Air Connectivity

Measuring the connections that drive economic growth

IATA

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Abbreviations

ACI	Airports Council International
ATRCI	Air Transport Regulatory Competitiveness Indicators
EU	European Union
GCC	Gulf Co-operation Council
GDP	Gross Domestic Product
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
PPE	Personal Protective Equipment
PPP	Purchasing Power Parity
SAATM	Single African Air Transport Market
VFR	Visiting Friends and Relatives
WEF	World Economic Forum

Executive Summary

Air transport is vital for the modern economy. It provides the city-pair connections that serve as virtual bridges supporting the flows of key economic activities between markets. As the only rapid global transportation network, it facilitates links between businesses, governments and people – enabling world trade, investment, tourism and travel among other key economic activities.

While this report focuses on the important role that air connectivity plays in promoting global economic prosperity, we acknowledge and discuss the disruptive impact that the COVID-19 pandemic has had on air connectivity around the globe. We provide a snapshot of global and regional air connectivity before and during the pandemic, discussing the importance of restoring air connectivity to support economic recovery. In a way, the outbreak and spread of COVID-19 proved to be a natural experiment to examine the interplay between the levels of connectivity and key economic flows, such as tourism, trade and investment.

Air connectivity enables cross-border trade
Air connectivity facilitates world trade. It enables countries' participation in the global economy by increasing access to international markets and facilitating globalisation of production and supply chains. Nearly 61 million tonnes of freight was carried by air in 2019. The total value of goods transported by air is $6.5 trillion, representing 35% of all international trade.

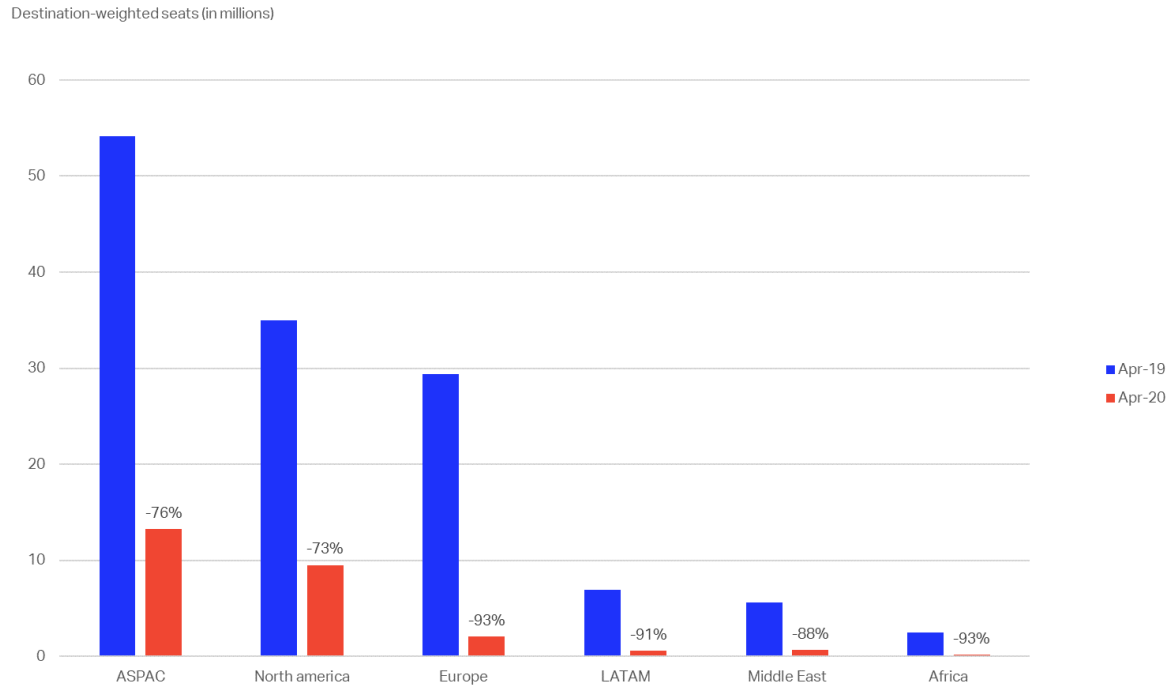
Air connectivity supports tourism flows
Aviation is indispensable for tourism, a major engine of economic growth, particularly in many emerging economies. Globally, 54% of international tourists travel by air. Aviation spurs innovation by facilitating the exchange of goods, services, knowledge and ideas. It widens markets and provides greater access to international capital, human resources and investment. Aviation's global economic footprint (direct, indirect, induced and tourism catalytic benefits) is estimated at $3.5 trillion, contributing 4.1% to the global gross domestic product (GDP) and supporting 87.7 million jobs.

Air connectivity enables cross-border investment and knowledge exchange
Air connectivity enabled through regular and speedy air service unlocks a wide range of economic benefits. Therefore, improving air connectivity can generate a substantial boost to economic growth. Air connectivity contributes to improved economic productivity by encouraging investment and innovation, improving business operations and efficiency, and allowing companies to attract high-quality employees and share knowledge.

Air connectivity is an important policy concept, which is becoming increasingly relevant in various international fora. Policy makers in the air transport sector need a rigorous measure to understand how air connectivity is evolving over time in order to compare the level of air connectivity across different cities, countries and regions. The IATA air connectivity measure captures important aspects of air connectivity – such as the economic importance of the destination city and onward connections to the rest of the global air transport network – while at the same time providing a simple and intuitive way to measure and report air connectivity.

The onset of the global pandemic has led to significant disruptions in air connectivity across all regions. According to the IATA connectivity measure, all regions sustained sharp declines in air connectivity levels relative to the previous year. Connectivity in some regions such as Asia Pacific and North America proved to be more resilient due to the presence of sizable domestic aviation markets. Domestic markets have been more resilient to disruptions in air connectivity and are expected to recover faster than international air travel. Other regions, such as Africa, Europe, Latin America and the Middle East experienced drops in connectivity levels close to 90% at the lowest point.

ES 1: Global air connectivity disruption due to COVID-19



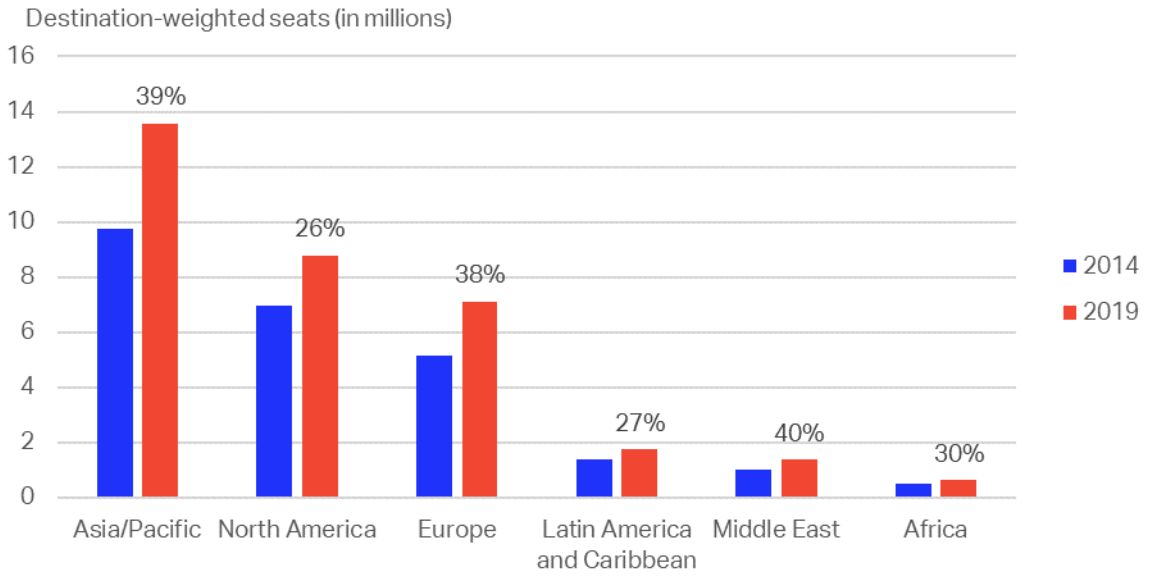
Source: IATA Economics

While connectivity has been recovering as this report is being published, several challenges for restoring connectivity to pre COVID-19 levels remain in the short and medium term. Firstly, ongoing restrictions on international travel and quarantine requirements continue to suppress leisure and business travel, posing a challenge for the recovery in air connectivity. Secondly, the timing of restoring passenger confidence in flying will continue to shape the recovery in air transport service and air connectivity. Thirdly, economic recovery will play an important role in supporting recovery in air travel demand and air connectivity once border restrictions are lifted. It is important to point out that recovery in air connectivity itself will contribute to economic recovery around the globe.

In the past five years, economic development worldwide has been getting a significant boost from improved air transport linkages. This wider economic benefit is being generated by increasing connections between cities – enabling the flow of goods, people, capital, technology and ideas – and falling air transport costs. Before the COVID-19 pandemic, the number of unique city-pair connections was set to exceed 23,000 in 2020, more than double the connectivity by air twenty years ago. The price of air transport for users continues to fall, after adjusting for inflation. Compared to twenty years ago real transport

costs have more than halved. Air connectivity is essential for trade flows; trade itself has resulted from globalized supply chains and associated investment. Air transport is vital for manufactures' trade, particularly trade in components which is a major part of cross border trade today. Air connectivity is also vital for supporting tourism flows, particularly for many emerging and island economies dependent on tourism spend as an economic engine.

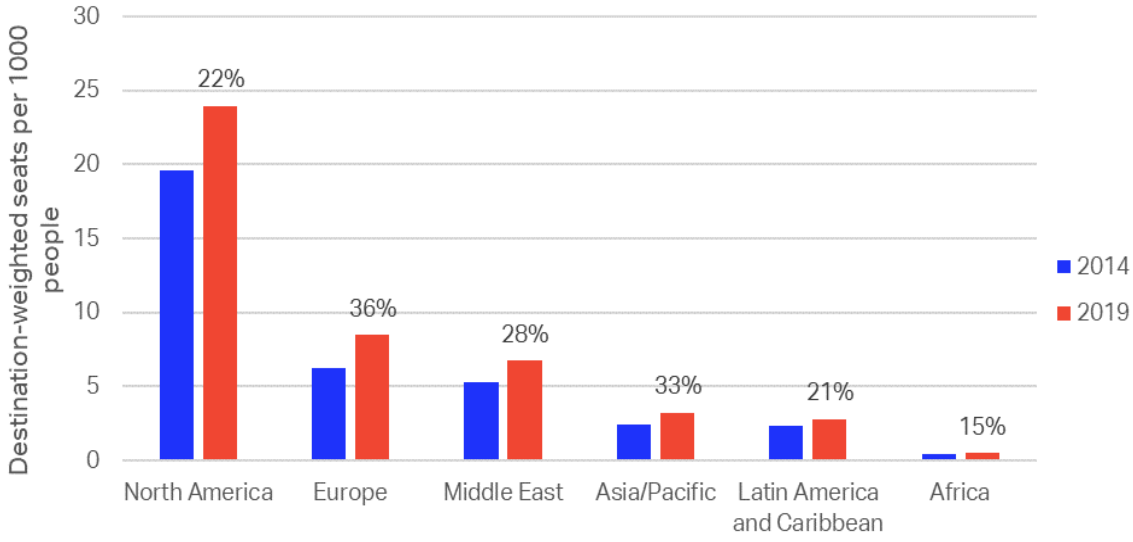
ES 2: Global air connectivity evolution during 2014-2019



Source: IATA Economics

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. After adjusting for population size, connectivity has been improved across all regions in recent years, with North America in the lead.

ES 3: Global air connectivity relative to population size, 2014-2019



Source: IATA Economics

In addition to an overview of connectivity levels globally and regionally, the report provides a detailed analysis of connectivity trends at a country and city level in each region during the past five years (2014 to 2019). Using the IATA air connectivity index (originally developed in 2007),[1] the report presents results ranking countries and cities globally and by region.

To evaluate the importance of air connectivity, case studies are used to examine key drivers and trends in air connectivity in selected countries (Ethiopia, Nigeria, India, Vietnam, Iceland, Georgia, Chile, Panama and Qatar). In addition, the case study of small island states is used to illustrate the importance of improved air connectivity for economies which depend on tourism as a source of economic growth.

Given the significant benefits generated by air connectivity, it is important to look at how air connectivity can be maintained and improved. Air connectivity is a function of many variables. There are variables in the air connectivity function that cannot be influenced, such as geographic location, demographics and geopolitical issues. However, the cases of many countries around the world (the Netherlands, Singapore, Iceland, etc.) show that policy makers can influence the policy and regulatory landscape in which the industry operates, creating conditions that facilitate the development of air connectivity. A favourable policy environment is especially important for restoring air connectivity during and in the aftermath of the COVID-19 pandemic.

Importantly, while economic growth is a driver of air connectivity, air connectivity itself is essential for generating and promoting economic growth. The relationship is symbiotic. Governments can enhance air connectivity through favourable aviation policies, and in doing so support growth in their economies.

The structure of this report is as follows:

Chapter 1 introduces the concept of air connectivity and discusses the wider economic benefits of air connectivity.

Chapter 2 describes the IATA air connectivity index and compares it with other measures of air connectivity, in particular those developed by SEO Aviation Economics and used by Airports Council International and the World Bank.

Chapter 3 discussed the impact of the COVID-19 pandemic on air connectivity and the importance of restoring air connectivity to support economic recovery.

Chapter 4 provides an overview of air connectivity trends and performance globally.

Chapter 5 provides an overview of air connectivity trends and performance by region, exploring case studies for selected countries in each region.

Chapter 6 examines factors that impact the levels of air connectivity, discussing the role of policy in shaping the future of air connectivity.

