the Kyoto Protocol is a subsidiary mechanism. The Kyoto Protocol provided for limits on emissions to be placed on the developed world, while the developing world is not subject to such restrictions, in order for these economies to develop. This approach, known as common but differentiated responsibilities, is not the most appropriate treatment for a global and homogenous industry such as aviation, where airlines compete on the same routes using the same equipment. Different approaches applied to different carriers could very quickly lead to market distortion and a lack of environmental integrity.

The industry has been urging governments to back the industry plan for reducing emissions and to agree to develop a single, global market-based measure for the aviation sector. At the 38th ICAO Assembly in 2013, despite political challenges, the industry's suggestion was taken up and agreement was reached amongst governments to develop a global measure, to be settled at the next ICAO Assembly in 2016 and be ready for implementation from

ENVIRONMENT



Running on green

It may not grab the headlines as much the announcement of a new aircraft but 'the electric green' aircraft taxiing system under development by Honeywell and Safran will significantly improve an airline's operational efficiency by reducing fuel and other taxi related costs, while providing environmental benefits by slashing the carbon and other emissions created during taxi operations.

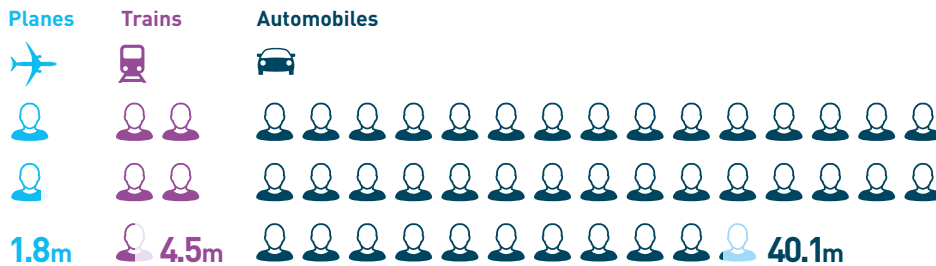
The two companies have set up a joint venture, EGTS International, to develop an autonomous electric pushback and taxiing system for the Airbus A320 family of aircraft. The new company has signed an agreement with aircraft maker to offer the new system as the 'eTaxi' option on the aircraft. e-Taxi would allow the aircraft's pilots to push-back from the gate without a tug, taxi-out to the runway and return to the gate after landing without operating the main engines, using the aircraft's auxiliary power unit to power electric motors fitted to the main landing gear wheels.

By fitting this new system aircraft operators will cut their fuel bill — and CO₂ emissions — by up to 4% per trip and speed up airport operations, according to EGTS International, as they will no longer have to rely on pushback tractors to move the aircraft from the airport terminal gate on to the taxiways. Taxiing-related carbon and nitrogen oxide emissions will be cut by more than half. Pilots will keep full control of their aircraft's speed and direction during taxi operations.

A global industry

Planes, trains and automobiles

Population exposed to noise above 50dB at night in Europe (in millions), by source¹⁰⁸



2020¹⁰³. The work to design such a scheme is now taking place through the ICAO process.

These advances in environmental performance illustrate the concerted efforts the aviation industry is making to reduce its environmental impact in the skies. However, it is also important to recognise the progress made on the ground.

Energy-efficient terminal building design often takes advantage of sophisticated environmental control technology to regulate lighting, cooling and heating within the airport. Most new airports are built using LEED certification¹⁰⁴ and a number of airports have installed on-site renewable energy sources such as wind turbines, photovoltaic panels and ground heat pumps. The solar panels being installed at Kuala Lumpur International Airport will cut CO₂ emissions by 18,000 tonnes per year¹⁰⁵. As major transportation hubs, many airports also have significant intermodal transport exchanges. Heathrow Airport in London, for example, has extensive public transport links, with over 40% of passengers arriving by public transport¹⁰⁶. Many airports also encourage on-airport staff to either take public transport or have organised carpooling schemes.

A large number of airports now provide fixed electrical ground power units. These plug the aircraft directly into the mains power so they do not use fuel to run on-board systems such as air conditioning while sitting at the airport gate. At Zurich Airport alone, installing these units on 50 gates has resulted in 33,000 tonnes of CO₂ reduced annually. Furthermore, many airports are

taking advantage of hybrid, natural gas or electric vehicles for use by ground crews.

Noise

Modern jet aircraft are 75% quieter than the first models and each new generation continues this downward trend. While each new model has reduced its noise footprint significantly, the number of aircraft movements has grown and the sensitivity of people living under flight paths to perceived noise has also increased. However, according to the FAA, the number of people negatively impacted by aircraft noise in the United States decreased from seven million in 1975 to fewer than 300,000 in 2009, despite the volume of flights more than doubling during that time¹⁰⁷. This trend is being replicated around the world: not only do aircraft get quieter, but airports and air traffic controllers work to provide operational noise mitigation measures and local governments work with the aviation industry to more appropriately zone areas around airports. It should also be remembered that air transport is not the only source of noise for communities. In a 2011 study in the European Union, it was found that both road transport and rail have significantly larger impacts from a noise perspective, despite not receiving as much political or media attention¹⁰⁸.

The manufacturing and construction process

Aircraft and engine factories are large industrial sites dealing with materials and

processes that require specialist handling, both in production and as waste. Those companies operating in civil aerospace around the world are showing industrial leadership, with many of them exceeding best practice in the manufacturing process. Importantly, a number are also insisting on such standards throughout the production supply chain as well.

Engine maker Pratt & Whitney has launched aggressive goals to further improve the sustainability of its factories, suppliers and products by 2025. The goals, backed with an investment of \$60 million in more than 800 environmental projects, focus on waste, energy, water, safety and wellness, materials, suppliers and products. By 2025, Pratt & Whitney aims to have zero waste in its factories, with 100% of waste recycled. Energy use will be optimised and there will be a reduction of greenhouse gases by 80% (greenhouse gases have already been reduced by 30% in factories). The company is aiming for no water waste and a reduction of water consumption by 80%. In terms of safety, the goal is for employees to be injury-free and have best-in-class wellness programmes. Pratt & Whitney engines will be 100% recyclable at the end of their life. And suppliers will have world class safety rates, meet aggressive resource conservation targets and be 100% green certified.

Boeing and aluminium supplier Kaiser have recently announced the instigation of a closed-loop recycling system for aluminium, which will see around ten million kilograms of offcut and scrap metal a year being re-



used in the industry – the largest such scheme of its type¹⁰⁹. A five-year environment audit has revealed that Boeing reduced hazardous waste by 18%, CO₂ by 9%, energy-use by 3% and water intake by 2%, all despite employing 13,000 more people and opening a major manufacturing facility. In 2012, 79% of the solid waste Boeing generated was diverted from landfills – a 36% improvement since 2007¹¹⁰.

In January 2007, Airbus became the first aerospace enterprise to receive ISO14001 environmental certification covering all of the company's production sites, products and services throughout a lifecycle approach¹¹¹. The Airbus blue5 initiative has a set of stringent targets for the company's manufacturing sites around the world to meet by 2020. In 2012, the programme had already resulted in, among other things, a 29.7% reduction in energy consumption; 43.3% reduction in water consumption; 46.2% reduction in non-recycled waste production; and a 34.2% reduction in CO₂.

End-of-life

An aircraft will typically remain in service for around 20-25 years. During that time, it will fly on average 40,274,144 kilometres – over 1,000 times around the world – with some long-haul aircraft flying over 100 million kilometres, for several airlines¹¹². Once it reaches the end of its useful life, an aircraft can be recycled not only to ensure proper disposal but also to take advantage of the many high-quality components and materials of which they are made.

The Aircraft Fleet Recycling Association¹¹³ is working with 72 companies such as manufacturers of aircraft and engines, component suppliers and operators, to establish best practice guidelines for the disposal and recycling of aircraft. These organisations recycle over 150 aircraft and 30,000 tonnes of aluminium a year. Manufacturers are also ensuring that new aircraft are designed not only for a long, safe and efficient life, but also for end-of-life opportunities. The Airbus PAMELA project, begun in 2005, demonstrated that more than 70% of the weight of an aircraft can be re-used or recovered¹¹⁴. This project led to the creation of Tarmac Aerosave with partners including Safran. This company specialises in recycling aircraft and is now able to re-use and recover materials making up over 90% of an aircraft's weight.

New materials such as carbon fibre present new challenges for aircraft designers to find ways of dealing with the materials once the product leaves service. Processes are being developed to allow these new materials to be recovered and potentially recycled once the aircraft reaches the end of its useful lifespan.

ENVIRONMENT



Powering biofuel research down under

Australia has become one of the world's most important centres for biofuel research and a new organisation, the Australian Initiative for Sustainable Aviation Fuels (AISAF), aims to develop partnerships in order to build commercial supply chains for sustainable aviation fuels in Australia and internationally.

A May 2011 study concluded that there will be sufficient biomass to support almost 46% of the aviation fuel needs of both Australia and New Zealand by 2020 and over 100% of fuel needs by 2050. AISAF is helping to make that a possibility.

On 13 April 2012, Qantas operated Australia's first commercial flight powered by sustainable aviation fuel. An Airbus A330 flew from Sydney to Adelaide powered with a 50:50 blend of biofuel and conventional jet fuel in one engine. Derived from used cooking oil, provided by SkyNRG, the life cycle carbon footprint of the biofuel component of the blend was approximately 60% smaller than that of conventional jet fuel.

Meanwhile, Virgin Australia has supported a University of Queensland project to undertake a detailed analysis of a potential Queensland-based renewable jet fuel industry from three distinct biomass sources – sugar cane, pongamia, and algae.

Both airlines are also members of the Sustainable Aviation Fuel Users Group, a global consortium of airlines pledged to develop sustainable aviation that will perform as well as, or better than, traditional fossil fuel jet kerosene but with a smaller carbon lifecycle. Other commitments are to use only biomass feedstock sources that minimise biodiversity impacts, requiring minimal land, water, and energy to produce; not to compromise food security; jeopardise drinking water supplies; and provide socio-economic value to local communities where biomass is grown.

A global industry

Environmental leadership





ENVIRONMENT



Investment in recycling engine parts pays off

Aircraft engine maker Rolls-Royce has developed a recycling programme now operating at over 100 locations worldwide to recover and recycle exotic materials. The Revert programme ensures that valuable material from waste products can be used safely in the manufacture of new parts.

The company uses over 20,000 tonnes of exotic aerospace alloys every year in its manufacturing processes, including hafnium, rhenium, tantalum and titanium. The global supply of such metals is finite. It therefore makes good business sense, as well as environmental good-practice, to recycle as much as possible.

Over the past decade, the company has developed processes to remove coatings, separate alloys and clean the waste metal. Unserviceable engine parts and waste metal from machining titanium are recovered and reused. Rhenium alloys from used turbine blades are re-melted. Almost half of a used engine can now be recycled and the quality of the recovered material is now so high that the metals can be safely used again to make a new engine.

The end result is a reduction in the need for raw materials and a measurable reduced impact on the environment from the production process. The Revert programme saves the company 20,000 MWh of energy per year — enough to power 1.8 million homes for a day. This reduces CO₂ emissions by 9,000 tonnes a year — the equivalent carbon footprint of a car circumnavigating the planet 1,500 times.

Rolls-Royce has partnered with waste-metal processing specialist SOS Metals, which has established itself close to Rolls-Royce's manufacturing plants near Derby in the United Kingdom, creating new jobs and further growth opportunities.

Love from above: the soft power of aviation



Essay by Jonathan McClory

Never before has the ability of a government to attract and engage with international audiences been so important to its prosperity, security, and international influence.

Governments today – whether national, regional, or municipal – face an increasingly challenging global context as unprecedented shifts in power and technology reshape the determinants of success in tourism, trade, investment, and foreign policy.

For savvy governments, the response to this shift has been to build up and leverage their ‘soft power’, effectively using the power of attraction to meet major economic and political objectives. This means nations need to have a strong global brand. Importantly, this is not just about glossy PR campaigns, but what countries do, how they contribute to the global common good, and the opportunities they offer to the rest of the world. While it may not seem immediately obvious, aviation is a crucial source of soft power for nations. Well-run national carriers can lift global perceptions of their home country, but more broadly, aviation is a great facilitator of soft power, closing distances and connecting people, cultures, companies, ideas, innovation,

and opportunity.

As a concept firmly rooted in foreign policy studies, ‘soft power’ has made a swift transition from university lecture halls to the corridors of power. In the last few years the term has come to populate news stories, fill op-ed pages, feature in the speeches of world leaders, and dominate foreign ministry strategy papers. This sudden rush of enthusiasm for soft power, however, has managed to erode some of the original clarity of concept.

‘Soft power’ was first coined in 1990 by Harvard professor Joseph Nye. Nye used the term to describe the ability of a country to use attraction and persuasion in the pursuit of foreign policy objectives, as opposed to offering payments or deploying force. In short, soft power is the ability to get others to want what you want via the pull of attraction and admiration. While often used in the context of high-level statecraft, soft power also has huge implications for foreign direct investment, tourism, trade, and even access to increasingly mobile global talent.

The growing interest in soft power stems from the need for governments to develop suitable responses to a rapidly changing world, shifting as a result of four primary factors. The first factor is the diffusion of power, which is

happening on two fronts. Power is moving between states as the global centre of power drifts from west to east. At the same time, power is shifting away from states altogether, as non-state actors play an increasingly significant role in world affairs.

The second factor is the communications and IT revolution. The speed with which information is disseminated throughout the globe and the subsequent democratisation of access to that information creates a more informed – and increasingly activist – global public. The rapid movement and availability of information has made individuals better informed and more powerful than at any point in history.

The third factor is the rise in international networks. The proliferation of new channels of information and platforms for engagement mean that transnational networks can spring up in a matter of hours. These networks are mobilised across a diverse set of issues from broad political movements to single transnational issues like climate change or disarmament.

The final factor, which is linked to the second and third, has been difficult for many governments to accept: propaganda is dead. Governments no longer have the luxury of

An expanding and advancing aviation industry yields benefits that are shared globally.

saying one thing and doing another. With easy access to instant information, global publics are smarter, more engaged, and likely to dismiss propaganda when they see it.

As a result of these shifts and the subsequent challenges they present, soft power has become a critical tool for governments looking to assert themselves internationally. However, recognising the importance of soft power is easy, using it is not. Any attempt to use soft power must begin by answering the question ‘what soft power do we actually have?’

Indeed, the first step for governments hoping to deploy soft power is measuring it. Without a clear account of the ‘soft power resources’ at a government’s disposal – including where those resources will be most effective – they cannot hope to use it effectively. Putting soft power into practice is still very much in the early stages of development. Moreover, the growing enthusiasm for the concept betrays most governments’ ability to use it.