1. Importance of Air Connectivity

1.1. Why does air connectivity matter?

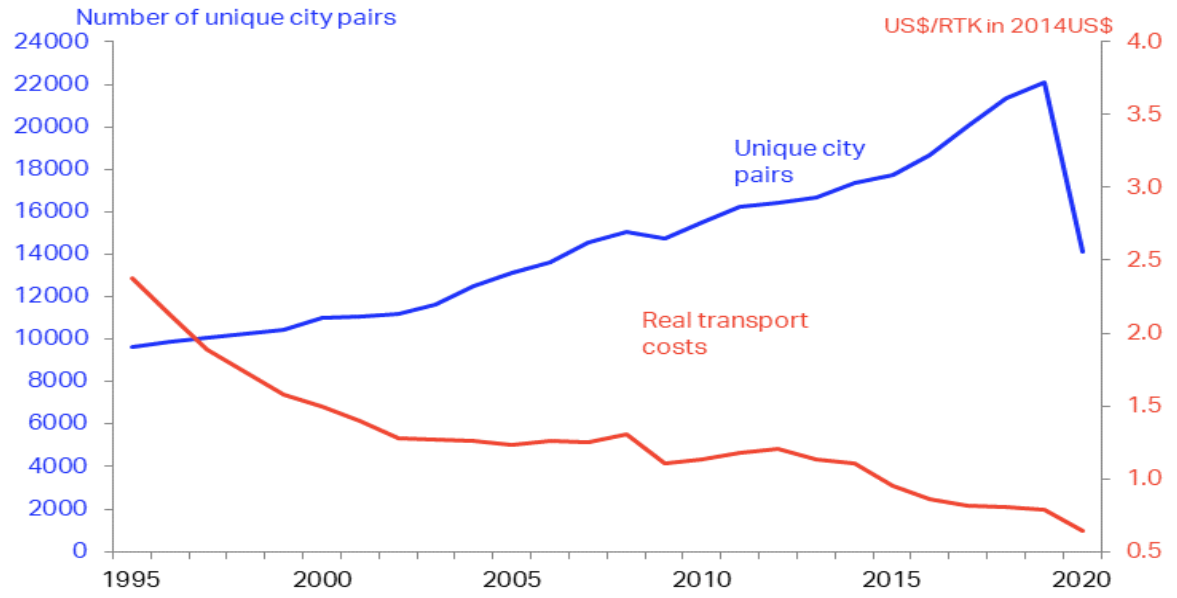
In 2019, Australia's national carrier Qantas was testing a new non-stop commercial flight from Sydney to London. This flight takes a staggering 19.5 hours to complete and, if launched, will propel the world of air travel into the new era of ultra long-haul travel. In the not-so-distant past travellers could not even dream of reaching London from Sydney on a direct flight within such a short time.

A century ago, it took 28 days to reach Australia from the UK by air with multiple stops on the way and no passengers on board. About 70 years ago (in the late 1940s), the length of this trip was shortened considerably and yet it would take four days for passengers to reach Sydney from London with stops in Rome, Tripoli, Cairo, Karachi, Calcutta, Singapore and Darwin.[2] The introduction of jet engines and the penetration of new aircraft technologies have made it possible to operate direct flights on long-haul and ultra long-haul distances, allowing airlines to add and develop air connectivity regionally and globally. Consequently, it is now possible to reach London the same day one departs from Sydney.

Improved air connectivity benefits users of air transport networks (passengers and shippers). Perhaps the most important economic benefit of air transport is the value that passengers and shippers derive from the ability to access destinations and markets around the world.

Over the course of the past decades, air travel has offered consumers and producers more choice in routings and faster linkages to the rest of the world, at an ever-decreasing cost in real terms. In 2019, the air transport industry connected a record number of cities worldwide, reaching and exceeding 23,000 unique city-pair connections for the first time. Moreover, the cost of air travel and air freight transportation has been decreasing in real terms as savings from new technology adoption and greater efficiencies are being passed on to the consumer in the form of a lower price in real terms. Figure 1 illustrates the number of unique city pairs and real air transport costs globally.

Figure 1: Unique city pairs and the real cost of air transport



Source: IATA Economics

Improved air connectivity brings about wider economic benefits, beyond the user. These are effects in the economy that extend beyond the immediate users of the air transport networks – households, businesses and the government. It is important to note that these effects are different from what is often described as the economic benefits of aviation where the main focus is on air transport entities (airlines, airports, ANSPs, manufacturers and suppliers) as employers and generators of economic activity.

Improved air connectivity between cities around the world serves as an important catalyst for economic growth and prosperity. Most assessments of economic benefits of aviation tend to focus narrowly on the contribution that industry players make as employers, measuring the employment and economic footprint of the air transport industry and its supply chain. This standard approach for measuring economic impact can be applied to any industry.

The standard economic impact methodology, which captures the impact of spending by employees in the air transport sector and its supply chain and tourists travelling by air, has a number of limitations. If an economy is at full employment, then expanding employment in the air transport industry will mean diverting resources from other economic sectors or other geographic regions in the country. Consequently, the net macroeconomic impact in terms of real economic activity is zero. Increased employment in the air transport industry, when the economy is at full employment, can also lead to inflationary pressures as employees demand higher wages.

The unique contribution of the air transport industry to the economy is its role in enabling and promoting key economic flows such as trade, investment, tourism and the other drivers of economic development enabled by efficient and affordable air services. Air linkages that connect cities make an important contribution to economic growth because they can boost the supply side of the economy – build additional productive capacity to enable economic growth without inflationary pressures.

1.2. Different types of air connectivity?

The term "air connectivity" can mean different things to different people. The IATA air connectivity index measures the degree to which air transport connections support a country's economic development and productivity levels. It is designed primarily for governments and policy makers to evaluate the role of air connectivity in supporting their country's economic policy agenda.

Other measures of air connectivity have been developed offering a different and interesting perspective on air connectivity. From a passenger's perspective, air connectivity represents the ability to seamlessly travel by air from origin to destination in the shortest possible time. Similarly, cargo shippers have a vested interest in finding the most efficient routings in order to get freight delivered quickly and efficiently from origin to destination. From an airport's perspective, measuring air connectivity is useful in assessing the value of individual air linkages. An air connectivity index could thus support an airport's business development and strategic planning. Selected alternative measures of air connectivity are reviewed in Chapter 2.

Research established an empirical link between air connectivity and economic productivity, controlling for other factors which influence the level of productivity: education levels, research and development, capital spending, institutional and regulatory factors. IATA's research found evidence indicating that a 10% increase in air connectivity, relative to a country's GDP, will boost labour productivity levels by 0.07%.[3] Earlier research which examined only the EU economies found that a 10% increase in air connectivity, relative to a country's GDP, boosts total factor productivity by 0.9%.[4]

- **A positive link between connectivity and productivity.** IATA's research shows that connectivity has a statistically significant relationship with labour productivity levels. It shows that a 10% rise in connectivity, relative to a country's GDP, will boost labour productivity levels by 0.07%.

- **The impact is greater for developing countries**. The relationship between connectivity and productivity is logarithmic (i.e. based on percentage changes in both values), rather than linear. This suggests that investments in air transport capacity in developing or transition countries, where connectivity is currently relatively low, will have a much larger impact on their productivity and economic success than a similar level of investment in a relatively developed country.

- **Capital investment has the greatest impact on productivity**. Investments in the overall capital stock are shown to have a strong positive impact on productivity levels. A 1% rise in capital spending per worker is found to increase labour productivity by 0.37%.

- **A positive impact from Research & Development (R&D)**. A higher level of expenditure on research and development is shown to have a positive impact on productivity. R&D helps to develop new production methods and knowledge, allowing more output to be produced from a similar level of inputs.

- **Other factors can constrain productivity in some countries**. For developed countries (e.g. the US and UK) there is little difference in productivity levels beyond those that are explained by differences in capital spending, education, R&D and connectivity. However, for some developing countries (e.g. India) the country specific indicator highlights other factors (i.e. institutional or social) that can act as a constraint on productivity.

From a policy maker's perspective, it is this very link between air connectivity and a country's economic potential which is of utmost importance. IATA's air connectivity index reflects the degree to which a city or a country is connected to the air transportation network, global or regional. It enables policy makers to assess the extent to which their country is integrated into regional or global air transport networks and provides an important measure to support policy decision making. Measuring and understanding air connectivity could help governments develop and implement evidence-based policies aimed at improving the level of integration into regional and global transportation networks. Importantly, policies aimed at improving and developing air connectivity could also support economic development and, in doing so, improve the welfare of citizens in a given country.

1.3. What is air connectivity?

Air connectivity reflects how well a country is connected to cities around the world. Access to greater air connectivity is fundamental to the ability of a given country or city to develop economic linkages with the rest of the world. Air connectivity provides the foundation for international mobility of people and goods and is therefore a vital engine of economic growth worldwide.

The global air transport system can be thought of as a network of nodes connected by air services offered by airlines. One central question to evaluating and reporting air connectivity is the choice of a reference point – the node within the global air transport system. IATA's air connectivity index was developed to evaluate the linkages between air connectivity and economic performance, so the relevant reference point is a country. The connectivity score can also be reported for cities.

From an economic development perspective, it is important to evaluate how well a city or a country (rather than an airport) is connected within the region or to the rest of the world. The IATA air connectivity score can be used to evaluate air connectivity at the level of a city, country or region. For example, a national government may be interested in adopting policies aimed at improving its country's air connectivity score within the region. The IATA connectivity score at the country level can be used to benchmark the country against other regional peers.

Other measures of air connectivity have used various reference points when analysing air connectivity. These measures are designed for different purposes and the choice of the reference point is linked to the objective of a given measure. ACI Europe uses the NetScan methodology developed by SEO Aviation Economics. The connectivity score is reported at the airport level and is designed for the competitive analysis of airline networks and the airports they serve. The World Bank reports connectivity scores at the country level and defines air connectivity in reference to the importance of a country as a node within the

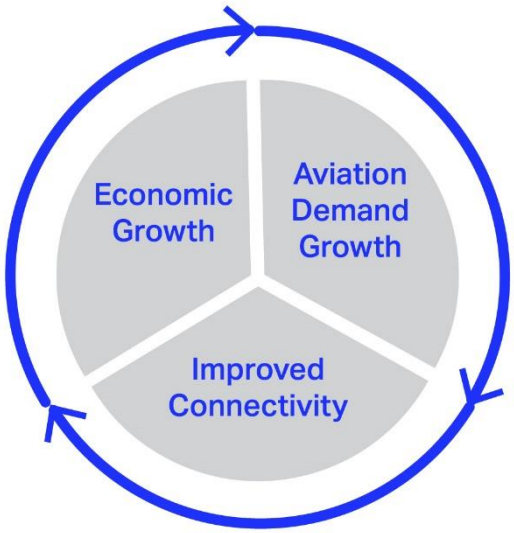
global air transport system. The World Bank measure aims to examine the relationship between air connectivity and global trade. A detailed discussion of other connectivity measures and a comparison with the IATA air connectivity index is provided in Chapter 2. Further, Chapter 2 will discuss the various dimensions of air connectivity.

1.4. What are the benefits of air connectivity?

As the global economy is growing, demand for air travel and air cargo shipping is increasing, translating into an increased flow of passengers and goods across markets and improved air connectivity. At the same time, aviation itself can be a key cause and facilitator of economic growth through improved air connectivity. Air connectivity generates benefits for local and national economies, including improved competitiveness and enhanced employment and economic growth opportunities. The benefits of the air transport sector to a country's economy are often measured in terms of its direct contribution to GDP, through profits and the payments made by airlines for wages and other inputs. In addition, several appraisals consider the direct and indirect output and employment benefits created along the industry's supply chain, as well as indirect benefits in other industries from additional expenditure (e.g. the benefits for tourism). The wider economic benefits from air transport are often overlooked in policy and investment appraisals.

There is a clear need to better understand and quantify the symbiotic relationship between air transport and economic growth (Figure 2). Conceptually, improved access to the global air transport network leads to an increase in economic flows. As the connections to the global aviation network grow, so do business opportunities, providing better access to international capital markets and skilled human resources. As the business climate improves, the economy grows which itself encourages further increases in aviation demand and in connectivity, providing another round of positive effects for growth in economic productivity.

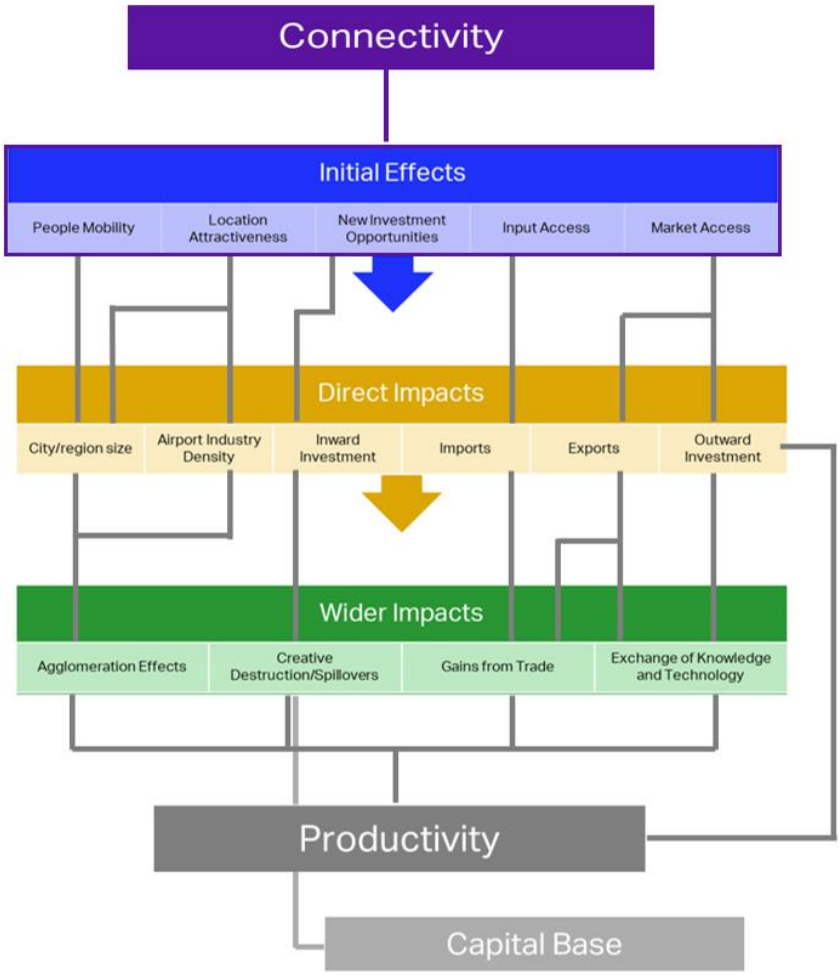
Figure 2: Air connectivity and economic growth



Improved air connectivity enables and facilitates a range of benefits for consumers, producers and governments. The higher the level of air connectivity, the greater the catalytic effects of aviation. Better air transport linkages bring about tangible economic benefits to communities worldwide. Connecting cities stimulates world trade, global investment, facilitates labour and capital productivity improvements, boosts innovation and knowledge exchange. This enables improved specialization and better allocation of human and capital resources, boosting productivity. Inflows of foreign direct investment allow expanding the existing capital base. Thus, air transport facilitates the expansion of the productivity capacity of an economy, creating an important platform for long-term economic growth and prosperity. Several catalytic benefits of air connectivity have been documented by the existing body of academic, industry and government literature.