In 2010, the Institute for Government (IfG), working in collaboration with Monocle magazine, set out to address the soft power measurement challenge for the first time, creating a composite index that ranks countries according to their soft power. The IfG-Monocle Soft Power Index comprises over 50 metrics assessing countries according to their values, government, diplomacy, culture, education, business friendliness, and capacity for innovation.

Aviation features prominently in the IfG-Monocle Soft Power index, and with good reason. The index includes metrics like ‘annual number of international tourists’, ‘average tourist spending’, ‘number of international students’, and ‘quality of national air carrier’. Aviation also has an indirect influence on

much of the index as most of the metrics relate to or rely on seamless global connectivity in some way.

The value of connectivity is illustrated in the Flight Connectedness Index (FCI), a research product compiled using flight data from IATA. The FCI ranks countries according to the number of commercial international flight routes, gauging the international connectivity of 190 countries. Looking at the most recent results of the IfG-Monocle Soft Power Index, the rankings are strikingly similar: Germany, UK, USA, and France all feature in the top five of both the FCI and the IfG-Monocle Soft Power Index. Of course, correlation is not causation, but the above rankings would suggest that connected countries are influential countries.

In addition to the benefits of greater connectivity air carriers provide the countries they serve, they also make a significant impact on their nation’s soft power. For many tourists, business travellers, or visiting dignitaries to a destination, a national airline will be responsible for passengers’ first impressions of the eventual destination.

As unofficial ambassadors, national carriers – even those like British Airways that operate independently of government control – play a significant role in contributing to the international reputation of their home country. While this fact has certainly escaped some carriers and their patron governments, there are a number of airlines that have

Rank	Flight Connectedness Index	Soft Power Index
1	Germany	Germany
2	France	UK
3	UK	USA
4	USA	France
5	Italy / Netherlands	Japan

embraced their ambassadorial role. Singapore Airlines stands out as a carrier that brilliantly reflects the culture, values, and ambitions of

its country – seen in the diversity of its staff, the cuisine, a welcoming service, pristine equipment, and highly efficient service. As a result, Singapore Airlines is a valuable soft power asset for the internationally minded Asian city-state.

Like Singapore Airlines, Emirates and Qatar Airways have been part of a government strategy to boost awareness, recognition, and even admiration for their respective countries, the United Arab Emirates and Qatar. Putting an emphasis on quality of service, and an expanding international route map, both airlines have helped develop the soft power of Qatar and the United Arab Emirates.

But perhaps the most impressive use of a national carrier as an instrument of soft power is found in Turkey. The Turkish government has been pursuing a soft power approach to foreign affairs under Prime Minister Erdoğan, and Turkish Airways has been a pillar of the country’s strategy to improve relations and build new ties across the world. Backed by public investment, Turkish Airlines now flies to more countries than any other carrier – 197 destinations in 104 countries. Expanding Turkish Airlines network and delivering a highly regarded service has been an astute soft power play by the country’s government. The expansion of Turkey’s national carrier has lifted the overall brand awareness of the country as a whole and generated new opportunities for prosperity and influence through an expanding network of international flight routes.

Individually, high-performing national carriers provide a boost to the soft power of their respective countries of origin. But taken in aggregate, an expanding and advancing aviation industry yields benefits that are shared globally. Economically, the new opportunities for international business links, trade, and face-to-face sharing of ideas help generate greater global prosperity. For students, the chance to study in another country, explore new ideas, and build lasting relationships ultimately leads to better understanding between nations and cultures. The expansion of international tourism too, has positive ripple effects for world culture and even international relations.

Love from above: the soft power of aviation



Diplomacy itself – where soft power is put into action – has been transformed by aviation. Henry Kissinger demonstrated the power of face-to-face negotiation when he ushered in the era of ‘shuttle diplomacy’. Flying constantly to meet with all sides, Kissinger helped bring an end to the crisis of the 1973 Yom Kippur war. More recently, in visiting 112 countries during her tenure as Secretary of State, Hillary Clinton showed that even in a digital world, nothing trumps a handshake. Globally, the number of summits, conferences, trade talks, and negotiations has ballooned over the years. The progress made during such meetings would be impossible without bringing key parties together for face-to-face discussions. Indeed a more efficient aviation industry makes diplomatic engagement easier – at least logistically. Better air transport may not bring aggrieved parties to an agreement, but it does make getting them to the table easier.

Building better international relations is about creating opportunities to engage with, learn about, and build trust between different peoples. Over the last 100 years, aviation has fundamentally transformed our ability to generate and leverage these opportunities. On a global level, aviation facilitates international engagement, thereby encouraging the use of soft power. At the individual country level, aviation provides a useful tool to lift the global brand of a country, while generating new international links. As it expands and grows more efficient, aviation will continue to shape a world where soft, rather than hard, power drives change for the better.

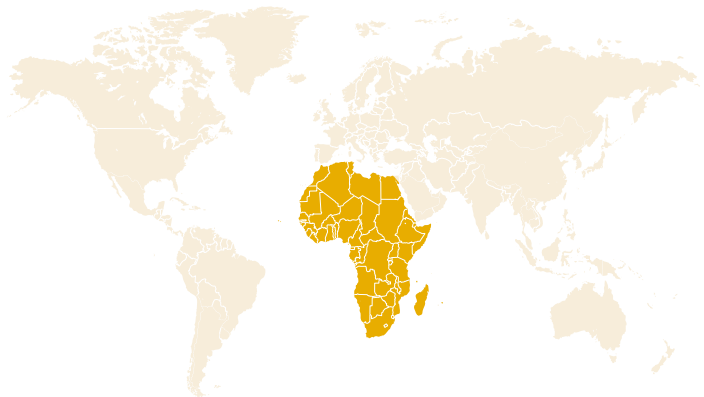
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Africa¹¹⁵

Air transport supports 6.9 million jobs and \$80.5 billion in GDP in Africa



69.8 million

passengers¹¹⁶

1,584,000

flights¹¹⁷

176 billion

RPKs¹¹⁸

371

commercial airports¹¹⁹

245

airlines¹²⁰

1,273

aircraft in service¹²¹

38

air navigation service providers¹²²

The air transport industry in Africa directly generated an estimated 428,000 jobs in 2012.

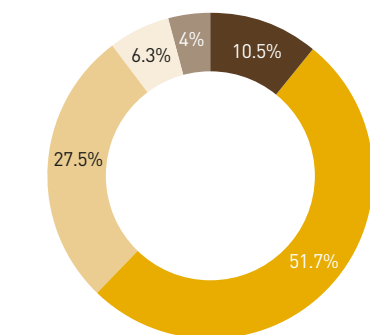
- » 118,000 of those people (27% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 45,000 people (11% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 222,000 jobs (52%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 27,000 people (6%) were employed in the manufacture of civil aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 17,000 people (4%).

The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported 1.1 million jobs (0.4% of economy-wide employment) and contributed \$34.5 billion (1.7% of economy-wide GDP) to GDP in Africa.

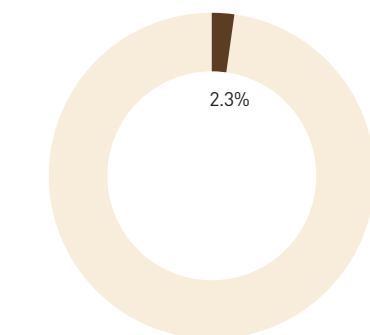
In addition, travel and tourism supported 5.8 million people in employment and contributed \$46 billion to GDP in Africa's economies.

Direct jobs generated by air transport in Africa, 2012



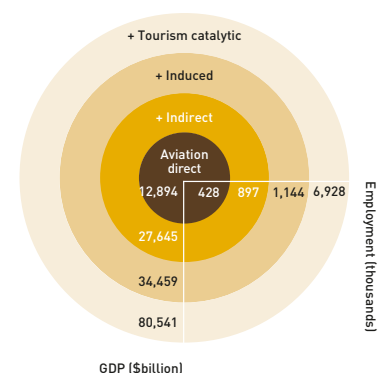
■ Airports
 ■ Aerospace
 ■ Other on-airport
 ■ Airlines
 ■ Air traffic Management

Africa's share of global passenger traffic, 2012



■ Africa
 ■ Rest of the World

Total jobs and GDP generated by air transport in Africa, 2012



GDP (\$ billion)

Employment (thousands)



Worldwide, including the tourism impacts, Africa accounts for 12% of the jobs and 3% of the GDP supported by the air transport industry.

In 2012, African airports witnessed a 7% growth in passengers handled, compared with 2011. Of the top 20 airports, three are located in South Africa and three in Egypt, making the two countries the biggest air transport markets in Africa. O.R. Tambo International Airport in Johannesburg is the busiest airport in Africa in terms of passenger numbers, cargo handled and aircraft movements¹²³. Of the passengers carried on airlines in Africa, 42% are intercontinental, 31% domestic and the remaining 27% are flying within the region¹²⁴.

The expansion in air travel, at an expected rate of around 5.1% per annum, is likely to continue generating significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow

to 10.5 million by 2032, a 51% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$168.7 billion by 2032, a 109% increase on 2012 figures.

While there are a number of renowned world-class carriers in the region (such as South African Airways, Ethiopian, Kenya and Egyptair), Africa is still an area of safety concern within the industry. However, a concerted effort by partners across the industry and governments will tackle this challenge by ensuring the region's safety meets global standards by 2015¹²⁵. Flying is still relatively expensive in the region. Africa has only recently seen the establishment of low cost carriers and the regional airline association has highlighted the negative impacts of high taxes and fees on the possibility of growth in African aviation.

Ensuring that aviation's growth potential is fulfilled will require policymakers to overcome a number of challenges. Infrastructure investment is not as pressing as in other regions, although some of the region's larger airports do appear to be suffering from capacity constraints. However, skills shortages are posing a considerable short-term obstacle to growth with a lack of adequately trained pilots and other technical staff being a key area for attention, with an expected 16,500 pilots and 15,900 technicians required in the next 20 years¹²⁶.

SKILLS DEVELOPMENT



Building aerospace skills in Morocco

By the end of 2020, Canada's Bombardier Aerospace plans to have invested around \$200 million in equipment, buildings and start-up costs to establish a world-class manufacturing plant in Nouaceur, Morocco, where it will make aircraft structural parts. The establishment of its facility in Morocco is part of the company's long-term commitment to partner with the Moroccan Government to develop a world-class aerospace industry in the country.

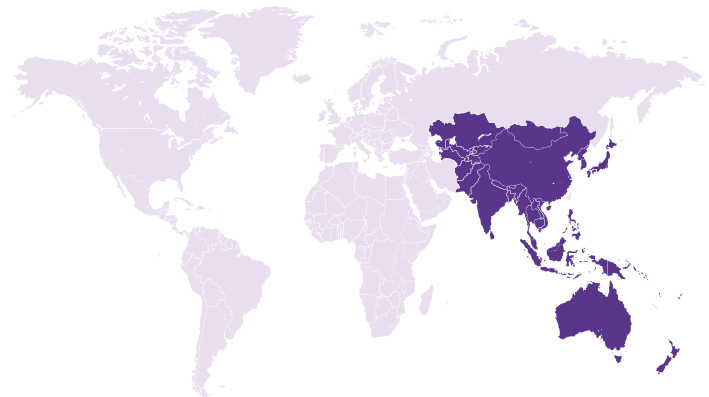
In February 2013, Bombardier began its first operations in Morocco, employing 19 local staff at its transitional site near Casablanca's Mohammed V airport, making flight-control components for its CRJ family of regional jets. A year later, that number has risen to 130, with an average age of just 24. At the end of 2020, Bombardier plans to have its workforce level reach 850 employees.

By establishing its own fully integrated manufacturing facility in Morocco, Bombardier Aerospace could serve as a catalyst for the aerospace industry in Morocco, by looking for opportunities to share some of its knowledge and manufacturing processes. However, building an aerospace business is more than just learning new manufacturing techniques, there is also an important need to increase the skills base.

To address this, Bombardier has developed a close relationship with the Institut des Métiers de l'Aéronautique in Casablanca, which helps provide a workforce skilled in aircraft assembly and manufacturing techniques. In 2012, Bombardier employees provided 'train-the-trainer' sessions to teachers at the institute to train local workers to find jobs in Bombardier's new site in Morocco.

Asia-Pacific¹²⁷

Air transport supports 24.2 million jobs and \$516 billion in GDP in Asia-Pacific



947.9 million

passengers

9,602,000

flights

1.8 trillion

RPKs

906

commercial airports

355

airlines

6,251

aircraft in service

44

air navigation service providers

The air transport industry in Asia-Pacific directly generated an estimated 1.8 million jobs in 2012.

- » 580,000 of those people (33% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 120,000 people (7% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 900,000 jobs (50%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 137,000 people (8%) were employed in the manufacture of civil

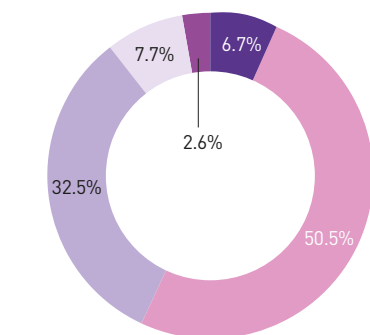
aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 47,000 people (3%).

The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported 4.8 million jobs (0.3% of economy-wide employment) and contributed \$265 billion to GDP in Asia-Pacific (1.2% of economy-wide GDP).

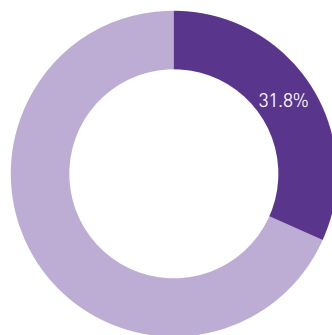
In addition, travel and tourism supported

Direct jobs generated by air transport in Asia-Pacific, 2012



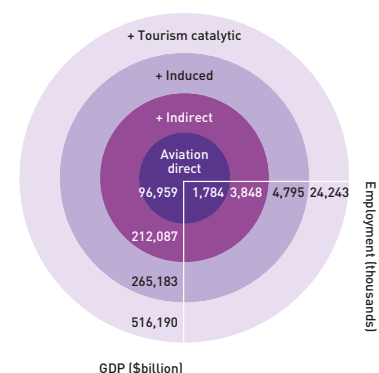
■ Airlines
■ Other on-airport
■ Airports
■ Air traffic Management
■ Aerospace

Asia-Pacific share of global passenger traffic, 2012



■ Asia-Pacific
■ Rest of the World

Total jobs and GDP generated by air transport in Asia-Pacific, 2012



GDP (\$ billion)

Employment (thousands)



19.4 million people in employment and contributed \$251 billion to GDP in the Asia-Pacific's economies.