Figure 3 below illustrates linkages between improved air connectivity and an economy's productive capacity. Inflow of foreign direct investment, facilitated by strong air linkages, encourages domestic capital formation in a given country. The movement of goods and people, enabled by the air transport industry, can bring about improved economic productivity as a result of specialization and efficient allocation of resources. Acting together, these economic forces enable a country to expand its productive potential to enable long-term economic growth.

Figure 3: Air connectivity and economic productive capacity



Source: Steer Davies Gleeve, adapted by IATA

Foreign direct investment expands access to capital. Air transport facilitates flows of foreign direct investment as business travellers explore markets and uncover new opportunities to invest. An economy's productive capacity is improved as a result of two forces. First, business investment is supported by the wider markets that air transport allows a firm to access. Second, higher productivity is achieved as a result of better access air transport can provide to new production techniques and more efficient suppliers.

IATA and Oxford Economics conducted an analysis of the EU countries, which showed that the level of connectivity to the air transport network can have a significant and positive impact on long-run economic performance. Air connectivity was found to have a causal link to both long-term investment and long-run productivity of an economy. Among the EU countries, a 10% increase in the level of connectivity, relative to the GDP size, can increase long-run GDP by 1.1%.[5]

Increased foreign direct investment creates a foundation for long-term economic growth through the creation of important economic assets. For example, an investment in a local production facility by foreign investors would create the capacity on the supply-side for increased economic output and employment without creating inflationary pressures.

International trade improves productivity. Aviation facilitates world trade, allowing countries to access a wider international market for production inputs and encouraging knowledge and technology transfers through both exports and imports. In classical economic literature, the benefits from trade arise because countries specialise in the production of goods and services in which they have a comparative advantage. Specialisation which arises from division of labour and economies of scale enables countries to improve productivity and lower the price for goods and services produced.

More recent research on the topic identified additional gains from trade, such as agglomeration economies and improved productivity due to increased competition. Agglomeration effects refer to improved productivity levels due to an increase in geographic clustering of economic activity. Firms can increase productivity levels as a result of improved proximity to employees, suppliers and customers or collaboration with other firms. For example, economic clusters created and developed around airports result in knowledge, technology transfers and labour pooling and thereby an increase in productivity.[6] Beyond agglomeration effects, imports of goods and services can increase the level of competition in a country, stimulating greater economic efficiencies in the use of resources. In addition, producers can benefit from increased access to a large range of inputs and global supply chains, while consumers – from greater choice of products and services. Incumbent firms may respond by reducing costs, increasing productivity or reducing prices and foregoing profits. Increased competition may lead to the disappearance of less efficient companies. Exports enable economies of scale for producers in a given country, as they can sell more products and services to existing markets and access new markets.

While air transport accounts for less than 1% of world trade by volume, it carries around 35% of global freight by value. Improvement in air connectivity encourages more trade between countries. In 2019, nearly 61 million tonnes of goods were shipped by air. Air cargo has increased its share over other transport modes – since early 2014 growing faster than

world trade. Part of the reason for the outperformance of air cargo is the structural shift in retailing towards e-commerce and the important role that aviation plays in e-commerce.

Tourism revenue may be reinvested to form capital assets. Air transport is a critical facilitator of tourism. It enables prosperity, development and economic growth as a result of tourism spending on local economies. Good air connectivity is particularly important for those countries that see a higher share of air travellers among tourists. With 54% of international tourists travelling by air, air transport has contributed to greater employment opportunities and wider economic benefits through the tourism catalytic effects, particularly in small island states. In emerging market economies, there may be a structural shortage of demand, so tourism spend can fill in the gap. To the extent that revenues from spend by foreign tourists are channelled to build and expand the asset base of a given economy, inbound tourism can boost GDP without inflation. This positive wider benefit from tourism is less likely in developed economies, where economic policy is managed by independent central banks.

Information and knowledge exchange boosts productivity. Air connectivity spurs innovation and productivity by facilitating exchange of information and knowledge. Firms wishing to access new markets sometimes lack sufficient information about prospective buyers or suppliers. The search costs associated with obtaining such information may prove a substantial barrier to entering new markets. By improving the flow of information and enhancing knowledge exchange, better air connectivity lower barriers to exploring and entering new markets. As a consequence, improved air connectivity enables dynamic productivity gains as a result of lower information barriers, unlocking further returns that would otherwise have not been realised.[7]

Tax revenues may increase from increased economic activity. Air connectivity facilitates economic activity and growth in a given country, which may have a positive impact on government tax revenues. In competitive markets, improved labour productivity translates into higher wages. Higher compensation of more productive labour could in turn generate higher government revenue from the income tax. Similarly, increased business and economic activity in a given country could increase government receipts from corporate taxes.

Air transport fundamentally changes the way companies do business with each other and with their customers. Enhanced connectivity enabled by aviation improves accessibility of companies in a given economy or region to other companies, input resources and customers. Air connectivity enables an expansion of productive capacity through two main channels: increased capital base enabled by better access for foreign capital and increased productivity as a result of gains from trade, improved labour mobility, exchange of information and knowledge and other positive spillover effects.

2. IATA Air Connectivity Index

This chapter presents various approaches to measuring air connectivity and sets out the definition of and the methodology for computing the IATA air connectivity index. Before examining the measures of air connectivity, the following section provides an overview of the various dimensions of air connectivity.

2.1. Types of air connectivity

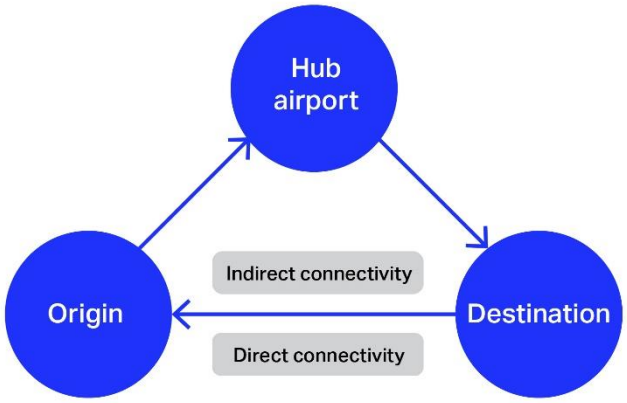
Air connectivity is a composite measure reflecting the ease of accessing various locations around the world. Different measures of air connectivity may capture various aspects of connectivity such as travel time, travel costs, the number of connections, the quality of connections, the number of destinations served, frequency of service, reliability of connections and opportunities at destination (e.g. population or GDP). A number of measures of air connectivity exist – incorporating the abovementioned factors to a greater or lesser degree – and the choice of the connectivity measure depends on the practical question to be answered.

2.1.1 Direct vs indirect air connectivity

The largest benefits of air connectivity stem from access to the global air transport network and consequently to the global economy. Improving air connectivity enables more connections to the global air transport network in two main ways: directly and indirectly. Direct connectivity measures the number of destinations passengers can reach with a non-stop flight. Indirect connectivity reflects the number of destinations accessible to passengers with a connecting flight.

In general, indirect connectivity is regarded as less valuable than direct connectivity, given the longer travel times and potentially inefficient routings. For example, a direct flight from London to Geneva would be preferable compared to a connecting flight from London to Geneva via Paris-Charles de Gaulle. The distinction between direct and indirect connectivity is important for measuring user benefits but also wider economic benefits. Time-sensitive business travellers attending a business meeting in London would give preference to a more efficient travel option, other things being equal. Figure 4 provides an illustration of direct and indirect connectivity from point A to point C through point B.

Figure 4: Direct and indirect air connectivity



The SEO Aviation Economics NetScan connectivity model (used by ACI Europe) reports direct, indirect and airport connectivity (equal to the sum of the direct and indirect connectivity score) for the airport in question. Airport connectivity refers to the overall level to which an airport is connected to the rest of the world, either by direct flights or indirect connections via other airports. Direct connectivity measures direct air services from the airport in terms of the number of destinations served, factoring in the frequency of flights to the same destination. Indirect connectivity measures the number of places people can fly to through a connecting airports, factoring in connecting time and detour involved with the indirect routing. ACI Europe also reports hub connectivity which reflects the extent to which an airport can facilitate connecting flights. In particular, it measures the number of connecting flights that can be facilitated by the airport in questions, controlling for the quality of connections. While a useful metric for airport strategic planning and route development, this measure of connectivity cannot be used to measure the wider economic benefits of connectivity.

2.1.2 Absolute vs relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. This report will examine air connectivity adjusting for the economic or population size of a country where needed in addition to reporting absolute air connectivity.

2.1.3 Air connectivity adjusted for economic size

IATA worked closely with Inter *VISTAS* Consulting to develop a detailed statistical analysis of the relationship between a country's connectivity to the global air transport network and its level of productivity. The analysis covered a wide range of economy – including developed and developing economies – over a period of ten years (1996-2005). The study established that there is a statistically significant and positive link between connectivity, productivity and long-term economic growth. Specifically, the study showed that as air

connectivity relative to the size of a country's GDP increases, so does labour productivity. IATA's research with Inter *VISTAS* showed that a 10% rise in air connectivity, relative to the size of a country's GDP, boosts labour productivity by 0.07%.[8] Earlier research by IATA and Oxford Economics focused on the EU economies, establishing that a 10% rise in air connectivity adjusted for economic size can increase long-run GDP by 1.1%. [9]

Interestingly, there appears to be a threshold effect above which an increase in the connectivity level of already well-connected developed economies has a smaller marginal impact on productivity than it does for developing countries. Among developing economies, there appear to be a clear positive relationship between higher levels of connectivity and higher levels of labour productivity, and hence higher GDP and living standards. For developed economies, there appears to still be a positive relationship, but with smaller incremental impacts once the threshold level of connectivity as a proportion of GDP is reached.[10]

A relative measure of connectivity – adjusted to reflect the size of an economy – is more useful in examining the relationship between air connectivity and economic potential in the long term. For many countries, especially developing countries, investment in air transport infrastructure and services can offer a significant and sustainable boost to economic growth and development. The incremental value of air connectivity will be greater for a country with a lower level of air connectivity relative to the size of its economy. Ten new destinations to economically significant countries are likely to bring more benefit to the businesses served by Tirana airport than those already served by a well-connected London Heathrow airport.

As such, it is the level of connectivity relative to economic size, as measured by GDP, that will be examined in this report in addition to absolute connectivity. This adjusted measure is important in understanding the relationship between air connectivity on the one hand and productivity and economic growth on the other.

2.1.4 Air connectivity adjusted for population size

Another way to examine air connectivity is in relation to the population size of a given country. The connectivity measure adjusting for economic size by construction penalizes wealthy states with relatively small populations, such as Qatar or Singapore. The larger the size of the economy (as measured by GDP) the smaller the adjusted score will be, other things being equal. Both countries are well connected and operate global hubs. In such instances, using population to examine connectivity per capita may prove to be more appropriate. Generally, adjusting connectivity for population size generates similar results to the GDP adjusted metric, except for very wealthy city states such as Hong Kong, Singapore, Qatar, the United Arab Emirates and Macao.

2.1.5 Total vs international air connectivity

In certain circumstances, it may be appropriate to examine international connectivity separately from total connectivity which combines domestic and international connectivity. Among other reasons, examining the international dimension of air connectivity may shed

additional light on the main sources of changes in the level of connectivity in a given country and inform the choice of policy measures.

First, international connectivity plays an important role in supporting the key flows of cross border economic activities which can boost economic potential of a country in the long-term, such as foreign direct investment, international trade and foreign tourism.

Second, having visibility of international connectivity scores provides a way to understand the main drivers behind connectivity evolution over time in a given country. For example, a country's overall air connectivity may be declining over the years, while its international connectivity may be improving over the same time period.

Third, international connectivity would be a more suitable measure for benchmarking countries with only international air service against regional peers. For example, one should use international air connectivity when comparing China and Singapore because the large domestic market in China would have a strong bearing on China's overall air connectivity score.

Fourth, the choice of policy measures will depend on whether a country wishes to stimulate international or domestic connectivity. For example, greater liberalization of international air service agreements may be the appropriate measure to boost international connectivity, while a different range of effective policy tools may be appropriate for stimulating domestic connectivity.

Finally, understanding the evolution of international connectivity in a city or country level may help track progress of government policies or business objectives, such as developing and operating an international hub. This report will examine international connectivity in addition to presenting total connectivity scores.

2.1.6 Intra-regional air connectivity

A deriving measure from air connectivity is an indicator measuring air connectivity within a region. This measure may be relevant for tracking progress of policy or industry initiatives aimed at promoting connectivity within a given region. The Single African Air Transport Market, an initiative aimed at advancing liberalization and promoting connectivity within Africa, is an important step in promoting economic, political and social integration of the continent. The IATA intra-regional air connectivity index can be applied to measure the dynamics of air connectivity post-implementation with the view to assess the effectiveness of the initiative.

The destination weights used to calculate the intra-regional connectivity score are different from the destination weights used for the general air connectivity score. To differentiate between the two, the air connectivity indicator using destination weights (world to world flights) is labelled as "global connectivity". The global connectivity weights (i.e. the destination airport weights used for the calculation of the air connectivity indicator) are based on the size of the destination airports in terms of number of total passengers handled in each year globally, while the intra-regional connectivity weights are based on the size of the destination airports in the region in terms of number of passengers originating from the

region handled in each year. For instance, the airport destination weights for the intra-regional connectivity analysis of Africa are based on the size of Africa's airports.

2.2. IATA air connectivity index

IATA has developed a connectivity indicator to measure the degree of integration of a country into the global air transport network. It is a composite measure reflecting the number and economic importance of the destinations served from a country's major airports and the number of onward connections available from each destination.