Worldwide, including the tourism impacts, the Asia-Pacific region accounts for 42% of the jobs and 21% of the GDP supported by the air transport industry.

The spectacular growth of Asia-Pacific aviation has been underpinned by progressive liberalisation of air services, and this trend is expected to continue, with further developments including multilateral agreements within the ASEAN countries (targeted by 2015), as well as expanding bilateral relations amongst other countries in the region and around the world.

Despite some turbulence in the global economy, the Asia-Pacific region has demonstrated considerable resilience in maintaining a faster pace of economic growth, with aviation playing a leading role in enhancing both regional and international connectivity.

Key drivers of the robust expansion of the region's air transport market include steadily

rising incomes, and rapid urbanisation of the very large populations in China and India, as well as the other dynamic Asian economies.

Asia is now the largest tourism destination, with the increase in Chinese tourists driving growth domestically and in Thailand. According to analysis by Euromonitor¹²⁸, over half of the world's top 20 tourism destinations are now in Asia-Pacific and 32 out of the top 100 are in this region.

Air travel forecasts suggest that these benefits will grow significantly in future. Over the next 20 years, revenue passenger kilometres are expected to grow at an average annual rate of 5.5% in the Asia-Pacific region. This expansion in air travel is likely to generate significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 46.4 million by 2032, a 91% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$1.6 trillion by 2032, a 209% increase on 2012 figures.

Significant investments are planned to meet this projected growth in demand, including fleet expansion using newer, more fuel-efficient aircraft, as well as corresponding investments in building the necessary aviation infrastructure, including modern airports and air traffic management systems to support long term sustainable development of the region.

LIFELINES



Turboprop aircraft key drivers to economic growth

A new generation of quiet, fuel-efficient and rugged turboprop aircraft such as the ATR 72-600 and Bombardier Q400 are proving to be vital to the growing economies of South-east Asia and, overall, Pacific Island nations and Latin America.

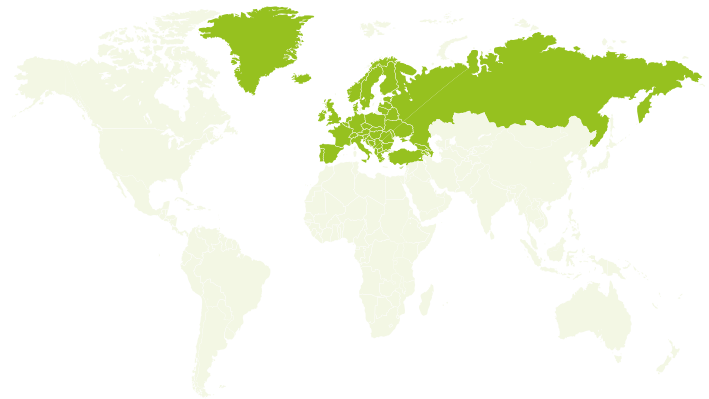
Indonesia, for example, stretches over 6,000 inhabited islands. Airline travel — using these cost-effective, versatile and modern aircraft, burning up to 40% less fuel than a jet — is often the only way to connect key centres throughout the archipelago, thanks to excellent take-off and landing performance.

In Brazil, the arrival of new more efficient aircraft have paved the way for a new domestic transport system linking 127 cities by a network of air routes, rather than road and rail links which would be expensive and environmentally damaging to build in a country covered 63% by Amazonian rain forest.

The new generation of turboprop aircraft can carry between 40 and 86 passengers in comfort and quiet and are able to access remote airports with semi-prepared runways. Their lower operating costs mean it is now possible for increasing numbers of passengers to fly to destinations which even a few years ago would have involved expensive, long journeys between islands or overland. In the early years of the decade, when economic growth really started to surge in Brazil, domestic airlines were reporting up to 40% monthly increases, year on year, in demand for domestic air services.

Europe¹²⁹

Air transport supports 11.7 million jobs and \$860 billion in GDP in Europe



780.6 million

passengers

9,401,000

flights¹³⁰

1.2 trillion

RPKs

959

commercial airports

387

airlines

6,306

aircraft in service

46

air navigation service providers

The air transport industry in Europe directly generated an estimated 2.6 million jobs in 2012.

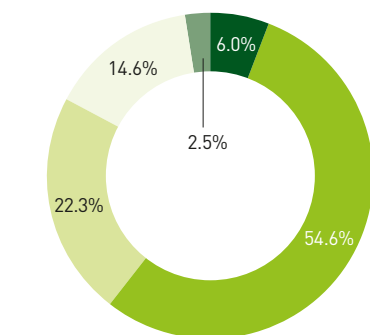
- » 576,000 of those people (22% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 156,000 people (6% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 1.4 million jobs (55%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 378,000 people (15%) were employed in the manufacture

of civil aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 64,000 people (2%).

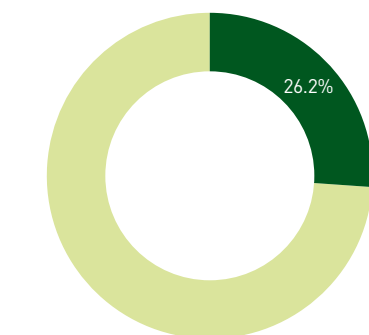
The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported seven million jobs (1.9% of economy-wide employment) and contributed \$581 billion to GDP in Europe (2.8% of economy-wide GDP).

Direct jobs generated by air transport in Europe, 2012



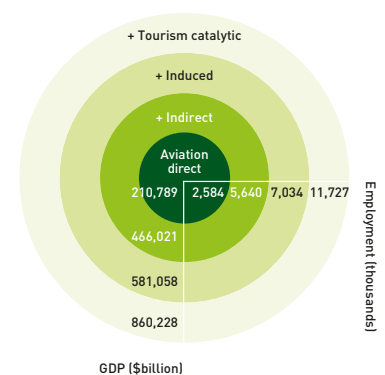
■ Airports
■ Other on-airport
■ Airlines
■ Aerospace
■ Air traffic Management

Europe's share of global passenger traffic, 2012



■ Europe
■ Rest of the World

Total jobs and GDP generated by air transport in Europe, 2012



GDP (\$ billion)

Employment (thousands)



Moreover, substantial benefits derive to regional economies via the catalytic impacts of tourist spending, much of which is generated by tourists travelling by air. In 2012, the spending of tourists arriving at their destination by air is estimated to have added 4.7 million to employment (1.3% of economy-wide employment) and \$279 billion in GDP (1.3% of economy-wide GDP).

Worldwide, including the tourism impacts, Europe accounts for 20% of the jobs and 35% of the GDP supported by the air transport industry.

Air travel forecasts suggest that these benefits will grow significantly in future. Over the next 20 years, revenue passenger kilometres are expected to grow at an average annual rate of 3.8% in Europe. This expansion in air travel is likely to generate significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 19.1 million by 2032, a 63% increase from

2012. Meanwhile, the contribution to GDP is forecast to grow to \$1.8 trillion by 2032, a 108% increase on 2012 figures.

Characterised by a mixture of mature and typically slower-growing markets in the west and more dynamic emerging economies in the east, forecasts still point to a significant overall increase in demand for aviation services, which current levels of capacity are ill-equipped to deal with. Therefore, it is crucial that investment in infrastructure be sufficient to ease congestion and increase connectivity.

Despite a substantially deregulated marketplace which has stimulated competition and fostered the development of new airline business models, air transport in Europe is constrained by regulatory burdens heavier than in other parts of the world. These arise in many fields, including social affairs, consumer protection and environment. The sector is also a prime target for taxation.

Meanwhile, escalating security-related costs need to be addressed, as they are impeding the ability of airports to function profitably. The inefficiency of the current system is starkly illustrated by ACI's estimate that 35% of airport operating costs are accounted for by security. Further investment in relevant technologies is a pre-requisite here, but increased harmonisation at the global level on security processes could also generate significant efficiency savings.

JOBS



Soaring interest in airport career opportunities

London's Heathrow Airport saw 5,800 young people attend the airport's Jobs and Careers fair in 2014, the largest number of attendees since the fair was launched seven years ago.

The fair, which is held every February, brings together 16-24 year olds from communities surrounding the airport and links them with the companies working there. In 2014, 47 companies attended to explain what career opportunities were on offer. Parents and teachers also came to the fair to gain an understanding of what prospective employers expected in candidates, and were given information on CV advice, interviews and career guidance.

As one of the largest single-site employers in the country, with 76,500 people directly employed on the Heathrow site, the airport offers a wide range of jobs, training and career opportunities. A total of 114,000 jobs are supported in the local area by the operation of Heathrow Airport — representing one in five jobs (or 22% of the total) in the local area.

The business community surrounding the airport includes firms involved in construction, engineering, retail, logistics, communication, planning, security and technology. There are 323 separate businesses working within the perimeter fence at Heathrow.

The airport also plays an active role in supporting small and medium-sized enterprises (SMEs) in surrounding areas. At its annual Business Summit, the airport provides an opportunity for 'speed dating' between procurement executives of the airport and large on-airport businesses and local SMEs that could provide services.

Latin America and the Caribbean¹³¹

Air transport supports 4.9 million jobs and \$153 billion in GDP in Latin America and the Caribbean



226.5 million

passengers

3,340,000

flights

410 billion

RPKs

631

commercial airports

177

airlines

1,833

aircraft in service

29

air navigation service providers

The air transport industry in Latin America and the Caribbean directly generated an estimated 840,000 jobs in 2012.

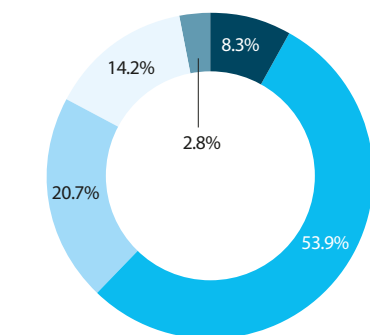
- » 174,000 of those people (21% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 70,000 people (8% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 453,000 jobs (54%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 119,000 people (14%) were employed in the manufacture of civil

aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 24,000 people (3%).

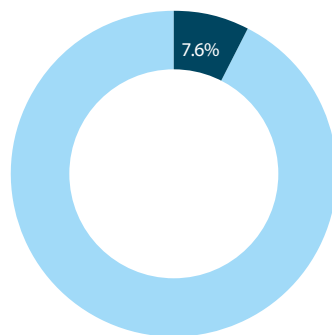
The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported 2.2 million jobs (0.8% of economy-wide employment) and contributed \$101 billion to GDP in Latin America and the Caribbean (1.8% of economy-wide GDP).

Direct jobs generated by air transport in Latin America and the Caribbean, 2012



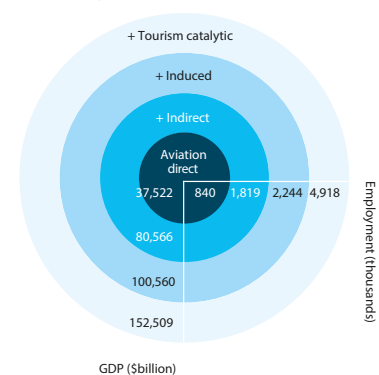
■ Airlines
■ Other on-airport
■ Airports
■ Air traffic Management
■ Aerospace

Latin America and Caribbean's share of global passenger traffic, 2012



■ Latin America and the Caribbean
■ Rest of the World

Total jobs and GDP generated by air transport in Latin America and the Caribbean, 2012



GDP (\$billion)

Employment (thousands)



In addition, travel and tourism supported 2.7 million people in employment and contributed \$52 billion to GDP in Latin America and Caribbean economies.

Worldwide, including the tourism impacts, Latin America and the Caribbean account for 8% of the jobs and 6% of the GDP supported by the air transport industry.

Air travel forecasts suggest that these benefits will grow significantly in future. Over the next 20 years, revenue passenger kilometres are expected to grow at an average annual rate of 5.4% in Latin America and

the Caribbean. This expansion in air travel is likely to generate significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 9.8 million by 2032, double the 2012 figure. Meanwhile, the contribution to GDP is forecast to grow to \$389 billion by 2032, a 155% increase on 2012 figures.

The economic outlook is undeniably favourable and the industry in the region continues to thrive. The growth in Latin America and the Caribbean continues to outpace global growth. In 2012, the region grew more than 60% compared to global traffic growth.

The industry faces many challenges ahead, the principal being infrastructure gaps. However, other challenges include the misunderstanding and inconsistent application of antitrust regulations, an unbalanced approach on consumer rights legislations, immigration and customs delays for both passengers and cargo. There is also a lack of government understanding of the economic benefits generated by aviation¹³².

AID LIFELINES



Organ transplant flights provide a lifeline in Brazil

Over 7,000 items — organs, tissues, empty special containers or medical teams — were carried on over 4,000 trips in the country for transplant purposes during 2012, according to data from the national transplant centre of the Brazilian Ministry of Health. Of this, over 99% was carried by air.

The members of Brazil's national airline association, ABEAR, play a central role in this effort. Avianca, Azul, Trip, Gol, and TAM together carried around 98% of these items, free-of-charge. The project has been supported since 2001, when 15 airlines entered into a cooperation agreement with the Ministry of Health.

Since then, the agreement has been revised to facilitate access to flight schedule information in Brazil and strengthen communication channels between airlines and health authorities.

The organs carried are used in varied and complex surgeries. As soon as availability for organ donation is announced, often a race against time begins to perform the extraction and re-implantation. This is where airlines are invaluable, with their ability to shorten distances and save precious minutes, whether by carrying medical teams and supplies to potential donors or by ensuring that organs and tissues reach the recipients.

Aircraft used for this purpose are given priority landing and take-off and the special containers with organs are safely carried in the cabin under the care of the chief flight attendant or pilot. Not all cities in Brazil have hospitals with trained professionals to perform these types of operation, so the service is particularly important for patients living in some of the more remote areas of the country.

Middle East¹³³

Air transport supports two million jobs and \$116 billion in GDP in the Middle East



144 million

passengers

1,240,000

flights

207 billion

RPKs

131

commercial airports

64

airlines

1,062

aircraft in service

14

air navigation service providers

The air transport industry in the Middle East directly generated an estimated 356,000 jobs in 2012.

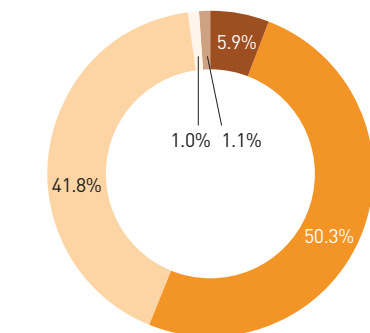
- » 149,000 of those people (42% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 21,000 people (6% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 179,000 jobs (50%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 3,600 people (1%) were employed in the manufacture of civil

aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 3,800 people (1%).