Geographically, IATA's air connectivity index enables the reporting of connectivity scores at different levels of aggregation: city, country and region. The index has global coverage and encompasses virtually all countries around the world. It covers more than 3,000 cities globally. The countries covered are grouped into different regions[11] as follows:

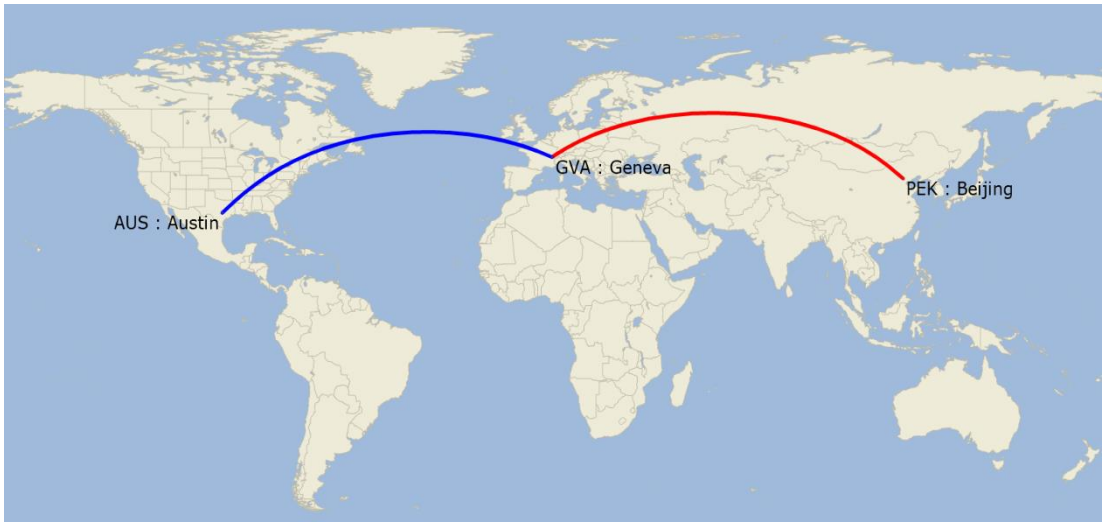
1. Africa
2. Asia
3. Europe
4. Latin America
5. Middle East
6. North America

The connectivity indicator is based on the number of available annual seats to each destination between 2014 and 2019. The source of available seat capacity is SRS Analyser, a comprehensive database containing passenger and cargo schedules for more than 900 airlines worldwide. The number of available seats to each destination are then weighted by the size of the destination airport (in terms of number of passengers handled at that airport in each year). The weighting for each destination gives an indication of the economic importance of the destination airport and the number of onward connections it can provide.

For example, Beijing airport, as the world's largest airport, is given a weighting of 1 while Austin airport, which handles 15% of the number of passengers handled by Beijing, is given a weighting of 0.15. Therefore, if an airport has 1,000 seats available to Beijing it is given a weighted total of 1,000. But if also has 1,000 seats available to Austin, these are given a weighted total of 150. The weighted totals are then summed for all destinations served out of a given airport to determine the connectivity indicator.

Another way to illustrate the impact of destination airport weights is to think of a single flight from Geneva to Beijing or Austin. Other things being equal, a flight from Geneva airport to Beijing would receive a higher connectivity score compared to a flight from Geneva to Austin airport (Figure 5). The difference in destination weights reflects the extent to which destination airports are connected to the rest of the global air transport network.

Figure 5: Destination airport weights for flights out of Geneva



Source: SRS Analyser

Therefore, the connectivity indicator for a given airport can be represented as the sum of destination weighted available seats from the airport to all destination airport:

$$Air\ Connectivity\ Index\ = \sum_{k=1}^{all\ destinations} (Annual\ Outbound\ Seats_k * Destination\ Airport\ Weight_k)$$

Another mathematically equivalent way to write this formula shows that the frequency of service from the origin airport to other destinations is taken into consideration:

$$Air\ Connectivity\ Index\ = \sum_{k=1}^{all\ destinations} (Flight\ Frequency_k * Average\ Available\ Seats\ per\ Flight_{k*} * Destination\ Airport\ Weight_k)$$

As evident from the second formulation, air connectivity increases as the range of destinations increases, the frequency of service increases or larger "hub" airport destinations are served.

In 2018, Beijing airport served almost twice as many destinations as Montreal airport and six times as many destinations as Tirana airport. However, Beijing served a larger number of major airports, also with higher frequencies, giving China significantly greater access to the global air transport network than Canada and Albania. This is reflected in the connectivity indicator, with the value for Beijing about six times greater than for Montreal and 53 times greater than that for Tirana (Table 1).

Table 1: A Measure of Connectivity to the Global Air Transport Network, 2018

	Number of Destination Served	Number of Available Departing Seats per week	Connectivity Indicator 2018
Beijing	255	109,576	412,174
Montreal	151	18,523	69,235
Tirana	45	2,959	7,799

Source: IATA Economics using SRS Analyser data

2.3. Other air connectivity measures

This section provides an overview of selected measures developed by SEO Aviation Economics, the World Bank and other organizations. Table 2 conveniently summarises key characteristics of the different measures of air connectivity.

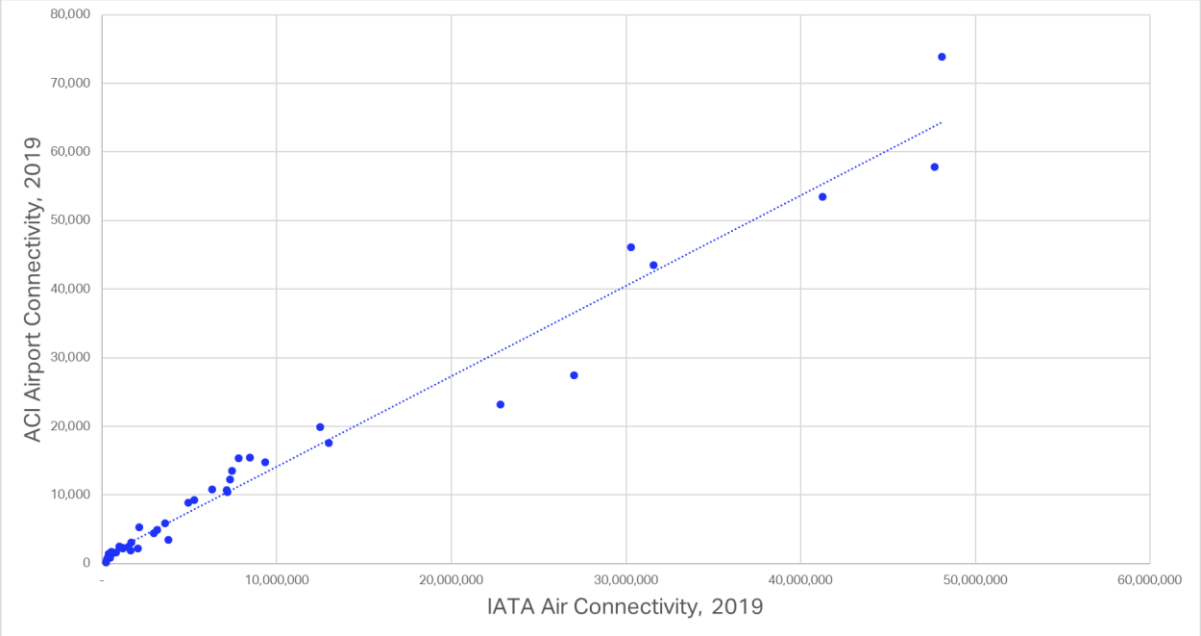
2.3.1 NetScan Air Connectivity Measure

The NetScan connectivity model (developed by SEO Aviation Economics and used by ACI Europe) reports air connectivity scores for individual airports and includes three types of air connectivity: direct, indirect and airport connectivity (the sum of direct and indirect). In addition, ACI Europe reports hub connectivity for big or smaller hub airports, which reflects the number and quality of connecting flights that can be facilitated by a given airport. In terms of geographic coverage, ACI Europe's connectivity measure is reported primarily for European airports and selected airports outside of Europe. Coverage is therefore limited primarily to Europe.

The main application of the NetScan air connectivity model is for competitive analysis of airline and airport networks. By contrast, the IATA air connectivity index, which evaluates air connectivity for cities, countries and regions, is designed for use by policy makers to improve air connectivity in their countries and regions with the view to unlock the potential for economic growth. IATA's measure is more versatile allowing to adjust the connectivity score to control for the size of a country's economy or population. The flexibility to report connectivity scores at the global, regional or intra-regional level further enable users of the index to use a more suitable measure given the question at hand.

In terms of results, IATA's connectivity index closely correlates with the airport connectivity measure used by ACI Europe (Figures 6a and 6b). Whereas ACI Europe's measure emphasizes the quality of indirect connections, IATA's connectivity measure implicitly captures indirect connectivity by measuring the quality of the destination in terms of its connectivity to the rest of the air transport network.

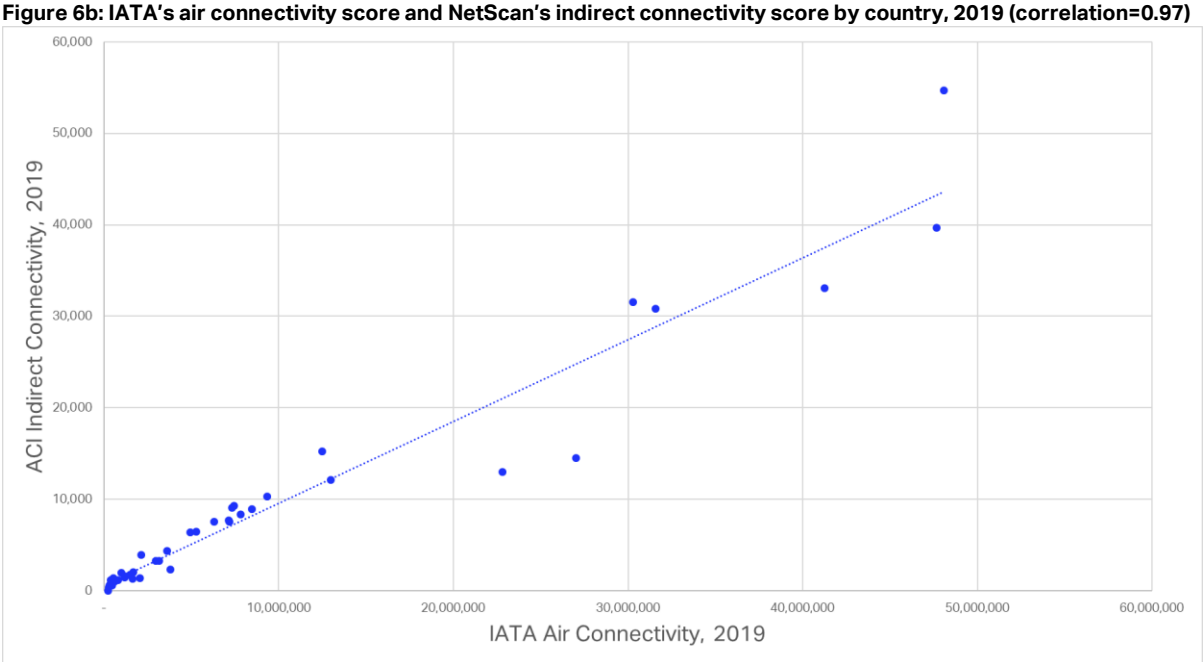
Figure 6a: IATA's air connectivity score and NetScan's airport connectivity score by country, 2019 (correlation=0.98)



Source: ACI Europe, IATA Economics

IATA's air connectivity index is also closely correlated with ACI Europe's Indirect Connectivity measure. The latter includes connecting time and detour, indicating that the proxi index used by IATA captures these factors well.

Figure 6b: IATA's air connectivity score and NetScan's indirect connectivity score by country, 2019 (correlation=0.97)



Source: ACI Europe, IATA Economics

2.3.2 World Bank

The World Bank's Air Connectivity Index[12], developed by J-F Arvis and Ben Shepherd, is a connectivity measure that refers to a country's ability to effectively connect to others within

a particular network. The air connectivity framework developed by the World Bank takes into account the hub-and-spoke nature of the global air transport network. Air connectivity scores are reported at the country level. A country is considered a node within the air transport network and the connectivity score is driven by two factors. On the one hand, a country is considered to be better connected to the global air transport network the stronger is the pull it exerts on the rest of the network. On the other hand, a country receives a lower connectivity score if the cost of moving to other countries in the network is relatively high.

The World Bank's index[13] extends the work of IATA (2007) by embedding it in a systematic model. While this measure of air connectivity is theoretically robust, it is computationally complex and especially sensitive to changes in the gravity coefficient. Considering the complexity of the measure, IATA's approach appears to be simpler, more intuitive and adaptable to respond to different policy questions. It is easier to interpret and communicate and importantly the IATA index is updated on a regular basis. The time series of connectivity scores allows comparison of connectivity levels over time, in addition to across different countries. Additionally, taking into consideration its various levels of granularity (city, country or regional level), it presents a flexible measure for policy analysis and evaluation.

2.3.3 Other measures

ICAO is developing a framework for measuring air connectivity at the country level. This framework does not generate a single measure to compare and contrast connectivity scores across different countries. Rather, the ICAO measure of connectivity presents the number of destinations that can be reached from a given country and provides a qualifying measure based on the percentage of those destinations that can be reached with non-stop, 1-stop and 2-stop flights.[14]

Eurocontol has developed a visual air connectivity tool. Rather than providing a composite measure of air connectivity, the Eurocontrol visual tool offers a range of descriptive statistics for a given location including the number of carriers, the number of flights, reachable population and an estimate of total door-to-door travel time. Connectivity is recorded at the airport level and reported at the regional level using Eurostats' definition of NUTS (e.g. EU28 has 1,300 NUTS). Coverage is limited to Europe. This tool was developed to assist regional and national policy makers in assessing the impact of policy measures on the level of air connectivity, within the EU and between the EU and the rest of the world. It is expected that in the future the tool will be expanded to include intermodal connectivity to capture the role of trains and buses.