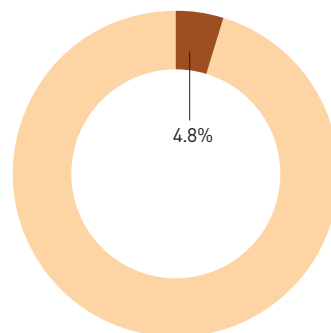
The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported 938,000 jobs (1.4% of economy-wide employment) and contributed \$66.8 billion to GDP in the Middle East (2.6% of economy-wide GDP).

Direct jobs generated by air transport in the Middle East, 2012



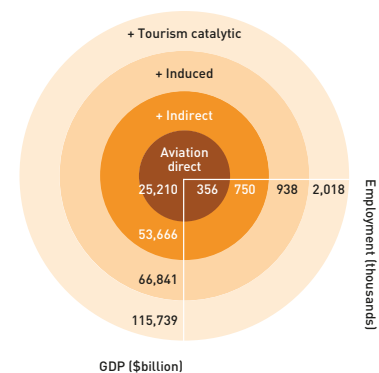
■ Airports
■ Other on-airport
■ Airlines
■ Aerospace
■ Air traffic Management

Middle East share of global passenger traffic, 2012



■ Middle East
■ Rest of the World

Total jobs and GDP generated by air transport in the Middle East, 2012



GDP (\$ billion)

Employment (thousands)



In addition, travel and tourism supported 1.1 million people in employment and contributed \$48.9 billion to GDP in the Middle East's economies.

Worldwide, including the tourism impacts, the Middle East accounts for 3% of the jobs and 4.5% of the GDP supported by the air transport industry.

Air travel forecasts suggest that these benefits will grow significantly in future. Over the next 20 years, revenue passenger kilometres are expected to grow at an average annual rate of 6.3% in the Middle East. This expansion in air travel is likely to generate significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 4.4 million by 2032, a

117% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$341 billion by 2032, a near tripling of the 2012 figure.

Supporting such a growth in demand for air transport services and maintaining the region's hub status will require a material level of investment in infrastructure. In addition to the necessary 'physical' investment, the region's current slow rate of market liberalisation and uncoordinated regional competition for passengers are barriers to continued success. Appropriate regulatory reform that promotes regional competition will help to spur future growth and should help to generate significant efficiency gains.

JOBS



UAE becomes a centre for aviation skills training

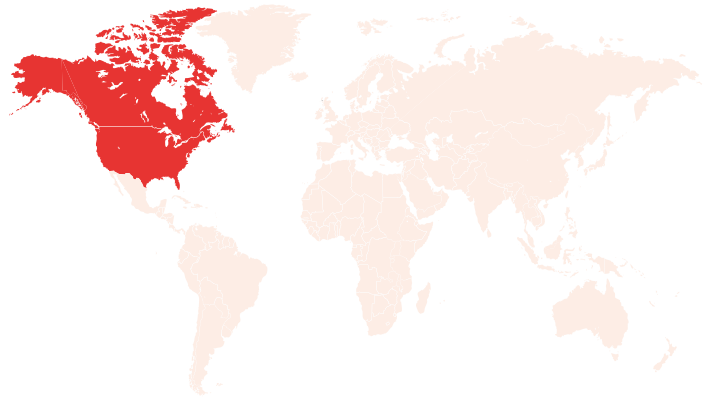
Hanan Jawad has wanted to be a pilot since she was 14 and is now a Boeing 777 first officer with Emirates, one of two UAE national female first officers who have gone through the Emirates pilot cadetship programme. Her career path is clear, she wants to become a captain on the Boeing 777, and sees flying as her lifelong career. She is not alone. At the beginning of 2014, there were five women in the cadet programme and the airline planned for a further 100 places to be opened to student pilots in 2015.

To meet the demand for new air services, Emirates, like most other major global airlines, is investing heavily in skills and professional training for both locally recruited employees and staff who have joined the airline from other parts of the world.

As part of its long-term strategy to nurture talent in Dubai, the Emirates Aviation College was established, offering an extensive range of aviation-related courses and programmes for both Emirates employees and the general public. The airline is planning a new flight training academy, based at Dubai World Central Airport, which will train up to 400 students at a time. Over the next few years, 40,000 pilots are required in the Middle East alone. The airline invests in learning and development for its employees and also has focused retention strategies; 47% of the 56,000 staff have been with the Emirates Group for more than five years and over 11,000 staff have been with the company for ten years or longer.

North America¹³⁴

Air transport supports 8.3 million jobs and \$7 billion in GDP in North America



808 million

passengers

12,246,000

flights

1.4 trillion

RPKs

866

commercial airports

167

airlines

7,776

aircraft in service

2

air navigation service providers

The air transport industry in North America directly generated an estimated 2.7 million jobs in 2012.

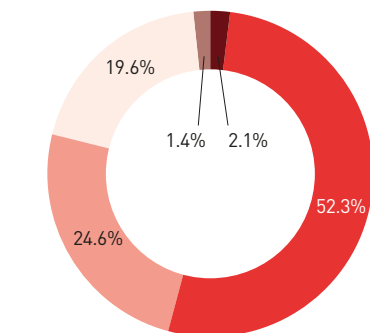
- » 675,000 of those people (25% of the total) were in jobs for airlines or handling agents (for example, flight crew, check-in staff, maintenance crew, reservations and head office staff).
- » Another 59,000 people (2% of the total) worked for airport operators (for example, in airport management, maintenance, security and operations).
- » 1.4 million jobs (52%) were on-site in airports, at retail outlets, restaurants, hotels, etc.
- » A further 538,000 people (20%) were employed in the manufacture of civil

aircraft (including systems, components, airframes and engines).

- » Air navigation service providers employed an additional 40,000 people (1%).

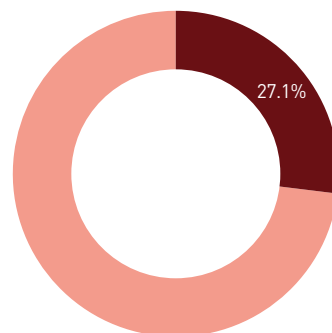
The total impacts – including those from the operations of the air transport sector itself, the impact of the air transport sector's procurement of inputs of goods and services from its supply chain, and the impact of employees of the air transport sector and its supply chain spending their wages – mean the air transport sector supported seven million jobs (4.4% of economy-wide employment) and contributed \$579 billion to GDP in North America (3.2% of economy-wide GDP).

Direct jobs generated by air transport in North America, 2012



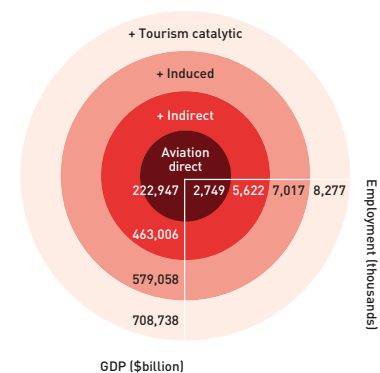
■ Airports
■ Other on-airport
■ Airlines
■ Aerospace
■ Air traffic Management

North America's share of global passenger traffic, 2012



■ North America
■ Rest of the World

Total jobs and GDP generated by air transport in North America, 2012



GDP (\$ billion)

Employment (thousands)



Moreover, regional economies derive substantial benefits via the catalytic impacts of tourist spending, much of which is generated by tourists travelling by air. In 2012, the spending of tourists arriving at their destination by air is estimated to have added 1.3 million to employment (0.8% of economy-wide employment) and \$130 billion in GDP (0.7% of economy-wide GDP).

Worldwide, including the tourism impacts, North America accounts for 14% of the jobs and 29% of the GDP supported by the air transport industry.

In the USA, the Federal Aviation Administration (FAA) also collects economic impact data, with which these numbers are aligned. The FAA assessment further evaluates the much wider economic activity that is supported by air transport (including general aviation and the domestic tourism markets that this report does not include). Accordingly, with these wider catalytic impacts included, the total number of jobs supported by civil aviation in the USA alone is around ten

million, with a contribution to GDP of around \$700 billion¹³⁵.

Air travel forecasts suggest that these benefits will grow significantly in future. Over the next 20 years, revenue passenger kilometres are expected to grow at an average annual rate of 3% in North America. This expansion in air travel is likely to generate significant economic impacts. Oxford Economics forecasts that the number of jobs supported by aviation and international tourism impacts will grow to 13 million by 2032, a 57% increase from 2012.

Meanwhile, the contribution to GDP is forecast to grow to \$1.5 trillion by 2032, a 112% increase on 2012 figures.

Supporting such growth in demand for air transport services will require a material level of investment in infrastructure. In the USA, it is vital that the NextGen air traffic control system being debated in Congress be implemented to replace the current antiquated ground-based system. Moving to a satellite-based system would bring significant efficiency savings in terms of reduced congestion while helping to maintain safety.

Meanwhile, industry growth will also imply stronger demand for particular types of skilled labour, particularly engineers. Addressing this potential skills shortage through appropriate educational reform will be an important impending challenge for North American policymakers.

TRADE



Alaskan salmon take to the air

Each year, Alaska Air Cargo delivers shipments of Copper River salmon from Alaska to seafood processors in Seattle and restaurants across the United States. The business is worth an annual \$20 million in direct economic benefits to the Alaskan economy, with a further \$20 million in related economic activity.

By air-freighting the salmon south, Copper River salmon arrive as fresh as possible at grocery shops and restaurants across the nation, thanks in part to a cool-chain training programme completed by all Alaska Air employees who handle perishables. The goal is to keep seafood moving rapidly throughout its journey on Alaska Airlines and maintain a consistent temperature range from the time it leaves the water to when it arrives at shops and restaurants.

Alaska Airlines plays a significant role in supporting the Alaskan seafood industry, which is recognised worldwide for its sustainable fishing practices. Copper River salmon runs are carefully managed for long-term sustainability by the Alaskan Department of Fish and Game, which conducts weekly aerial surveys and monitors weirs at several points, estimating salmon stocks to ensure that an adequate number of fish migrate to spawning grounds to reproduce each year.

The carrier flew nearly 9,000 tonnes of fresh Alaskan seafood to the continental United States and beyond in 2012, including nearly 500,000 kilograms of Copper River salmon.

APEC economies¹³⁶

Air transport supports 23.3 million jobs and \$1.3 trillion in GDP in the APEC economies

1.5 billion

passengers¹³⁷

58%

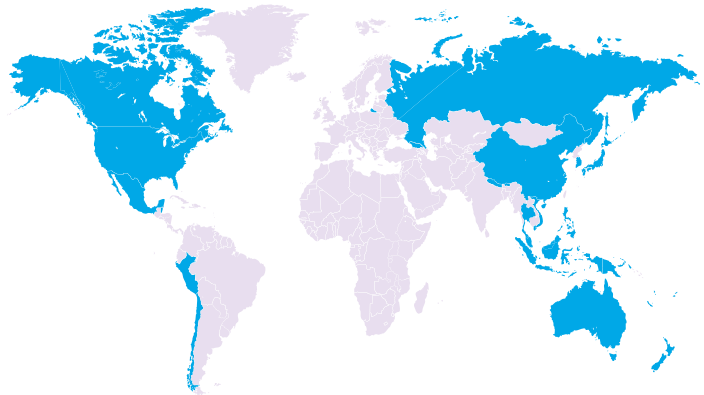
APEC share of global passenger traffic, 2012

493

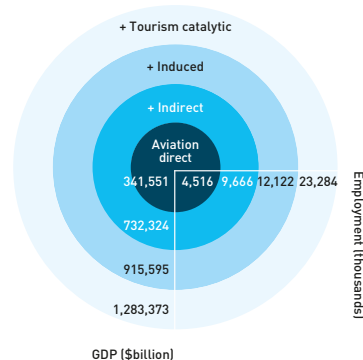
airlines

14,478

aircraft in service



Total jobs and GDP generated by air transport in APEC, 2012



The air transport industry in APEC economies directly generated an estimated 4.5 million jobs in 2012:

- » Airlines: 1.3 million (30% of the total).
- » Airport operators: 169,000 (4%).
- » Other on-airport: 2.1 million (48%).
- » Civil aerospace: 777,000 (17%).
- » Air navigation service providers: 84,000 (2%).

Including indirect and induced impacts, the air transport sector supported 12.1 million jobs and contributed \$916 billion to GDP in APEC.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending

is estimated to have added 11.2 million to employment (0.8% of economy-wide employment) and \$368 billion in GDP (0.9% of economy-wide GDP).

Over the next 20 years, air traffic is expected to grow at an average annual rate of 4.2% in APEC. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 48.8 million by 2032, a 109% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$3.5 trillion by 2032, a 175% increase on 2012 figures.

ENVIRONMENT

ASPIRE programme gathers pace and members



The Asia and South Pacific Initiative to Reduce Emissions (ASPIRE) links 19 transpacific flight routes in a programme,

ASPIRE Daily City Pair, where new fuel saving concepts are being trialled and refined for every phase of flight, beginning at the airport gate. The ASPIRE programme began in 2008 when a group of air navigation service providers — Airservices Australia, Airways New Zealand and the US Federal Aviation Administration — agreed to link their flight efficiency programmes in order to deliver the most

fuel-efficient operations at airports and across the ocean with airlines' own fuel-saving measures. The project now also includes the Japan Civil Aviation Bureau, the Civil Aviation Authority of Singapore and AeroThai.

The ASPIRE Daily City Pair features a number of new concepts, such as user preferred routes, where the airline determines which is the most efficient route to take based on the performance characteristics of individual aircraft and the prevailing weather. The air navigation system then configures itself around this flight — rather than forcing the aircraft to fly along fixed airways.