Table 2: A comparison of different approaches to measuring air connectivity

Institution	IATA	ACI Europe (NetScan)	World Bank
Definition	Air connectivity is a measure which reflects the scope of access between a country and the global air transport network. The IATA measure captures the range and economic importance of destinations, and the number of onward connections available through each country's aviation network.	Air connectivity is a composite measure reflecting the number of destinations, the frequency of service and the quality of the connections at a given airport. The NetScan connectivity measure (used by ACI Europe) reports airport connectivity using direct, indirect, total and hub connectivity.	Air connectivity refers to a country's ability to effectively connect to other nodes within a particular network. Rooted in a general gravity model framework, the World Bank measure reflects the degree of air connectivity between a country and its neighbours as well as the interactions among other countries in the global air transport network.
Coverage	Global	Europe	Global
Node	City, country, region	Airport, country	Country
Metric	Destination- weighted outbound seats 0 to infinity	Composite non-dimensional number 0 to infinity	Non-dimensional number 0 to 1
Characteristics	- Global coverage - Intuitive and easy to use - Adaptable to examine total, international or intra-regional connectivity - Versatile: weighted by GDP or population - Updated regularly - Captures indirect and indirect connectivity implicitly - Does not capture connecting time and re-routing explicitly.	- Limited coverage (Europe and selected other airports) - Airport focused - Updated regularly - Captures indirect and hub connectivity explicitly - Captures the quality of indirect connections (time and re-routing)	- Global coverage - Theoretically sophisticated and robust (based on a network analysis framework) - Computationally complex - Difficult to adapt and update (last available index is for 2007) - Sensitive to input parameters (sensitive to changes in the gravity coefficient)

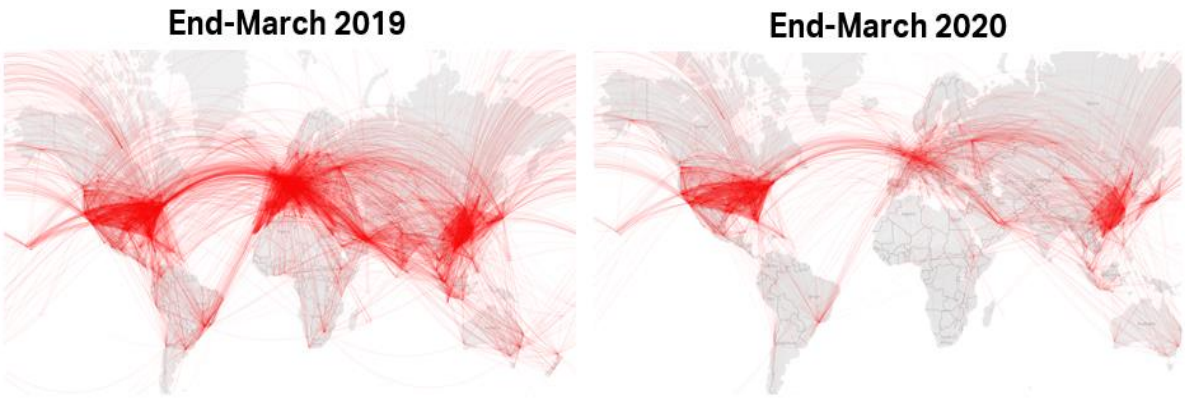
3. COVID-19 Impact on Air Connectivity

2020 has been an unprecedented year for the airline industry. The impact of the pandemic and measures taken by governments to contain the spread of the virus have caused a near closure of international aviation, with connectivity disrupted significantly across the globe.

In an attempt to address the spread of the virus, governments have implemented restrictions for international travel and in some cases put in place strict domestic lock downs to slow down local outbreaks. As a result of border closures and domestic lock downs, the number of unique city pairs connected by regular service has reduced dramatically. At the lowest point, the number of unique city-pairs was 67% lower than during the same time a year ago (Figure 7).

Air transport plays a key role in powering the modern global economy. This wider economic benefit is underpinned by both the direct connections between cities - enabling the flow of goods, people, capital, technology and ideas - and falling air transport costs. In the past two decades the number of direct city-pair connections has more than doubled. In 2020, unique city-pair connectivity is expected to decline for the first time since the global financial crisis. Moreover, there is a risk that the number of unique city-pair connections will not fully recover, undoing some of the gains of recent years.

Figure 7: Global route network



Source: IATA Economics using data from FlightRadar24, w/c March 25, 2019

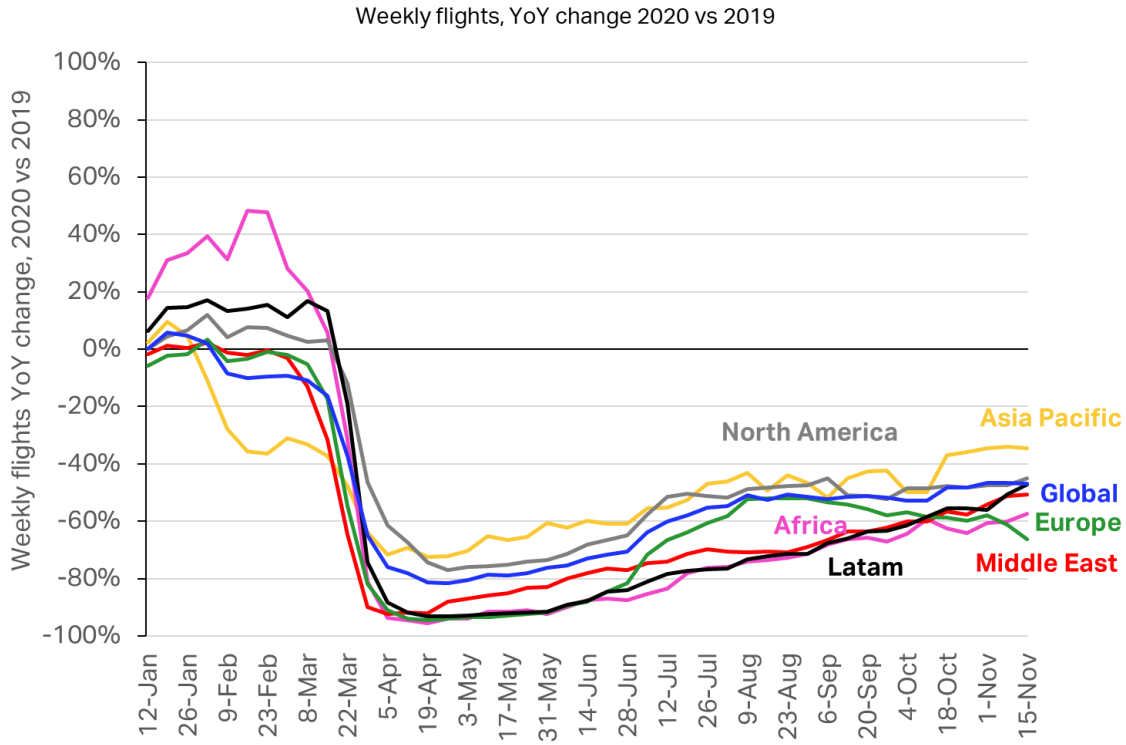
Since the lowest point in April 2020, the number of flights began to recover as a result of the re-opening of domestic markets and the lifting of restrictions on international travel in some countries and regions. At the lowest point, global flights were 80% below the level observed at the beginning of the year (Figure 8).

The pace of recovery has generally been gradual and varied by region. Flights in the Asia Pacific and North American regions have seen less of an impact compared to other regions, which is largely a consequence of two sizable domestic markets in those regions (China and the United States, respectively). Europe has seen a faster recovery during the summer months after travel restrictions between members of the Schengen area and non-Schengen members of the EU were lifted. There has been a considerable increase in the number of short-haul international flights during that period. Recovery of flights on intra-European routes was a reflection of many people travelling to visit friends and family as

well as holiday-makers travelling during the peak summer period, rather than business travel. Africa, Latin America and the Middle East have experienced slower recovery and the levels of air service and air connectivity in those regions remain supressed.

The performance of the European market sits in contrast to developments in both international flights between Europe and the rest of the world and the aggregate measure of all other international flights. The factors underpinning this outcome may offer a guide for other markets. Recovery on intra-Europe routes highlights the benefits that can come from a coordinated approach across countries to re-open borders, which supports traveller confidence and reduces uncertainty. The second wave of the outbreak in Europe and the resulting lock-downs have had a suppressing impact on air travel in recent months.

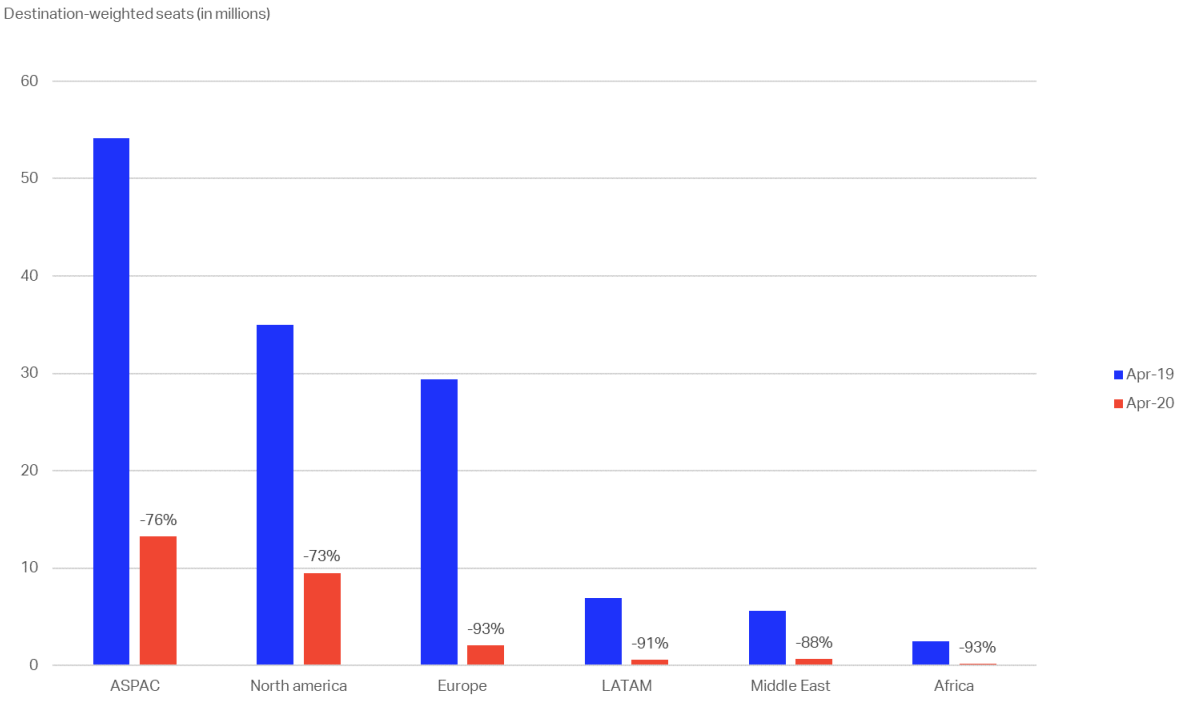
Figure 8: Global and regional flight departures



Source: IATA Economics analysis based on data provided under license by FlightRadar 24. All rights reserved

Examining changes in air connectivity scores offers another perspective on the impact of the pandemic on air travel in different regions around the world. The IATA air connectivity index, discussed in detail in the following chapters of the report, shows significant disruptions in air connectivity across all regions (Figure 9). In April 2020, the IATA connectivity measure shows significant disruptions to air connectivity relative to the previous year in Africa and Europe, followed closely by Latin America and the Middle East. Asia Pacific and North America, the two most connected regions in the world, were less affected, in part due to ongoing activity in the two large domestic markets. Domestic aviation markets have been more resilient to disruptions in air connectivity and are expected to recover faster than international air travel.

Figure 9: Disruptions to air connectivity by region



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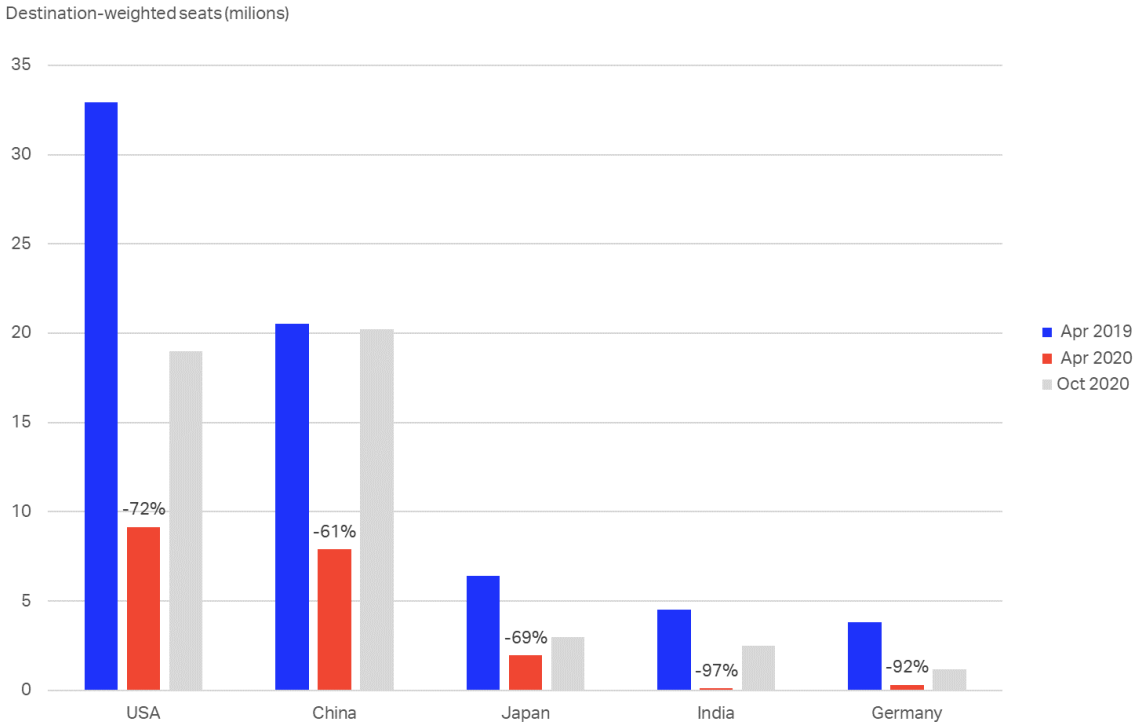
Among the top 5 best connected countries in the world, connectivity levels have declined significantly, although ongoing activity in domestic markets in some cases mitigated the impact. The US maintained domestic operations at the peak of the pandemic. China is credited for effectively brining the virus under control domestically and, after hitting the lowest point in February, began to recover domestic operations reaching near full recovery in connectivity levels in recent months. In Japan, the impact of disruptions to travel during the first wave of the pandemic was mitigated in part by the absence of a country-wide ban on domestic travel. In India, all domestic flights were suspended on March 25 for a period of two months, leading to an evaporation of connectivity during that period. In Germany, as in the rest of Europe, nation-wide lockdowns have triggered a virtual halt to operations and significant reductions to connectivity levels (Figure 10).