When user-preferred routes are used to optimise fuel consumption, the savings in greenhouse gas emissions can be substantial. Some of the CO₂ emissions savings that an ASPIRE-Daily city pair could produce over the course of a year include:

- » Auckland to San Francisco: 11 tonnes
- » Melbourne to Los Angeles: 28 tonnes
- » Sydney to San Francisco: 15 tonnes
- » Los Angeles to Singapore: 33 tonnes

European Union¹³⁸

Air transport supports 9.3 million jobs and \$658 billion (€512) in GDP in the EU28

534 million

passengers¹³⁹

21%

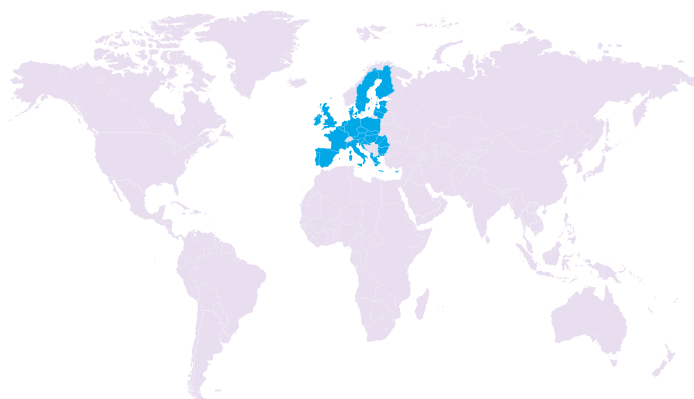
EU share of global passenger traffic, 2012

227

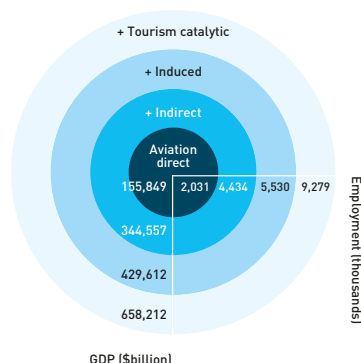
airlines

4,358

aircraft in service¹⁴⁰



Total jobs and GDP generated by air transport in EU28, 2012



The air transport industry in the EU28 directly generated an estimated two million jobs in 2012:

- » Airlines: 462,000 (23% of the total).
- » Airport operators: 106,000 (5%).
- » Other on-airport: 1.1 million (56%).
- » Civil aerospace: 287,000 (14%).
- » Air navigation service providers: 45,000 (2%).

Including indirect and induced impacts, the air transport sector supported 5.5 million jobs and contributed \$430 billion to GDP in the EU28.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending

is estimated to have added 3.7 million to employment (1.7% of economy-wide employment) and \$229 billion in GDP (1.4% of economy-wide GDP).

Over the next 20 years, air traffic is expected to grow at an average annual rate of 3.8% in the EU28. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 14.9 million by 2032, a 60% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$1.4 trillion by 2032, a 107% increase on 2012 figures.

ENVIRONMENT

Airports save over 170,000 tonnes of CO₂ emissions



During the fourth year of the Airport Carbon Accreditation scheme, 84 airports in Europe and Asia saved a total of 170,164 tonnes of CO₂

emissions — enough to power 71,000 households for one year. The airports now certified under the scheme represent 22% of global air traffic.

Many of the world's airports have embraced the need for greater energy efficiency to reduce damaging emissions, environmental impact and costs. In the past, airports have dealt with these issues on an individual basis. The need for better

results, however, has driven them towards collective action and Airport Carbon Accreditation is the tool that empowers this growing action plan.

Airport Carbon Accreditation independently certifies airports' efforts to manage and reduce carbon emissions through four levels of certification: mapping, reduction, optimisation and neutrality. Launched in 2009 by the European region of Airports Council International and endorsed by the European Commission, International Civil Aviation Organization and United Nations Environment Programme, airports have been quick to join the efforts to achieve greater global reductions.

By February 2014, 79 European airports in 24 countries were certified at one of the four levels of the programme. Extended to the Asia-Pacific region in 2011, there are now 12 airports in 7 countries that have achieved certification. In June 2013, the first African airport — Enfidha-Hammamet in Tunisia — brought another continent to the global effort and more are expected to follow in the near future. The programme was named one of the top three low carbon initiatives in the European Union in 2013.

Small island states¹⁴¹

Air transport supports 1.7 million jobs and \$37 billion in GDP in small island states

24.7 million

passengers

1%

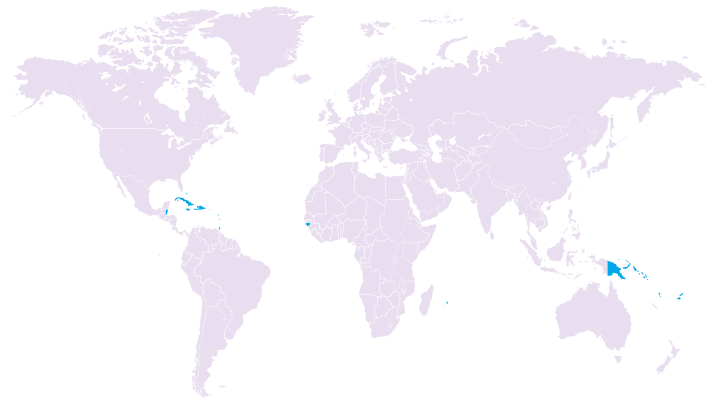
share of global passenger traffic, 2012

73

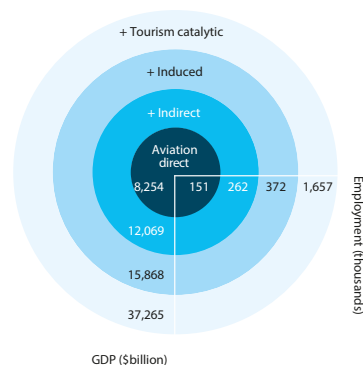
airlines

405

aircraft in service



Total jobs and GDP generated by air transport in small island states, 2012



The air transport industry in the small island states directly generated an estimated 151,000 jobs in 2012:

- » Airlines: 20,000 (13% of the total).
- » Airport operators: 16,000 (11%).
- » Other on-airport: 104,000 (68%).
- » Air navigation service providers: 11,000 (8%).

Including indirect and induced impacts, the air transport sector supported 372,000 jobs and contributed \$16 billion to GDP in the small island states.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending

is estimated to have added 1.3 million to employment (6.3% of economy-wide employment) and \$21 billion in GDP (8.7% of economy-wide GDP).

Over the next 20 years, air traffic is expected to grow at an average annual rate of 5.4% in the small island states. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 2.9 million by 2032, a 76% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$83 billion by 2032, a growth of 123%.

TOURISM

Why aviation is good news for Pacific sharks



Many Pacific islands face an uncertain future as falling fish stocks have severely limited one of their most important sources

of traditional income. Some have had to ban commercial fishing of threatened species entirely. Now, however, thanks to an influx of tourists from around the world, many of the islands are turning the former fishing grounds into marine sanctuaries and reaping the economic benefits.

In February 2014, President Tommy Remengesau of Palau, a country of 20,000 people spread across 250 islands, announced that all commercial fishing in the 200-nautical-mile exclusive economic zone around the islands would be banned in order to create a marine sanctuary, which will enable Palau to promote snorkelling, scuba diving and ecotourism as an alternative way to grow its economy. The president, a former fisherman, explained that a live shark was worth \$1.9 million as a tourist attraction while a dead one was worth just a few hundred dollars.

Fiji's Shark Reef Marine Reserve has been operating since 2002 as a no-fishing zone and is now an important self-sustaining shark observation diving site, generating income for local villages which have given up their former fishing rights in exchange for diver fees. It is not only sharks that are feeling the benefits. In Taveuni, the third-largest island in Fiji, fishing was banned in 1998 off the coral reef at Waitabu as a result of overfishing and damaged coral. A recent survey has shown that thanks to the establishment of a marine sanctuary there, the fish are more plentiful and the coral reef is, once again, growing.

Developing countries¹⁴²

Air transport supports 36.9 million jobs and \$656 billion in GDP in developing countries

1.2 billion

passengers

47%

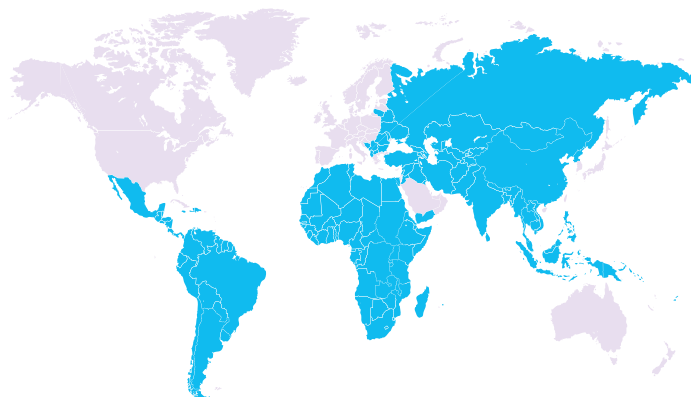
share of global passenger traffic, 2012

898

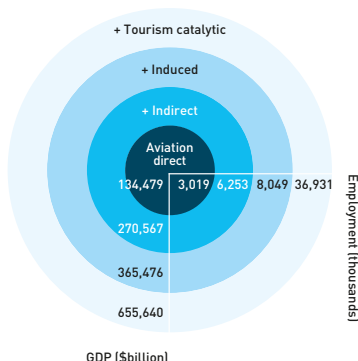
airlines

10,389

aircraft in service



Total jobs and GDP generated by air transport in developing countries, 2012



The air transport industry in developing countries directly generated an estimated three million jobs in 2012:

- » Airlines: 789,000 (26% of the total).
- » Airport operators: 299,000 (10%).
- » Other on-airport: 1.5 million (51%).
- » Civil aerospace: 299,000 (10%).
- » Air navigation service providers: 95,000 (3%).

Including indirect and induced impacts, the air transport sector supported eight million jobs and contributed \$365 billion to GDP in the developing countries.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending

are estimated to have added 29 million to employment (1.2% of economy-wide employment) and \$290 billion in GDP (1.2% of economy-wide GDP).

Over the next 20 years, air traffic is expected to grow at an average annual rate of 5.2% in developing countries. Oxford Economics forecasts that the number of jobs supported by aviation and tourism impacts will grow to 67.7 million by 2032, an 83% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$1.7 trillion by 2032, a 167% increase on 2012 figures.

ENVIRONMENT

Precise navigation, precise environment benefits



It may have a somewhat clumsy name: required navigation performance (RNP), but this new highly-accurate navigation

system is reducing flight times, saving fuel, reducing noise pollution and increasing capacity at airports throughout South America.

RNP technology allows aircraft to fly precisely-defined flight paths without relying on ground-based radio-navigation signals and is the centrepiece of the Green Skies of Peru project, a collaborative

effort between LAN Airlines, GE Aviation, Peru's air navigation service provider CORPAC and Peru's safety regulator DGAC.

By linking the precise on-board navigation system of today's modern aircraft with GPS satellite signals, the RNP system allows the aircraft to automatically fly very precise routes irrespective of weather conditions. The first continuously-guided flight from take-off to landing using this technology was made by LAN in February 2012. This saved, on average, 19 track miles, 6.3 minutes, 200 kilograms of fuel and 644 kilograms of CO₂ emissions per flight. Since the RNP paths have

been in use at Cusco, an airport located high in the Andes Mountains and a busy gateway to Machu Picchu, LAN has reduced cancellations from 12 to 5 and flight delays by 45%. During the first year of RNP use at Cusco, more than 30,000 of LAN Peru's passengers avoided flight cancellations or delays, thanks to the technology.

Using the technology, LAN can now automatically fly highly-precise approach paths, which avoid heavily built-up areas near airports or bad-weather approaches into airports surrounded by mountains, which can distort the signals from traditional ground-based radio navigational aids.

OECD countries¹⁴³

Air transport supports 20.8 million jobs and \$1.7 trillion in GDP in the OECD

1.4 billion

passengers¹³⁷

57%

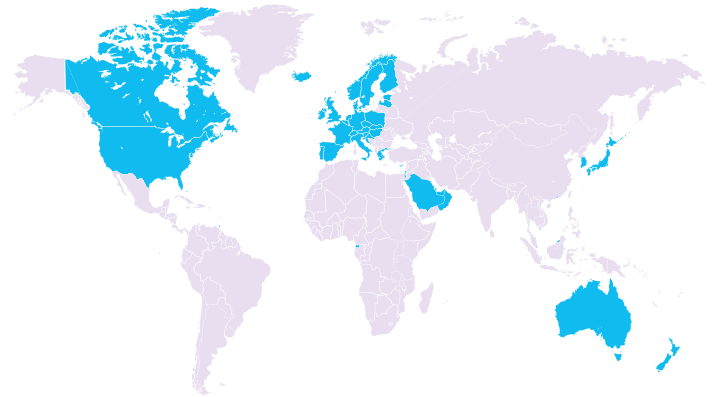
OECD share of global passenger traffic, 2012

505

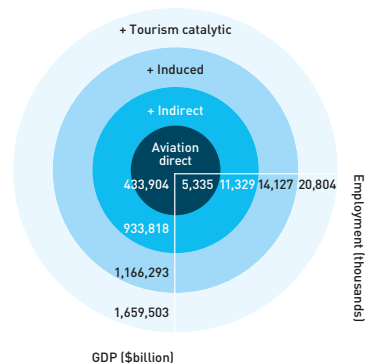
airlines

14,545

aircraft in service



Total jobs and GDP generated by air transport in OECD, 2012



The air transport industry in the OECD directly generated an estimated 5.3 million jobs in 2012:

- » Airlines: 1.4 million (26% of the total).
- » Airport operators: 197,000 (4%).
- » Other on-airport: 2.8 million (52%).
- » Civil aerospace: 899,000 (17%).
- » Air navigation service providers: 106,000 (2%).

Including indirect and induced impacts, the air transport sector supported 14 million jobs and contributed \$1.2 trillion to GDP in the OECD.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending

is estimated to have added 6.7 million to employment (1.2% of economy-wide employment) and \$493 billion in GDP (1.1% of economy-wide GDP).

Over the next 20 years, air traffic is expected to grow at an average annual rate of 3.7% in the OECD. Oxford Economics forecasts that the number of jobs supported by aviation and tourism in the OECD will grow to 34 million by 2032, a 66% increase from 2012. Meanwhile, the contribution to GDP is forecast to grow to \$3.6 trillion by 2032, a 115% increase on 2012 figures.

LIFELINES

Airport provides vital community links



The community on Svalbard, halfway between Norway and the North Pole, depends on air transport for many of the essentials in life. The remote island has a population of about 2,500, centred on the settlement at Longyear, which is where Svalbard airport is located.

Morten Ulsnes, airport manager at Svalbard, explains the extent to which air travel is a lifeline for his fellow citizens. "Most of our preserved food

comes by boat but there are no passenger boats at all, so all passenger traffic has to come by plane, as well as some of our fresh food, all of our mail and other essentials. We do have a small hospital here, but for anything that requires more complex treatment the ambulance planes are a life saver," he says.

Visiting professors come to Svalbard by plane to complement the island's basic education facilities. The airport also plays host to search and rescue helicopters and provides swift turnaround facilities for charter aircraft. Traffic can vary from about eight

scheduled flights per week provided by SAS and Norwegian in January / February to double that in August — plus a commensurate increase in charter flights, which include four to eight commuter flights per day serving local mines for which there is no road access.

Without Svalbard Airport, life on the island would be nearly impossible — and some of the services that depend on it, such as search and rescue — far less effective.