Figure 10: Air connectivity disruptions in the 5 most connected countries in the world



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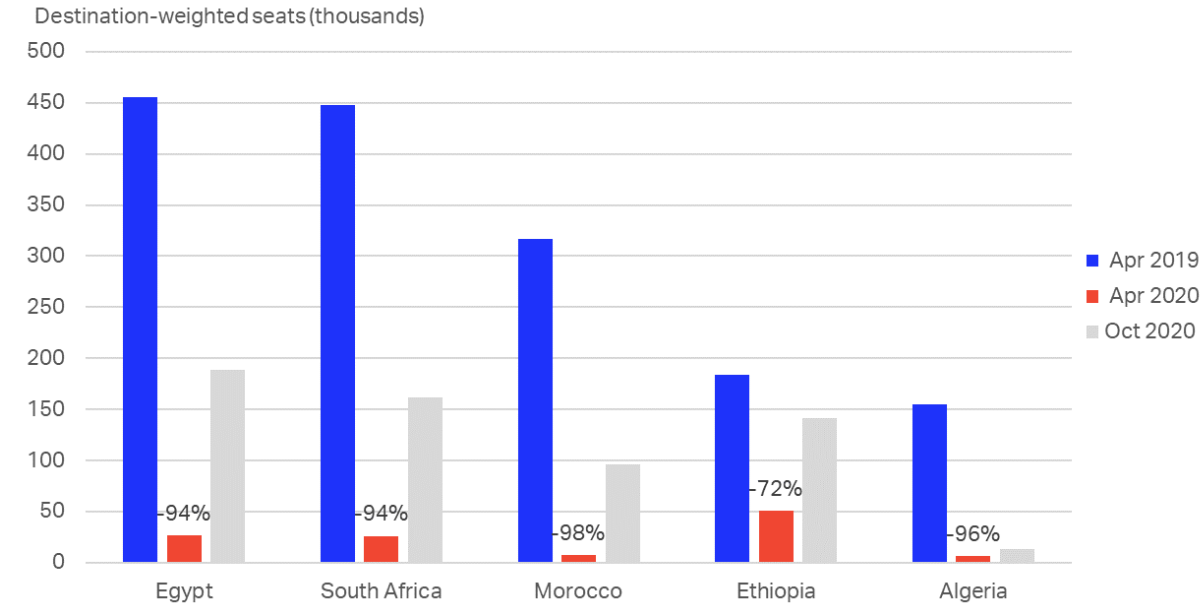
In Africa, during the first wave of the pandemic, air connectivity levels in many countries have been reduced by more than 90% relative to the previous year. Ethiopia is the exception to this trend. This is due to Ethiopia's continued position as a connecting hub for flights in Africa, both regionally and internationally. At the first peak of the pandemic in April 2020, Ethiopia maintained connections with 88 international destinations. Many aviation markets reliant on tourism, such as Egypt, South Africa and Morocco, were severely impacted.

Figure 11: Air connectivity disruptions in top 5 most connected countries in Africa



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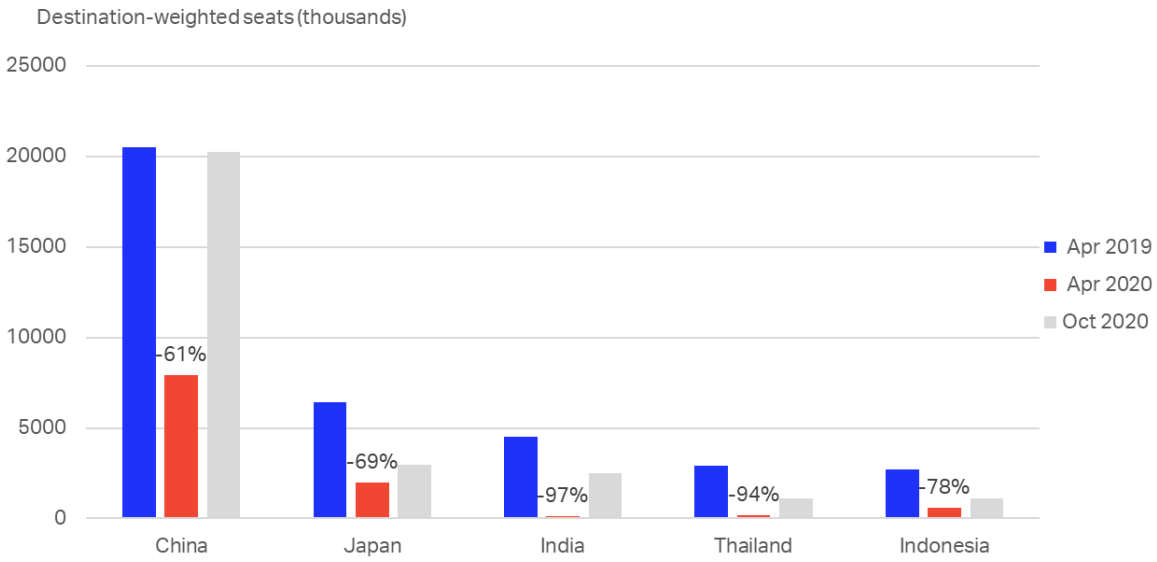
In Asia Pacific, stronger domestic aviation markets, such as China, Japan and South Korea performed better among the most connected countries in the region. Despite the relatively large domestic aviation market, Thailand was severely impact in terms of air connectivity. This could be due to the country's high reliance on international tourism.

Figure 12: Air connectivity disruptions in the 5 most connected countries in Asia Pacific



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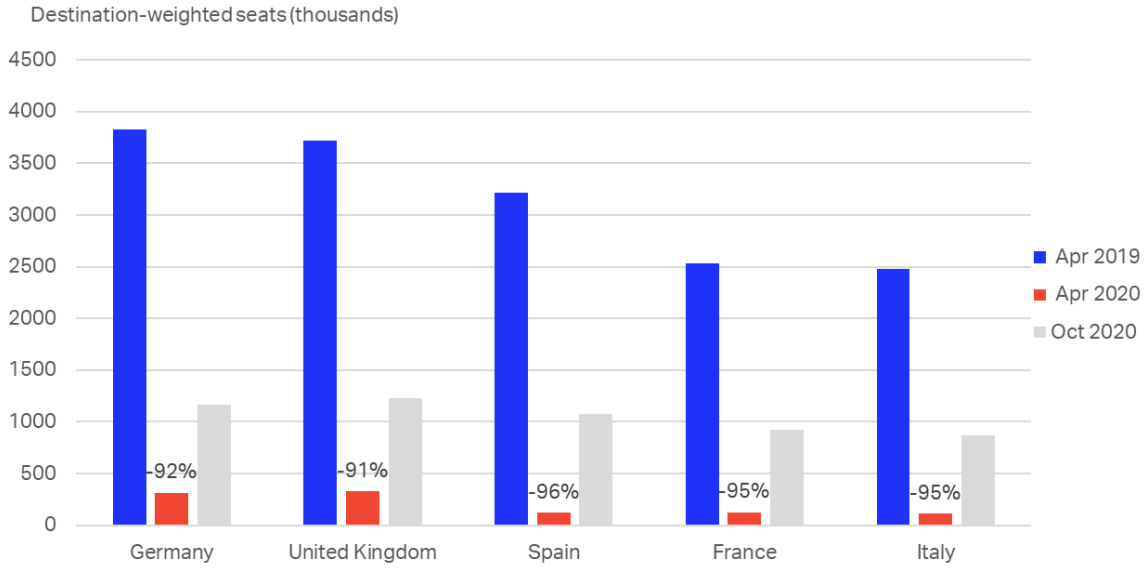
European countries sustained significant drops in connectivity levels in April 2020 due to the timing of the pandemic. Throughout that period, the majority of European countries put in place strict lock downs with connectivity levels falling by more than 90% relative to the same period in the previous year (Figure 13).

Figure 13: Air connectivity disruptions in the 5 most connected countries in Europe



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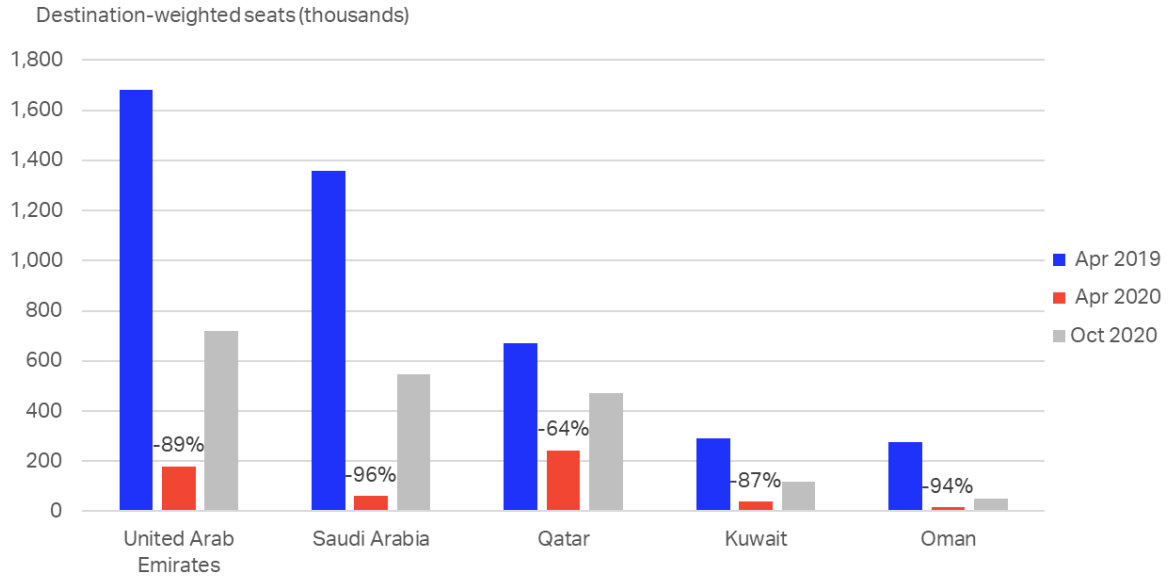
Countries in the Middle East experienced significant drops of air connectivity during the first wave of the pandemic. With the exception of Qatar, connectivity levels reduced by more than 85% for the five most connected countries in the region, Despite border closures, Qatar continued to serve as a link for long-haul flights allowing passengers to transit through its airport. Qatar is an important hub for air cargo and the carriage of air cargo, including personal protective equipment and medical supplies, contributed to airline operations during the first wave of the pandemic (Figure 14).

Figure 14: Air connectivity disruptions in the 5 most connected countries in the Middle East



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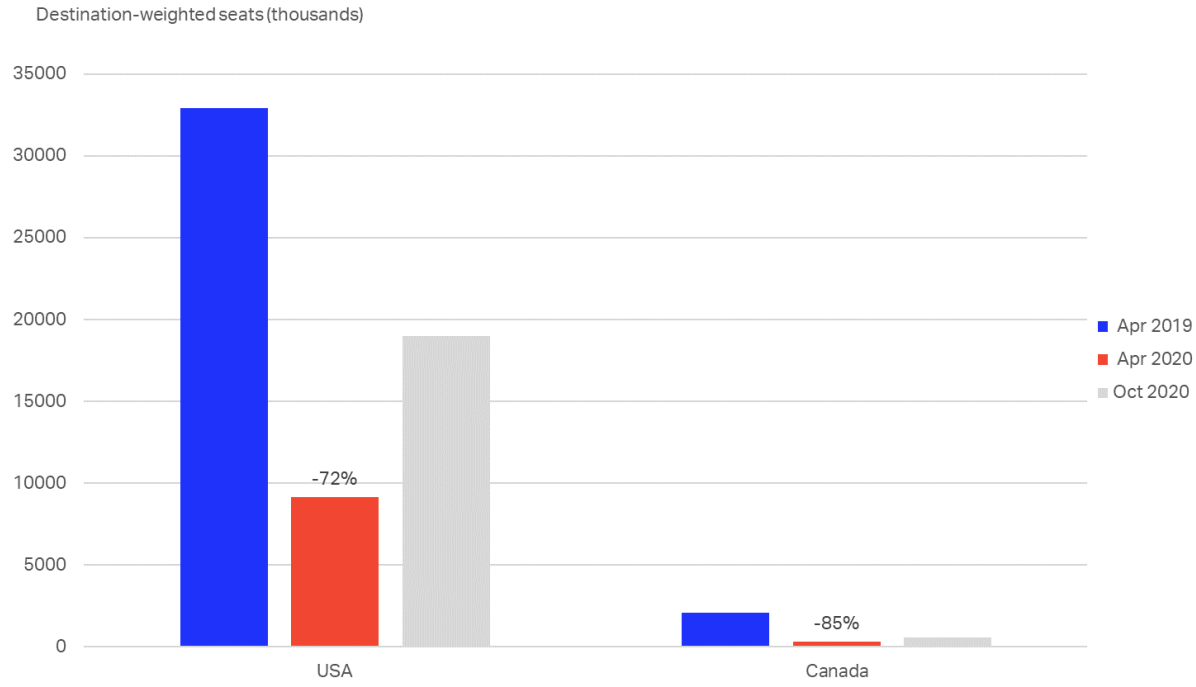
During the first wave of the pandemic, air connectivity in Canada reduced by 85% relative to the same period last year. In the United States the impact was less pronounced at 72%. In part, this is a reflection of the large domestic aviation market in the United States, which supported connectivity due to ongoing operations (Figure 15).