Fostering growth in emerging markets



Essay by Ian Saxon

Twenty years ago, the vast majority of world trade occurred amongst developed countries, with a lesser share occurring between developed and developing nations, and an even smaller share among developing countries. Since then there have been significant changes in world trade patterns. Trading between developing economies has expanded rapidly, which is likely to continue. Air transport has played a key role in facilitating this important development, often referred to as ‘South-South’ trade (exports from one emerging market to another ¹⁴⁶), fostering economic growth in emerging markets.

The world is becoming more interdependent, and South-South trade is playing an important role. In 1990, the value of world exports was roughly \$3.4 trillion¹⁴⁵, or 15% of world GDP at the time. By 2012, that value had increased by over 400%, to \$17.9 trillion. This is more than double the rate of growth of world GDP over the same period.

Since the early 1990s, the value of South-South exports has grown more rapidly than all international exports. Between 1990 and 2012, the value of exports between emerging

countries increased by an average of 14% per year. This compares to an average of 5% among developed countries (North-North trade), and 11% for exports from emerging to developed nations (South-North trade).

There is also some evidence that the growth in South-South trade is speeding up. Between 1990 and 2000, the average annual growth in the value of exports among emerging economies was 10%; over the next twelve years, that rate increased to 18%. In contrast, the growth in export value among developed nations remained broadly constant.

While these patterns are evident across many emerging countries, a key driver of growth in South-South trade has been export activity involving developing Asian countries. Between 1990 and 2012, for example, the value of exports between developing Asia and Latin America (including exports to and from both regions) grew by over 7,100%. That is a multiple of four of the growth in the value of exports among all emenrgers over the same period, and a multiple of 16 of the growth in export value around the globe. Over the same period, exports between Asia and Africa increased by nearly 5,000%, while the value of exports between developing Asian countries themselves increased by 4,500%.

The expansion in air transport services among emerging markets has facilitated the growth in South-South trade. The number of passengers flying between emerging market countries has increased by 116% between 2005 and 2012¹⁴⁷. That is compared to a 57% increase in passengers travelling from developing to developed countries, and a 9% increase in passengers travelling between developed countries.

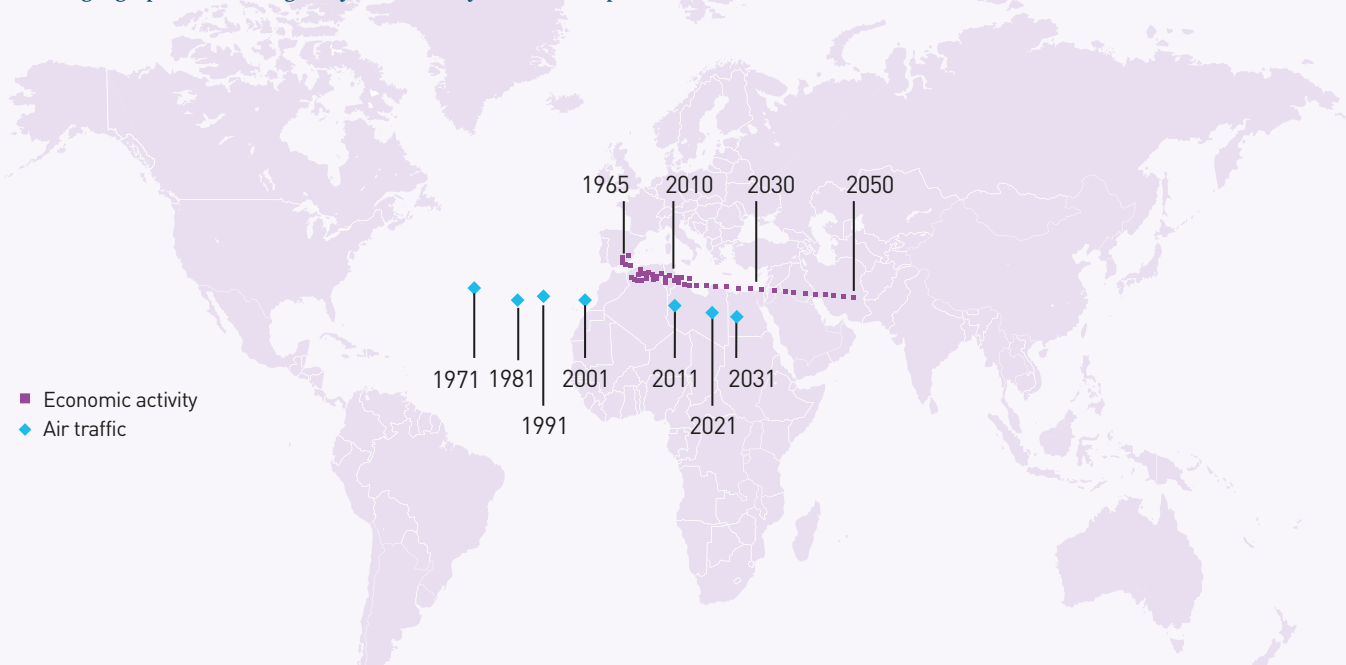
As with trade, there has been significant growth in air passenger numbers involving travel to or from Asia. Between 2005 and 2012, for example, the number of air passengers travelling between Asia and Africa increased by 141%¹⁴⁹. Over the same period, air passengers between Asia and Latin America increased by 99%, while those flying among Asian countries themselves increased by 97%.

The growth in air transport links between emerging markets has delivered invaluable connectivity benefits for businesses. As discussed elsewhere in the report, this is likely to include the ability to serve more distant markets, hasten the speed of delivery, source cheaper or better inputs more efficiently, and organise their businesses in a more cost effective way.

Fostering growth in emerging markets

Re-balance

Shift in geographic centre of gravity for economy and air transport¹⁵⁴



An additional implication of the growth of South-South trade and the expansion in economic output in some of the emerging markets has been the move eastward in the world's economic centre of gravity – a concept developed by academics and recently revisited by the Center for Global Development¹⁵⁰. In the 1960s, the economic centre of gravity was firmly planted in the Northern Hemisphere, somewhere in Spain.

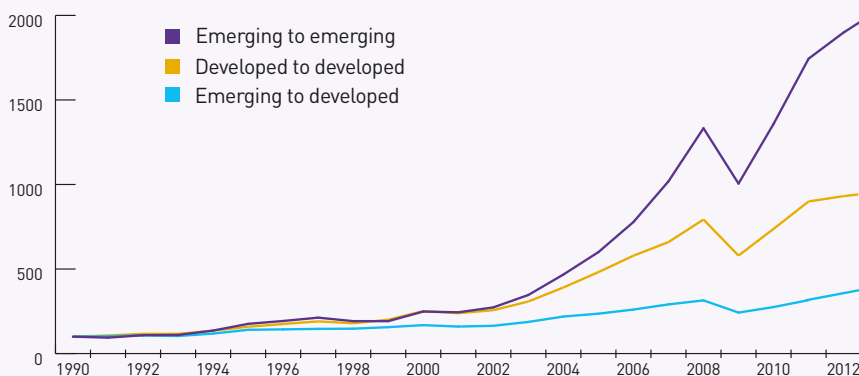
This was because most of the world's economic activity at the time – roughly two thirds¹⁵¹ – took place in Europe, North America, and the Former Soviet Union. Since then, the economic centre of gravity has moved steadily eastward, and in recent years southward, reflecting the growing importance of the economic activity of Asia and other emerging markets. It is forecast to move further east in the future.

As would be expected with the growth in air transport in the emerging markets, the world's 'aviation centre of gravity' has also shifted eastwards¹⁵². The aviation centre of gravity is estimated to have moved eastward and southward between 1970 and 2011, and is predicted to continue moving in that direction out to 2031¹⁵³.

Ian Saxon is an economist at Oxford Economics

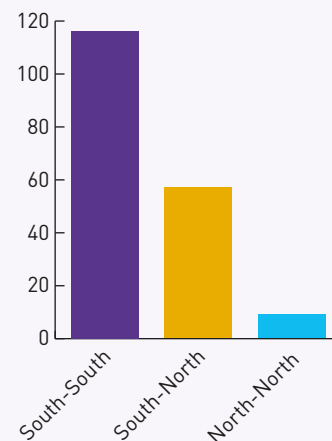
Rapid developments

Value of merchandise exports 1990-2012, indexed to 1990¹⁴⁶



Ahead of the pack

% growth in passengers between different economies, 2005-2012¹⁴⁸





B4

「National
analysis」

National analysis

National figures for employment and GDP supported by aviation, with analysis provided by Oxford Economics for those countries where reliable data are available and

estimations are possible at the national level. Estimates are conducted based on indicators such as airport employment, airport passenger traffic¹⁵⁵ and airline passenger

numbers¹⁵⁶. For other countries that are not included below, not enough data are available for a reliable country-specific analysis.

Africa

Country	Employment (000s)				Total	GDP (US \$ million)				Total
	Direct	Indirect	Induced	Tourism		Direct	Indirect	Induced	Tourism	
Egypt	46.1	76.9	36.4	1,230.8	1,390.1	1,332	847	401	14,805	17,385
Kenya	14.3	12.2	11.5	206.5	244.6	195	91	86	1,769	2,141
Morocco	32.2	41.0	28.0	818.2	919.4	648	374	255	8,373	9,650
Nigeria	45.3	62.8	50.2	96.1	254.5	462	266	212	464	1,404
South Africa	42.4	119.9	56.0	206.6	424.9	3,258	3,396	1,585	5,455	13,694

Asia-Pacific

Country	Employment (000s)				Total	GDP (US \$ million)				Total
	Direct	Indirect	Induced	Tourism		Direct	Indirect	Induced	Tourism	
Australia	118.1	84.3	56.8	253.9	513.1	13,909	11,384	7,669	28,261	61,222
China	900.8	2,624.1	1,335.4	993.5	5,853.8	26,286	28,236	14,369	11,994	80,885
Chinese Taipei	68.6	33.3	33.5	272.6	408.0	3,429	1,456	1,466	10,873	17,224
Hong Kong	91.3	57.2	36.6	150.2	335.2	9,024	4,102	2,627	12,450	28,204
India	121.6	334.2	240.2	5,998.7	6,694.7	1,860	1,354	973	19,121	23,308
Indonesia	40.2	108.1	91.4	1,321.5	1,561.1	1,544	855	723	11,575	14,697
Japan	289.8	140.0	106.9	237.8	774.5	19,464	13,265	10,126	21,780	64,634
Malaysia	107.6	52.7	32.1	235.3	427.7	1,574	1,284	782	6,558	10,197
New Zealand	24.8	38.9	39.8	131.6	235.2	2,610	2,990	3,057	8,271	16,927
Philippines	61.9	69.1	58.5	974.5	1,164.0	832	461	390	6,480	8,162
Singapore	94.5	46.4	35.5	148.5	324.8	10,746	3,883	2,975	15,868	33,471
South Korea	54.3	49.3	52.5	419.7	575.8	6,042	2,257	2,402	17,708	28,409
Thailand	110.8	246.8	173.6	2,898.0	3,429.3	3,346	2,320	1,632	36,616	43,914

Note that the country figures shown will not necessarily equal the regional totals expressed elsewhere in the report. In part, this is because individual country figures are computed using country specific multipliers, whereas regional figures are computed using region-specific multipliers. The former are smaller than the latter because of the effects of 'leakage' – spending that occurs outside of the country or region as a result of imports; an individual country will have more leakage than will a region, since some imports will occur within-region.

Europe

Country	Employment (000s)					GDP (US \$ million)				
	Direct	Indirect	Induced	Tourism	Total	Direct	Indirect	Induced	Tourism	Total
Austria	36.8	15.3	8.0	16.1	76.2	2,237	1,432	752	1,424	5,844
Belgium	35.7	29.8	12.3	34.3	112.0	3,314	3,154	1,302	3,356	11,126
Cyprus	11.5	3.2	3.8	60.3	78.8	565	185	225	3,290	4,265
Czech Republic	20.6	16.7	11.1	14.0	62.3	954	670	445	457	2,526
Denmark	31.8	9.9	6.8	12.5	61.0	2,146	1,186	820	1,292	5,443
Finland	70.9	26.5	20.0	25.1	142.6	4,178	2,603	1,966	2,338	11,085
France	229.1	252.3	158.2	231.0	870.6	30,191	24,413	15,305	19,966	89,875
Germany	411.0	251.2	163.5	291.1	1,116.8	29,463	20,693	13,471	22,699	86,327
Greece	56.3	22.4	25.6	250.9	355.2	4,370	1,486	1,695	14,067	21,619
Hungary	15.2	10.9	7.3	11.4	44.8	496	352	236	392	1,476
Iceland	3.4	4.5	2.8	20.1	30.8	434	364	224	1,582	2,604
Ireland	21.2	13.1	9.7	100.9	144.9	2,193	1,496	1,117	11,500	16,307
Italy	118.0	105.5	57.9	216.7	498.1	8,395	9,283	5,094	16,798	39,570
Latvia	4.0	2.1	1.7	12.4	20.2	125	67	54	422	668
Luxembourg	11.5	1.1	1.4	4.2	18.2	1,070	261	328	774	2,431
Malta	4.0	0.7	1.0	37.6	43.2	128	36	49	1,992	2,205
Netherlands	107.2	54.3	43.8	157.3	362.5	8,784	5,665	4,562	9,282	28,292
Norway	44.3	16.9	13.0	26.5	100.7	5,305	3,267	2,514	3,773	14,859
Poland	43.1	136.1	85.8	22.0	286.9	3,982	4,301	2,712	712	11,708
Portugal	30.4	26.4	19.4	166.6	242.8	1,972	1,207	887	6,562	10,628
Romania	28.5	18.7	17.6	32.8	97.7	904	374	353	609	2,240
Russia	319.4	186.1	174.2	196.6	876.3	11,809	5,235	4,898	5,911	27,853
Spain	106.6	65.5	46.4	918.3	1,136.8	7,271	5,012	3,548	70,238	86,069
Sweden	43.6	19.7	15.4	74.0	152.6	3,901	2,219	1,731	7,294	15,145
Switzerland	63.1	33.6	24.0	51.0	171.7	6,141	4,437	3,173	5,406	19,158
Turkey	152.2	137.9	63.2	798.5	1,151.8	5,827	4,390	2,010	34,171	46,398
United Kingdom	319.8	266.7	195.7	507.7	1,290.0	27,164	20,824	15,281	33,593	96,862

National analysis

Latin America and the Caribbean

Country	Employment (000s)					GDP (US \$ million)				
	Direct	Indirect	Induced	Tourism	Total	Direct	Indirect	Induced	Tourism	Total
Argentina	51.9	40.2	30.5	166.1	288.7	2,208	1,083	823	4,712	8,824
Brazil	206.9	638.7	406.6	289.5	1,541.7	16,645	14,373	9,148	7,179	47,345
Chile	42.3	45.3	36.9	37.1	161.5	3,178	1,593	1,297	1,366	7,434
Colombia	24.3	44.5	25.0	204.9	298.6	889	809	454	3,589	5,740
Dominican Republic	8.1	10.7	7.6	362.7	389.2	234	153	110	5,624	6,121
Ecuador	11.0	10.9	9.8	88.9	120.5	259	134	121	1,222	1,736
Mexico	155.6	102.8	75.5	423.8	757.7	4,062	2,489	1,829	9,626	18,005
Peru	23.0	10.5	8.4	171.4	213.4	251	141	112	2,755	3,259

Middle East

Country	Employment (000s)					GDP (US \$ million)				
	Direct	Indirect	Induced	Tourism	Total	Direct	Indirect	Induced	Tourism	Total
Israel	30.4	17.2	15.4	100.3	163.4	2,616	1,323	1,182	7,255	12,375
Jordan	18.4	10.1	9.3	47.6	85.4	348	215	198	1,154	1,915
Lebanon	8.6	7.0	5.9	136.9	158.4	517	221	186	4,515	5,439
Saudi Arabia	55.6	24.7	27.3	104.7	212.4	5,078	1,947	2,146	8,455	17,627
United Arab Emirates	97.6	43.1	34.6	325.7	500.9	7,670	3,153	2,530	21,923	35,277

North America

Country	Employment (000s)					GDP (US \$ million)				
	Direct	Indirect	Induced	Tourism	Total	Direct	Indirect	Induced	Tourism	Total
Canada	261.4	108.3	81.8	159.2	610.7	19,998	11,270	8,511	13,666	53,445
United States	2,227.2	1,309.8	985.2	1,209.1	5,731.3	181,933	149,353	112,331	118,098	561,716

#FLYINGHELP

Why airlines are making a change for good

Since 1987, cabin crew and airline ground-staff around the world have collected more than \$120 million in unused currency from passengers to support UNICEF's global Change for Good programme. Change for Good aims to reduce the number of preventable childhood deaths and, thanks to generous donations from passengers, UNICEF has been able to save more than 16,000 additional lives each day than was possible in 1990.