Figure 15: Air connectivity disruptions in the countries in North America



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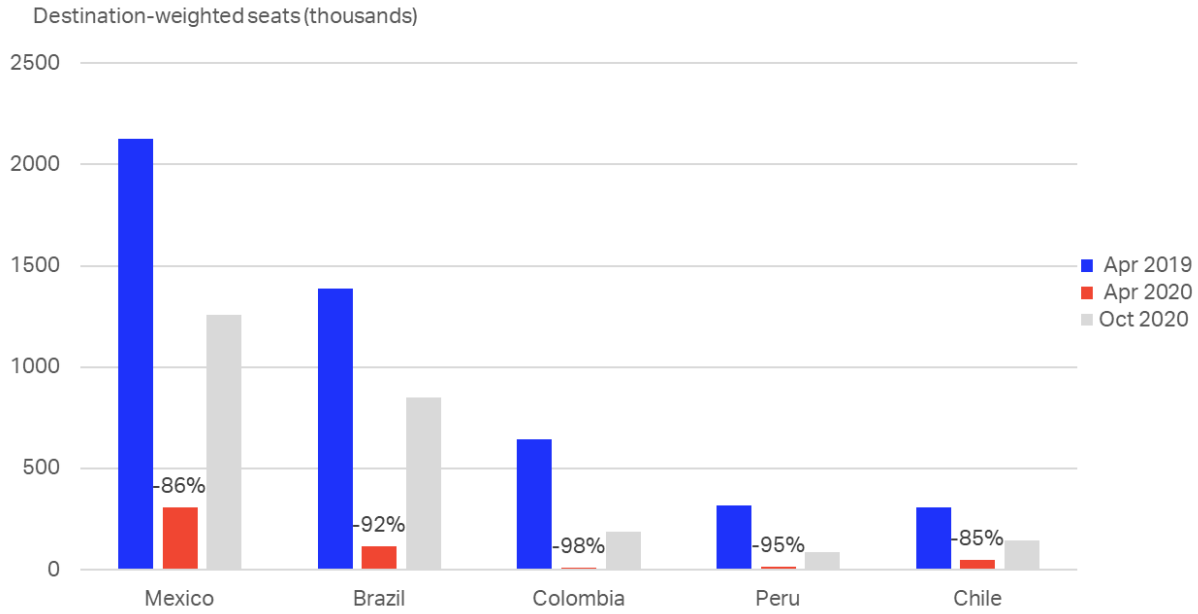
In Latin America and the Caribbean, Mexico and Chile performed relatively better than the other most connected countries during the first wave of the pandemic. The reason behind this slight difference could be the timing of domestic lockdowns in these countries and how strictly they were enforced. Mexico's domestic flights, even though one tenth of the usual traffic in April, decreased by less than in other markets such as Brazil. Brazil introduced domestic restrictions two weeks earlier than Mexico and Chile. Brazil had also tougher regulations in place for international travel compared to the other two countries (Figure 16).

Figure 16: Air connectivity disruptions in the 5 most connected countries in Latin America and the Caribbean



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Since the lowest point in April 2020, we have seen a gradual increase in the number of destinations served by airlines and flight frequency, supported primarily by recovery in domestic markets and the lifting of restriction on international travel in certain markets. Despite this welcome development, the near-term outlook for recovery of air connectivity remains highly uncertain due to the ongoing risk of subsequent waves of the pandemic and the potential for uncoordinated policy response by countries around the world. The risks remain firmly to the downside over the next five years, although it is possible that under favourable circumstances global and regional connectivity could recover faster.

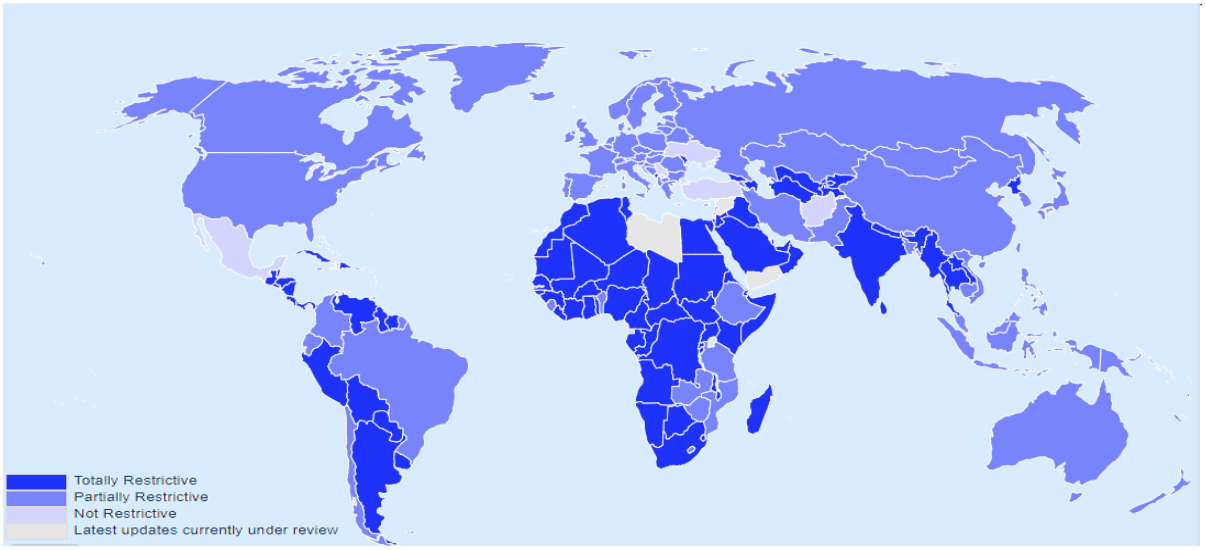
3.1. Challenges in restoring air connectivity

The sources of risks in the short and medium term can be broadly grouped into three categories: government response to potential future outbreaks of the virus, weak consumer confidence and macro-economic outlook.

Travel restrictions. The onset and spread of the pandemic has put the entire world on lockdown. In an attempt to slow down the spread of the pandemic, countries have

responded by closing their borders to international travel and in many cases by putting in place domestic lockdowns. While there has been some relaxation of border restrictions in recent months, the majority of countries around the world continue to maintain a complete or partial ban on international travel (Figure 17). Among those countries which chose to relax restrictions on international travel in an attempt to support their economies, some countries have elected to institute a quarantine requirement. For the most part, quarantine requirements act as a disincentive for people to travel for leisure or business purposes, perhaps with the exception of those travellers who visit family and friends. It is not surprising then that the ongoing complete or partial restrictions on international travel will continue to pose a challenge for the recovery in air connectivity in the near term.

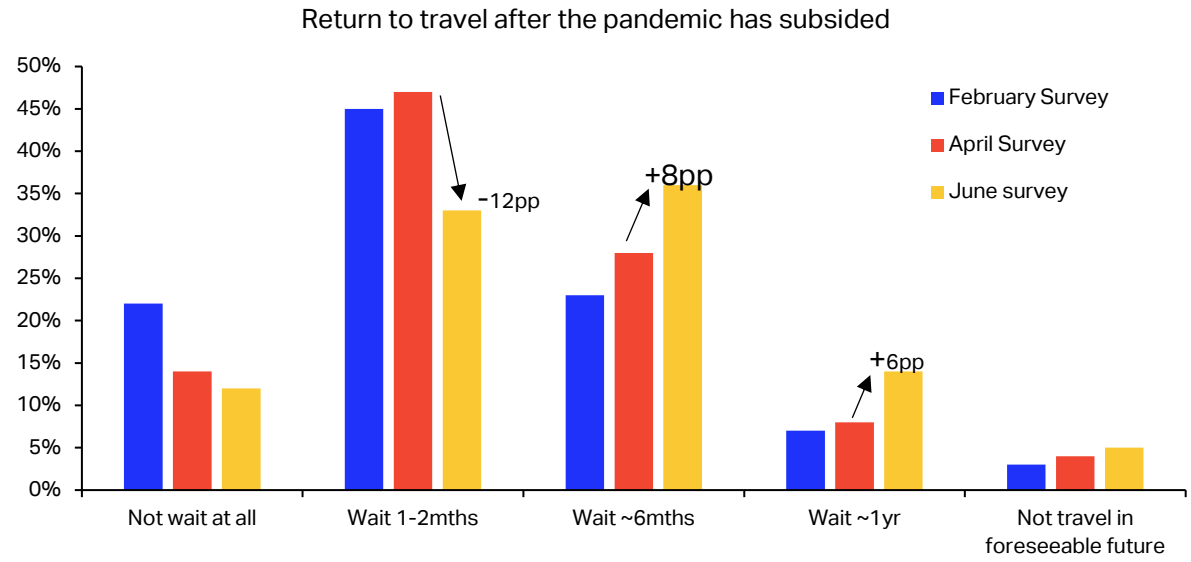
Figure 17: International travel restrictions, current as of 30 June 2020



Source: IATA Timatic

Passenger confidence. The pace of recovery from the consequences of the pandemic in the air transport industry depends critically on how quickly passenger confidence can be restored. A survey of passenger risk perceptions commissioned by IATA examined 11 countries to understand passenger views on the likely timing of a return to air travel. In June, only 45% of respondents indicated that they are likely to return to travel within a few months after the pandemic subsides (down from 60% in earlier surveys). 36% of respondents indicated that they expect to fly in around six months after the pandemic is brought under control, while 14% expect to wait around 12 months before taking their next flight. 5% do not see themselves travelling in the foreseeable future (Figure 18).

Figure 18: Passenger risk perception survey



Source: IATA Economics

- Passenger confidence and the timing of restoring passenger confidence in flying will continue to shape the recovery in air transport service and air connectivity. While passengers are worried about a range of factors – including being subject to quarantine measures during or following travel – some measures could act to instil confidence that flying is safe. For example, passengers feel safer when airport staff and aircraft crew wear appropriate protective equipment and that airport and aircraft facilities are regularly cleaned and sanitized. Understanding and addressing the concerns of passengers – and communicating these initiatives effectively – will be vital to the restoration of consumer confidence in air travel and getting the industry back flying again.

- Besides people's perception of risks associated with contracting the virus, passenger confidence depends on their financial situation. In part, passengers' decision to postpone travel may be motivated by the desire to wait until their financial situation or employment status stabilises.

Macro-economic outlook. Economic recovery will play an important role in supporting recovery in air connectivity and air travel demand once border restrictions are lifted. The slower than expected opening of markets has been the result of a deterioration in the COVID-19 trajectory in some key economies, notably in the United States.

- The ongoing closure of international borders has led to the deepening of economic recession in 2020 and a weaker outlook for recovery in 2021. The International Monetary Fund forecasts global GDP to contract by 4.9% in 2020, with recovery expected in 2021. In 2021 global growth is projected at 5.4%.[15]

- Business confidence appears to have risen very sharply, once economies unlocked and people began returning to work. For example, business confidence in the manufacturing and service sectors of the Chinese economy has risen above pre-crisis levels after its domestic lockdown was lifted. Some other economies have unlocked 2-

3 months later than China, but as this report is being published their business confidence had recovered to levels not far below the pre-crisis situation. These business confidence measures have, in the past, been highly correlated with GDP growth. Business travel would typically rise in tandem with business confidence, but surveys suggest a change in behaviour, at least for the next couple of years. Travel budgets will remain limited while the business sector remains under financial pressure, but also the extended experience of video conferencing is anticipated to reduce business travel in the short term. As a consequence, the GDP–business travel relationship may be weaker during this upturn period. In addition, the ongoing risk of contracting the virus while on business travel may pose additional challenges for firms in light of potential legal challenges and liability and also higher costs associated with enhanced insurance coverage.

- Consumer confidence remained weak in the early stages of recovery from the pandemic, with little sign of the rebound in optimism exhibited by consumers. This is to be expected, as unemployment rose significantly in the second half of 2020 when restructuring is forced on many businesses as government wage subsidies are reduced following the unlocking of economies. There is substantial pent-up demand for VFR (visiting friends and relatives) and leisure travel. However, a significant recovery in leisure travel – at least for overseas travel, rather than 'staycations' – will depend on a rise in consumer confidence and that is not visible in the data in the early stages of the recovery from the pandemic – and that rise may be delayed due to the likely rise in unemployment, as labour markets adjust to the post-lockdown business environment.

Restoring air connectivity is critical for supporting the recovery of key economic flows that power the modern economy. Tourism, trade and investment flows rely on speedy and affordable connections to move people and goods. Research increasingly shows that business travel has a statistically significant impact on a range of economic relationships between countries, such as trade, foreign direct investment and tourism flows. Moreover, a causal link has been established between business travel from countries specialising in a specific industry and growth in that economic activity in the destination country, suggesting that global business travel helps to transfer knowledge.[16]

3.2. Tourism and air connectivity

The tourism and travel industry is one of the worst affected. Restrictions on international travel remain in place for most global destinations, delaying the recovery in economies critically dependent on tourism. The sudden and massive fall in tourist numbers threatens employment and livelihood of people, particularly in emerging countries which critically depend on tourism as a source of income.

The World Travel and Tourism Council estimates that about 143 million jobs and $3.8 trillion in GDP could be at risk globally due to the impact of the COVID-19 pandemic. This represents more than 40% of the total economic footprint of the travel and tourism industry in 2019.[17]

During April 2020, which in some countries would normally mark one of the busiest travel periods of the year due to the Easter holidays, the introduction of travel restrictions in the

vast majority of countries around the globe led to a fall of 97% in international tourist arrivals. The UN World Tourism Organization estimates that from January to April 2020, international tourist arrivals declined by 44%, translating into a loss of about US$195 billion in international tourism receipts.[18]

Restoring air connectivity plays a crucial role in supporting recovery in tourism for regions and countries dependent on air travel as a source for international and domestic tourist arrivals. This is particularly relevant for countries where tourism serves as a lifeline for millions of people and a backbone of economies.

3.3. Trade and air connectivity

Air connectivity is an important facilitator of international trade. About 35% of international trade by value is moved by air. Countries with better connectivity tend to trade more - 1% better air cargo connectivity is associated with 6% more trade. By implementing policies that promote the improvement in air cargo connectivity and efficient movement of air cargo, governments have a strong potential to improve their trade competitiveness on a global level.

Another important contribution of air connectivity is establishing more direct routings and facilitating faster and better access to other markets for business travellers. Previous studies showed that geographic distance acts as a barrier to knowledge transfer: knowledge diffuses by spreading locally first and then across longer distances. It is the more skilled and mobile individuals (e.g. business travellers) who carry knowledge and disseminate it through their social and work networks.[19]

The COVID-19 pandemic has significantly disrupted business travel. According to the Global Business Travel Association, about 93% of companies globally have suspended non-essential business travel due to the pandemic. More specifically, 37% of companies have cancelled or suspended most business trips and 56% of companies have suspended all business trips internationally.[20]

About half of the companies have no intention or are uncertain about resuming business travel in the near future. The key impediments to resuming business travel in the short run are ongoing restrictions on international travel and concern about potentially contracting the virus while going on a trip. Where border restrictions have been lifted or eased, a requirement to quarantine on arrival or upon return acts as a strong deterrent to travelling for business purposes. The macroeconomic outlook is another important factor that will play a role in recovery of business travel – business travel is likely to continue to be depressed while companies are under financial pressure. This effect is likely to persist while the economy is in a contractionary territory.