While the Change for Good programme is in operation on 12 airlines worldwide, UNICEF has developed a particularly close association with

American Airlines, and since 1994, more than 2,700 flight attendants and Admirals Club volunteers have raised \$9 million alone. As well as collecting donations during international flights, the airline's volunteers have become involved in UNICEF's work in other ways.

After helping to raise nearly \$1.2 million for UNICEF in 2012, four American Airlines flight attendants made a trip to Brazil to see UNICEF initiatives that focus on child survival, protection and development, in addition to engaging adolescents to create social change. Each year, Champions for

Children have the opportunity to vote on a UNICEF project to support with a portion of funds collected through Change for Good and in 2012 they voted to direct \$200,000 of the 2011 collections to support UNICEF work in Brazil.

Change for Good donations are also supporting UNICEF's HIV/AIDS programmes and aiding children and families affected by the devastating food crisis in the Sahel region of Africa. Funds will also help provide clean water and sanitation to communities in southern Colombia.



1 January, 1914, the first
scheduled heavier-than-air
passenger airline takes flight
from St Petersburg, Florida

A black and white photograph of a biplane on a body of water. The plane is a large, open-frame biplane with a high-wing configuration. It is positioned in the middle ground, with a city skyline visible in the background. The water is choppy, and the sky is overcast.

A growth industry

A century of commercial aviation
and a look towards the next 20 years

A growth industry

A century of commercial aviation
and a look towards the next 20 years

65,327,000,000 30km

Passengers have flown in the first 100 years.
The next 65 billion passengers are expected before 2030¹⁵⁷.

Distance of the first flight (and it stopped
halfway to fix the engine). Today's modern jets
can fly up to 15,200 kilometres... non-stop¹⁵⁸.

1 Passenger 1.7 weeks

On the first commercial airline flight on
1 January 1914. On the same day 100 years
later, 8.5 million passengers flew.

Weeks it takes of the average Australian
wage to pay for the lowest Sydney – London
return airfare. In 1945, it took 130 weeks¹⁵⁹.

\$3,629

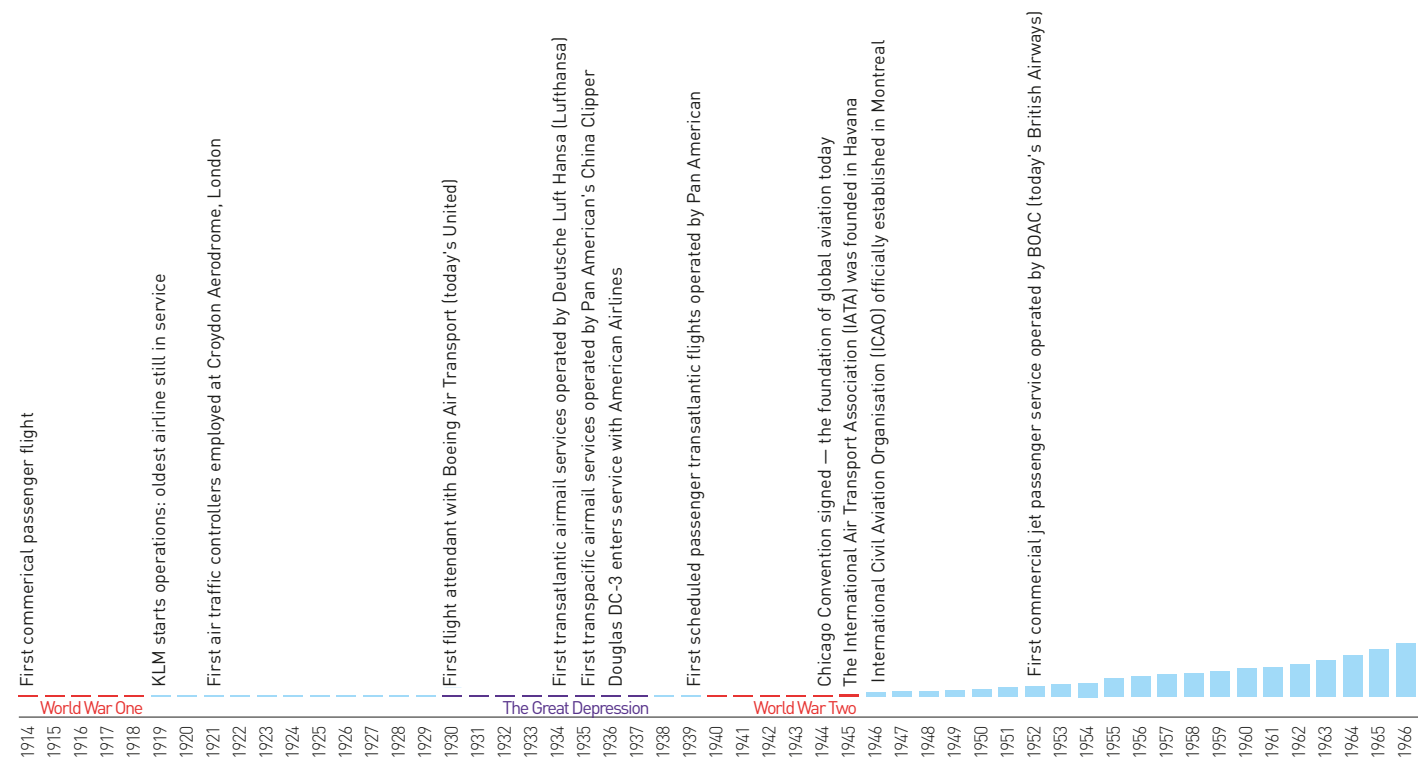
Cost, in 2014 dollars, of a New York to San
Francisco flight in 1930. Today, the same
ticket will cost under \$300¹⁶⁰.

20% of Americans had flown at least once in their life in 1965¹⁶¹. Today, it is estimated
that over 80% of the US adult population has flown at least once¹⁶², with around half the
population flying at least once a year. In the UK, around 77% of the population has flown at
least once¹⁶³, with half the population flying once a year¹⁶⁴.

**120 flights across the Atlantic per week
in 1948¹⁶⁶.** Today there are 1,200 every day
in the North Atlantic airspace alone.

The only way is up

100 years of commercial air transport growth, passengers 1914-2014¹⁷²



“International civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world.” – Preamble to the 1945 Chicago Convention

Still going strong

10 oldest airlines still in operation

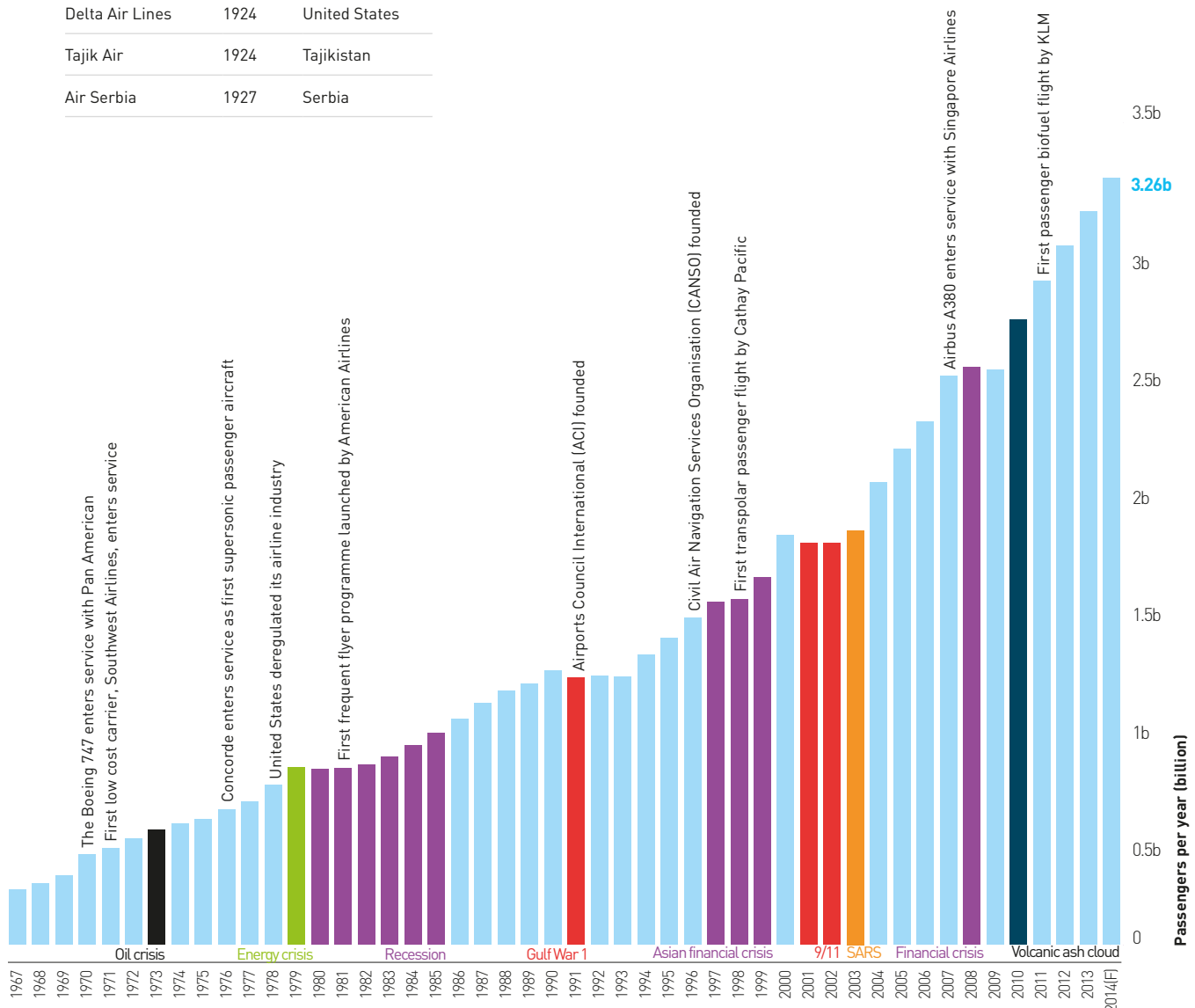
Airline	Year	Country
KLM	1919	The Netherlands
Avianca	1919	Colombia
Qantas	1920	Australia
Aeroflot	1923	Russia
Czech Airlines	1923	Czech Republic
Finnair	1923	Finland
Delta Air Lines	1924	United States
Tajik Air	1924	Tajikistan
Air Serbia	1927	Serbia

6.5

Average passengers per aircraft in 1937¹⁶⁵.
Today, the average is around 100.

47%

In 1920, aircraft would spend 47% of the time in the hangar under repair¹⁶⁷.



A growth industry



1937

Early reach

Map of the world's air routes in 1937¹⁷³

The past...

The world's first regularly scheduled heavier-than-air airline, the St Petersburg – Tampa Airboat Line, connected the towns of St Petersburg and Tampa in Florida with a 30 kilometre flight across the Tampa Bay. The airline was the creation of a local electrical engineer, Percy Fansler. He enlisted the support of Thomas Benoist, an early aircraft manufacturer who provided the plane and the pilot, Tony Jannus.

On 1 January 1914, 3,000 people gathered at the waterside in St Petersburg to see the first flight of this fledgling airline. This was a huge crowd for the city considering that the permanent population was perhaps 7,000 people at the time. In a charity auction, former St Petersburg mayor Abram C. Pheil bid \$400 for the privilege of being the first passenger. Normally passengers on the airline paid \$5 (around \$115 today) for the 23 minute flight. Invited to say a few words just prior to takeoff, Percy Fansler commented, “The airboat line to Tampa will be only a forerunner of great activity along these lines in the near future...what was

impossible yesterday is an accomplishment of today – while tomorrow heralds the unbelievable”¹⁶⁸. He was right.

Transport has often been a driver of development throughout human history. The overland silkroad was replaced with new technology in the form of ships. Rail services replaced horse and cart and were in turn partially replaced by the automobile. And aircraft, in the early 20th Century, started opening up new routes and opportunities around the world. It is telling that even from the start, buoyed by the colonial and trading interests of European powers, air transport had a reach extending to all parts of the world. The map above shows the reach of air services in 1937, with routes throughout China, South-east Asia, Africa and Latin America.

But it was when the first widebody jets were introduced in the 1960s that air transport really became the global force that helped shape the world. The opening up of tourism destinations and the use of this modern (and fast) transportation form allowed greater numbers of people to travel for business and leisure than ever before.

The airline sector has never been an easy business. That very first airline flying across Tampa Bay only lasted five months and never broke even (although getting close). And it is telling that of the 19 airlines that were members of the Air Transport Association of America in 1937, only three survive today: American, Delta and United¹⁶⁹. However, the significant growth in air transport has also seen significant increases in efficiency by the industry. In 1942, for example, there was an average of 86 passengers per airline employee in the United States¹⁷⁰. Today, the global average is 1,310 passengers per employee. And what is today's largest cost – fuel – has been a driver of efficiency gains from the earliest days of modern air transport.

Through efficiency gains, airlines are today able to break even with fuel at over \$100 a barrel, whereas they were making losses in 2003 when fuel was at \$30 a barrel¹⁷¹. The restructuring of many airlines and streamlining of their operations has brought significant efficiencies. The profitability of airlines remains a challenge, but the industry is one which also shows remarkable resilience. Despite



2014

We fly everywhereMap of the world's air routes today¹⁷⁴

massive security and energy shocks and a series of hijackings in the 1970s, traffic continued to rise. Despite a tumultuous last couple of decades, with financial crises, health scares and conflicts hitting the industry (sometimes directly, in the case of 9/11), the growth trend has continued. Now, the growth is mainly taking place in the emerging economies of the world which are beginning to enjoy the benefits of travel as middle classes develop.

**Air transport is
forecast to support 103
million jobs by 2032**

... and the future

2012	2032 ¹⁷⁵
2.97 billion passengers	6.63 billion
5.4 trillion passenger kilometres flown	12.2 trillion
20,101 jet aircraft in service	41,240
58.1 million jobs supported	103.1 million
\$2.4 trillion economic impact	\$5.8 trillion

The contribution of the air transport industry in 20 years' time

Several aircraft manufacturers, including Airbus, Boeing, Bombardier and Embraer, estimate the future demand for air transport in the form of revenue passenger kilometres. The most recent estimates¹⁷⁶ suggest that demand for air transport will increase by an average of 4.7% per annum over the next 20 years. That implies that demand for air travel will increase by a factor of two and a half over the period.

If this growth path is achieved, then in 2032 the air transport industry will contribute¹⁷⁷:

- » 13.9 million direct jobs and \$1.4 trillion of GDP to the world economy;
- » Including indirect and induced contributions, 36.7 million jobs and \$3.8 trillion in GDP;
- » Once the impacts of global tourism are taken into account, a total of 103 million jobs and \$5.8 trillion in GDP.

A growth industry

Through the ages



1



2



5



6



7

The impact of lower growth: a sensitivity analysis

As a result of any number of unexpected events, demand for air transport over the next 20 years may diverge from current expectations. How would the economic contribution of aviation change if global demand for air transport proves to be lower than expected? A sensitivity analysis can help to answer this question. By changing key assumptions driving the results, this type of analysis can indicate a reasonable range for alternative outcomes.

For example, if the average annual growth in passenger numbers for each region covered in this report turns out to be one percentage point lower than currently expected between 2012 and 2032, then in 2032:

- » Worldwide, there would be 1.4 million fewer direct jobs in the air transport sector.
- » Taking into consideration the direct, indirect, and induced impacts, there would be 3.7 million fewer jobs supported by air transport.
- » Once the impacts of tourism are included, the air transport sector would support

a total of 12.4 million fewer jobs than would otherwise be the case under the baseline scenario.

- » Worldwide, the direct, indirect, and induced GDP for air transport would be \$661 billion (2012 prices) lower than it otherwise would be.
- » An additional \$352 billion would be lost because of a reduction in tourism activity.

Aircraft in 2032 and beyond

Despite the rapid rate of growth in passengers and aircraft movements from 2010 to 2032, the industry is confident that its emissions reduction targets will see a capping of net CO₂ emissions from aviation in 2020. For the next target – reducing aviation CO₂ to half of what it was in 2005 by the year 2050 – the industry will have to tap into its long history of innovation.

Sustainable, advanced-generation aviation biofuels will certainly play a large role in reducing emissions. Operational and infrastructure improvements will also be an important building block. But new aircraft technology is going to be one

of the most visible signs of that progress.

Aerodynamicists are currently exploring new aircraft designs for the future.

By some measures, the most efficient aircraft model is a ‘blended wing’ design where the entire aircraft becomes a lifting device, effectively a flying wing. Super lightweight materials and new systems will be required to implement the concept. The ‘Very Efficient Large Aircraft’ project has already researched blended wing concepts which would deliver per-seat fuel consumption improvements of up to 32% over current aircraft designs¹⁷⁸.

How these aircraft could be designed to fit into current airports and how passengers may react to a windowless journey, however, are subjects for further research.

In late 2010, NASA awarded contracts to three teams – from Lockheed Martin, Northrop Grumman and Boeing – to study advanced concept designs for aircraft that could take to the skies in the year 2025. Each design looks very different, but all final designs have to meet NASA’s goals for: less noise; cleaner exhaust; lower fuel consumption; to fly up to 85% of the speed



of sound; cover a range of approximately 7,000 miles; and carry between 50,000 and 100,000 pounds of payload, either passengers or cargo. Each aircraft has to be able to do all of those things at the same time, which requires a complex dance of trade-offs between all of the new advanced technologies that will be on these vehicles¹⁷⁹.

Airbus has provided a glimpse into the future with its Concept Plane – the result of brainstorming between engineering and design staff as to the most efficient potential technologies and materials for aircraft construction. Even if these concept aircraft don't eventually fly, research into these designs is producing a lot of the valuable innovation needed to produce the next generation of aircraft and helps the debate on decisions that must be made about environmental priorities.

- 1 KLM is the world's oldest airline, celebrating its 90th year of operation in 2014.
- 2 The first flight attendants joined Boeing Air Transport in 1930.
- 3 A couple dines on the Lockheed Super Constellation in the mid-1950s. The cost of tickets was prohibitive to all but the very wealthy and should be compared to today's first class in service and price.
- 4 First class film on board a Boeing 707 in 1965. The first film to be shown on board a flight was in 1921 on Aeromarine Airways in Chicago.
- 5 The Boeing 747 rolls out in February 1969. This, the first 'jumbo jet', revolutionised the airline industry and opened up travel possibilities for much larger segments of the population.
- 6 French and British manufacturers Aérospatiale and British Aircraft Corporation joined forces in the late 1960s to develop the world's first successful commercial supersonic aircraft – Concorde – which flew for 27 years.
- 7 The Airbus consortium's first commercial aircraft, the A300, entered service in 1974.
- 8 In the future, aircraft may start taking on different appearances as manufacturers investigate even more fuel efficient designs. Boeing's Sugar Volt and the Airbus Concept Plane are two of the many visions of the future.

SKILLS DEVELOPMENT



Airports are catalysts to economic growth

Airports are more than just vital parts of the global transport system, linking communities and businesses with the world — they are important employers and catalysts to skills development in their own right.

Ecuador's New Quito International Airport, which opened in February 2013, has become one of the country's most important infrastructure projects in terms of technological development, economic growth and employment generation. Recent estimates suggest it has generated around \$1 billion in economic activity for the country and currently employs about 6,000 people across the different companies directly related to airport activity.

Ecuador is one the largest flower exporters in the world and there are about 560 flower-growing farms around Quito aiming to sell their produce to the world market. During the peak flower-producing season of San Valentine in February 2014 there was an increase of 23.7% in air cargo throughput over 2013 as a result of new, larger aircraft being able to access the airport.

During construction between 2006 and 2012, around 4,000 Ecuadorian workers and 120 local companies were contracted. The airport management company, as part of its development plan, launched a series of scholarship programmes, including the David Cachago Scholarship award which has seen 358 educational scholarships given to vulnerable young people. It has also formed new links with local businesses. These include helping Pimienta Gourmet — a small enterprise formed by local women — offer catering services to companies based at the airport, and setting up a database of local workers and small companies whose services could be needed by businesses based at the airport.

Global travel for all



Essay by Dr Marc Dierikx

Following dispersed early experiments before 1914, air transport started out in the first years after the end of World War I as an experiment in Europe as to whether there would be a market for rapid travel by aeroplane that might compete with journeys by rail or sea. It took time to catch on. Airports generally were difficult to access and lacked all of the comforts we now associate with air transport. In many cases, the aircraft hangar was the only building on the landing ground and combined technical functions with a corner set apart for passenger handling. Although airline advertisements boasted comforts on-board comparable to those of first class rail or sea travel, actual conditions for passengers were spartan: light-weight wicker chairs instead of leather cushioned seats; nothing to eat or drink; ear plugs against the deafening engine noise; a tin or a paper bag for depositing the results of air sickness caused by low flying. Small wonder then that passengers could opt to receive a special certificate, signed by the pilot, that they had actually flown (and now lived to tell the tale).

Reliability was also an issue. Aircraft, often with a single engine, were accident prone. Some airlines only hired pilots who had previously proven themselves capable of surviving emergency landings. The custom of handing out life vests on flights across water entailed more than a discrete warning. The situation only began to change with the spread of multi-engine aircraft in the mid-1920s. Nonetheless, flying remained a hazardous way to travel, a fact that was aggravated by the absence of dependable weather forecasts and radio communications. Air transport in general was limited to the months between April and November, winter conditions being regarded as impediments to flying as such. Speed in the air was relatively low and on the longer routes the difference between air and rail travel was often that between spending the night in a railway sleeper carriage, or in a hotel bed at the destination – overcome with exhaustion after suffering the discomforts of the flight.

Given these circumstances, early airlines aimed at travelling businessmen and government officials on missions that involved some urgency. Businessmen must be taken literally: only a minority of airline passengers were women, in most cases spouses

accompanying their husbands. Attracting clientèle was no easy matter. Flights were few and only the ‘busiest’ routes boasted daily departures. Apart from the adverse conditions on board, there was the question of price: airline tickets were horrendously expensive and a flight from, say, Amsterdam to London cost the equivalent of an average worker’s monthly wages. No surprise then that in the 1920s, the typical flight carried fewer than two passengers. Airlines survived on government subsidies and on the carriage of freight, in particular mail. In the early days, air transport meant mail transport. Indeed, in the United States all scheduled flying involved airmail operations until the second half of the 1920s.

Nonetheless, protagonists of air travel liked to present the aircraft as a means of transport that would unite people living in distant parts of the globe. When the first fully-fledged airlines took off in the spring of 1919, they were greeted as the heralds of a new age in which air travel would ‘shorten’ distances and contribute to a better, harmonious and more integrated world. That world was understood to be on a ‘western’ mould. Air services catered to the travel needs of the upper classes, and to their colonial interests. Imperial air services

aimed to strengthen a perceived superiority. Passengers on the air routes to Asia, Africa and South America were predominantly caucasian functionaries and administrators whose need for rapid transport lay in the political bonds of the day. In the 1930s, the French pilot-turned-novelist Antoine de Saint-Exupéry combined his personal reminiscences of piloting with an effort to spread the magic of the flying experience as such. It was his firm belief that air travel, partaking in the enchantment of flight, would create friendship between all humans inhabiting the planet earth, and would thus

passenger figures more than doubled in these years, with the transatlantic market taking precedence as old empires crumbled.

The numbers would continue to grow at double digits for the next decade and beyond. These were the golden days of air travel, reproduced time and again in airline advertisements depicting the upwardly mobile thirty-something passengers relaxing whilst enjoying drinks, a smoke and each other's company in the peculiar atmosphere of an aircraft bar at 20,000 feet. On the ground, airports were redeveloped to look like

of distance, but for permanent settlement elsewhere on the planet. This process was not limited to the industrialised countries. Economic stagnation in the Third World, political repression and violations of human rights put growing numbers of people on the move across the globe, seeking refuge from deprivation, insecurity and persecution.

To negotiate the distance to the industrialised and economically booming countries of the North, air transportation became the mode of choice. Indeed, the ever growing web of international and intercontinental air services drew Europe closer to the problems that a retreating colonialism had left behind in Asia and Africa. Similar developments manifested themselves between the United States and Latin America. Nonetheless, travel by air contributed to the spread - and mash - of cultures that has become a normal part of modern life. The effects of mass air transport have created the need to address cultures, conceptions, and beliefs outside one's own field of heritage.

In a world where borders are only lines on a map, the lines in the air contribute to a new, increasingly global civilisation despite increased border controls and perceived security risks. In more ways than one, the toy of the rich has become the tool of the poor. In this sense the inception of low-cost carriers in the 1990s has had a considerable impact. In several parts of the world it enabled an influx of temporary migrant workers, living in two locations at once, using cheap air travel to transpose between 'home' and 'work' environments.

In a little over a 100 years, aviation technology has evolved much more rapidly than people and cultures. Its effects have been considerable. In a closely knit world, the vastly increased personal experience with, and perception of, other cultures revealed just as many risks of rejection as of acceptance of different beliefs and ways of life. Aviation opened and closed the door on the emergence of a true global society - the very thing that visionaries of its glorious future such as Saint-Exupéry had held so high when flight was still about uniting all peoples in a new and better world.

Dr Marc Dierikx is the author of *Clipping the Clouds: How Air Travel Changed the World*.

The rise of the tourist promised to deliver on the expectations that had come with the rise of air transport: a world in which the air would unite all people

contribute to a new and better society, a true Terre des Hommes - planet of man. Despite a gradual increase in the numbers of airline passengers, such high hopes did not materialise before the next onslaught of worldwide violence between 1939 and 1945.

When the war ended in 1945, aviation faced new challenges. Governments the world over came to realise that aircraft might be used to create something of a temporary means of transportation at a time when roads, bridges, railway depots and canals had to be rebuilt. This would serve a reconstruction of international trade. Hundreds of military cargo aircraft were converted for civil use. Even before America's Marshall Plan for the economic reconstruction of Europe came into effect in 1948, the market for air transportation to and from the United States showed very rapid growth. Wartime developments in aviation technology coincided with worldwide recognition that the United States emerged from the conflict as the planet's leading nation, not just in the military sense, but also in economics, in technology, and even in culture. Air transportation was instrumental in spreading American goods, technology and ideas across the globe. A new market for air travel evolved: flights across the Atlantic. World

architectural marvels of modernity and design. Yet airline passage continued to be prohibitively expensive and beyond the means of the average traveller. Not until the advent of the jet age, around 1960, did the social composition of the average airline flight begin to shift. A period of continuous economic growth in the western world provided for increased disposable incomes and leisure time. These developments coincided with the introduction and spread of larger, faster aircraft, and the rise of the new phenomenon of relatively low-priced charter flights. The combination broadened the market for air travel beyond all previous planning and would eventually change it beyond recognition.

Since the 1960s, decreasing ticket prices made it possible to travel by air for other than commercial or government purposes. The rise of the tourist, or the individual leisure traveller, not only changed aviation. It promised to deliver on the expectations that had come with the rise of air transport: a world in which the air would unite all people. In the 1960s the first contours of a more globally balanced composition of air travellers began to show: more tickets were being sold in countries situated in the Southern hemisphere. Increasing numbers of passengers were travelling not for a temporary negotiation

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 138. The European Union member states as of 2013 include: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom.
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