Some opine that in the long term business travel will undergo a structural change as video conferencing appears to have made inroads as a substitute for in-person meetings. In response to the pandemic, many companies have adjusted work arrangements and made extensive use of modern telecommunication technologies to hold virtual meetings. It remains a question whether in the long term, the widely adopted use of video conferencing

caused by the pandemic has the potential to become more permanent. In the longer term, despite improvements in communication technologies, firms are likely to continue to rely heavily on business travel to establish and maintain the international links that keep the global economy connected. As observed by Inter*VISTAS*, the extent to which video-conferencing technology will impact business travel is likely to be limited. Business travel has two key components: intra-company and inter-company business. As well, conventions, conferences and networking events are often considered part of business travel.[21]

- Intra-company meetings. The pandemic has accelerated the shift to using technological platforms for companies across different industries. With many workers required to work from home during the pandemic, teleconferencing platforms (MS-Teams, Zoom and Skype) have become widely used. While video conferencing has the potential to reduce intra-company travel, a permanent and significant reduction is unlikely. A number of commentators have observed that the networking and relationship-building dimension of teleconferencing is weak or missing.

- Inter-company business travel. This component is more heavily dependent on interpersonal relationships and networking, and thus less likely to find teleconferencing as an acceptable substitute. There are certainly some intercompany meeting elements that can be accomplished by teleconferencing, but many business functions such as marketing, customer support and financial relationships will still require in-person meetings. Further, teleconferencing is not yet a substitute for in-person attendance in all circumstances, such as on-site tours, conferences and trade shows. Overall, there is likely to be a limited impact of enhanced work environment telecommunications on intercompany air travel.

- Meetings and Conventions. In response to the pandemic, some conference organizers have shifted to virtual conferences and events using modern video- and tele-conferencing platforms. Once the artificial barriers to travel, such as travel restrictions and bordure closures, are removed a reverse shift to physical events is expected because personal network and relationship building are a critical component of conference attending, which is difficult to achieve with remote conferences.

3.4. Travel bubbles' role in restoring air connectivity

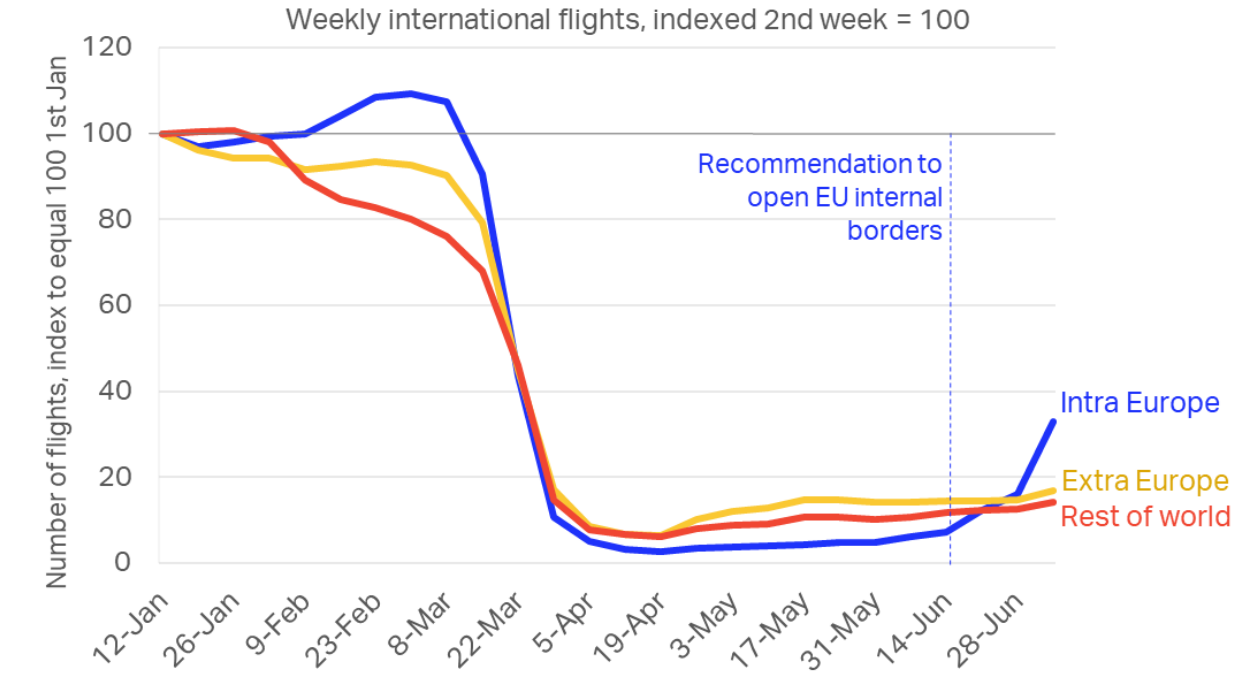
Restoring air connectivity is important for both business and leisure travellers. The concept of a travel bubble has received much focus given its potential role in restoring air connectivity. A travel bubble can be defined as state level agreement that enables international air travel between two countries by reducing the restrictions or conditions compared to those that apply to travel from and to other non-travel bubble countries.[22]

Travel bubbles could help air travel recover by providing a higher degree of predictability and transparency for airlines. Increased connectivity could result from the ability of airlines to better foresee the weeks ahead and plan their networks, and for passengers to plan their travel. Travel bubbles also have the potential to support traveller confidence and reduce uncertainty.

The European market offers one example of a travel bubble where flights did indeed recover after governments began to ease restrictions on international travel within Europe. Following the gradual lifting of border restrictions for the Schengen member states, which came into effect on 15 June 2020, a sharp increase in the number of short-haul international flights within Europe was recorded (Figure 20).

This pick-up in intra-Europe international flights has been supported by passengers travelling to visit friends and family as well as holiday traffic associated with the peak summer period. The performance on intra-European routes sat in contrast to developments in both international flights between Europe and the rest of the world and the aggregate measure of all other international flights in this period. The intra-Europe experience highlights the benefits that can come from a coordinated approach across countries which supports traveller confidence and reduces uncertainty.

Figure 20: Weekly international flights intra -Europe, extra-Europe and rest of the world



Source: IATA Economics analysis based on data provided under license by FlightRadar 24. All rights reserved.

The global pandemic has had a serious disruptive effect on air connectivity, breaking vital connections which enable the flows of tourists, trade and investment across different markets around the globe. This chapter focused on the impact of the pandemic on global and regional connectivity levels, emphasising that air connectivity will play a vital role in supporting economic recovery. The remainder of this report will focus on evaluating historical trends in air connectivity over time and across different markets, using case studies to illustrate what factors contributed to improved levels of air connectivity in selected countries.

4. Global Air Connectivity Overview

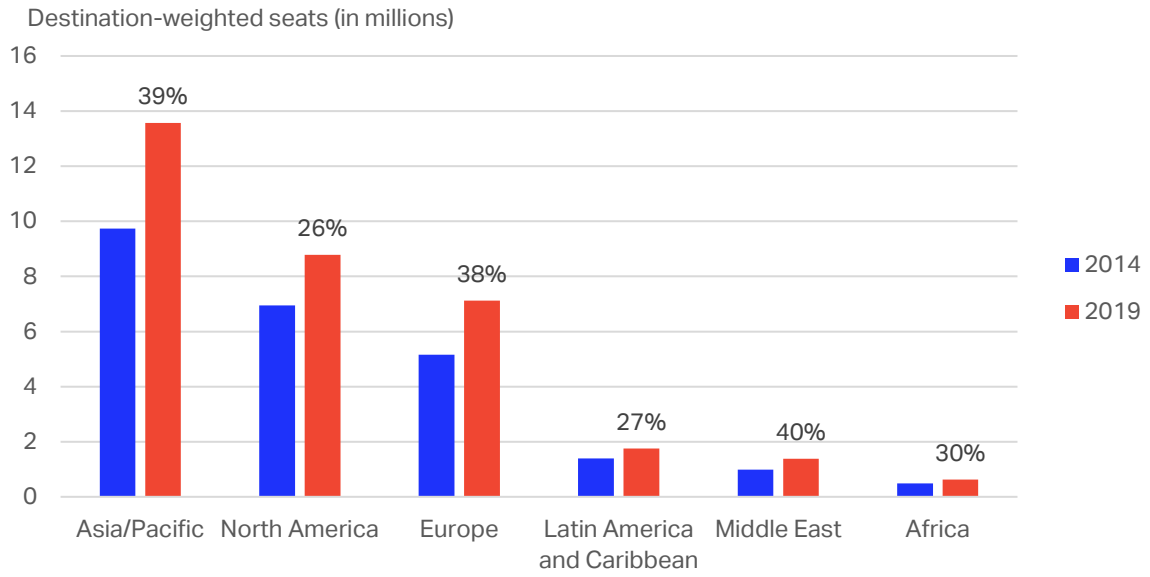
This chapter applies the IATA air connectivity methodology to assess the air connectivity performance of countries and cities in 2019 vs 2014. In particular, Chapter 4 presents the results of the air connectivity indicator by looking at various regions, countries and cities in the world. The charts in this chapters offer various ways to interpret the data (for a more detailed explanation on the methodology used, see Chapter 2). These concepts are illustrated more in detail in the examples, found in the boxes parts of the chapter.

4.1. Air connectivity by region

Absolute air connectivity

The most connected region in the world is Asia. Asia is characterised by a growing domestic regional market, most notably in China, India and Indonesia. The second most connected region is North America, with the United States being the most connected country in the world. In terms of connectivity growth, both Asia and the Middle East have had the highest growth rates over the five-year period from 2014 to 2019, followed closely by Europe with a growth rate of 38%. Figure 21 shows the connectivity indicator by region in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 21: Air connectivity and growth rates by region (2019 vs. 2014)



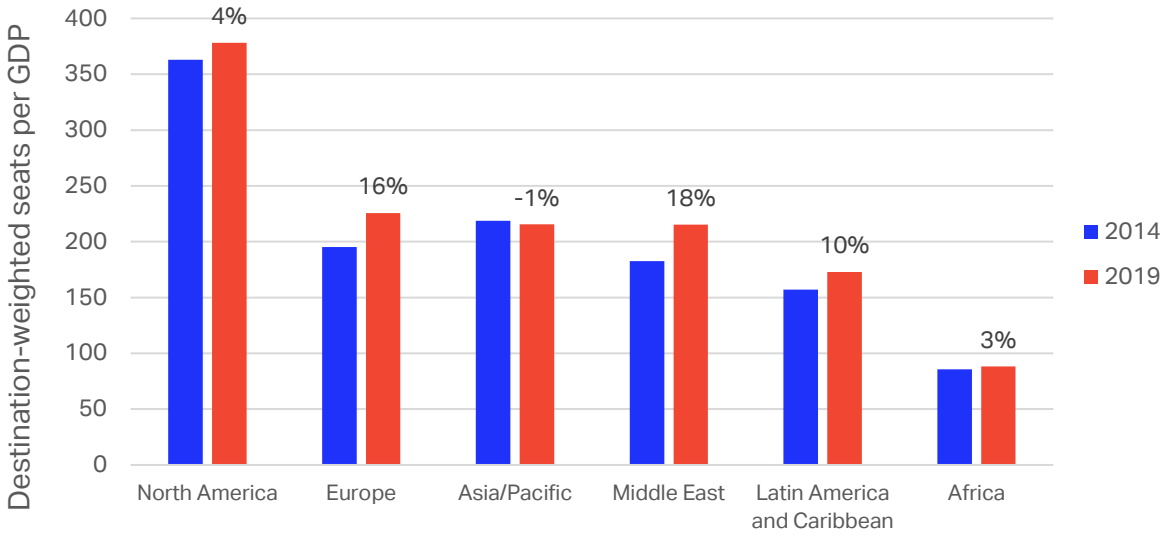
Relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of

quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

After adjusting for GDP, North America, which has the second highest absolute connectivity indicator, ranks first. The air connectivity growth rate seems to be the same as GDP growth for Asia, with some moderate growth for Africa, North America and Latin America. Europe and the Middle East have managed to increase their connectivity beyond the GDP growth in the region. Figure 22 shows the connectivity indicator divided by its level of GDP, in 2014 and 2019 for each region, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

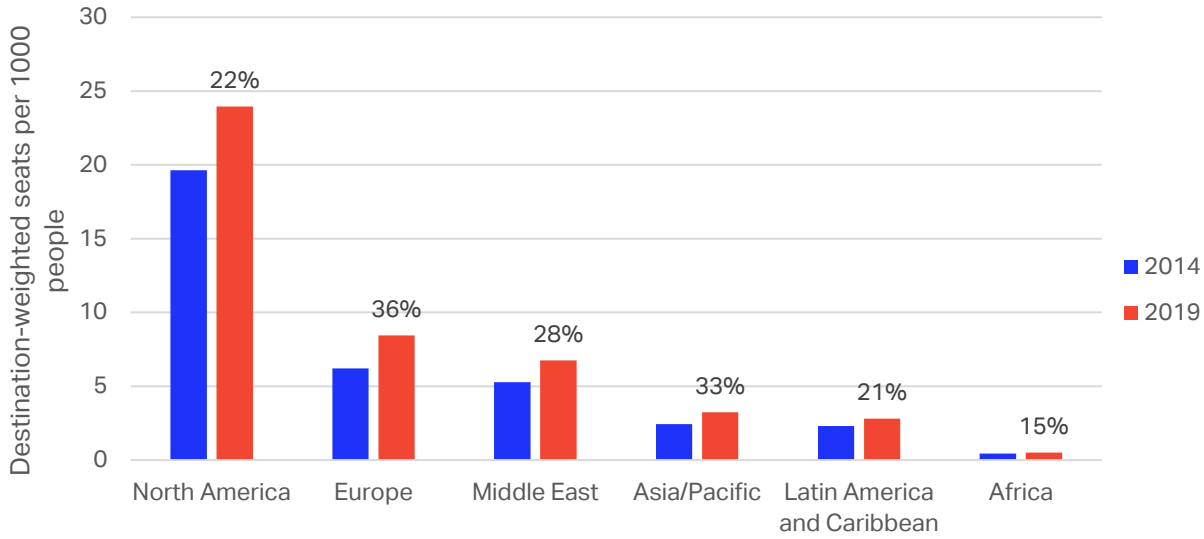
Figure 22: Air connectivity per $billion of GDP and growth rates by region (2019 vs. 2014)



Compared to air connectivity relative to the size of the economy, regional performance in terms of air connectivity relative to the population size shows a few differences. For the latter Europe, Asia and the Middle East are leading in terms of growth. For Europe this growth comes mostly from connections to the Eastern European region despite having very slow population growth.

Figure 23 shows the connectivity indicator divided by the population size, in 2014 and 2019 for each region, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 23: Air connectivity relative to population size and growth rates by region (2019 vs. 2014)



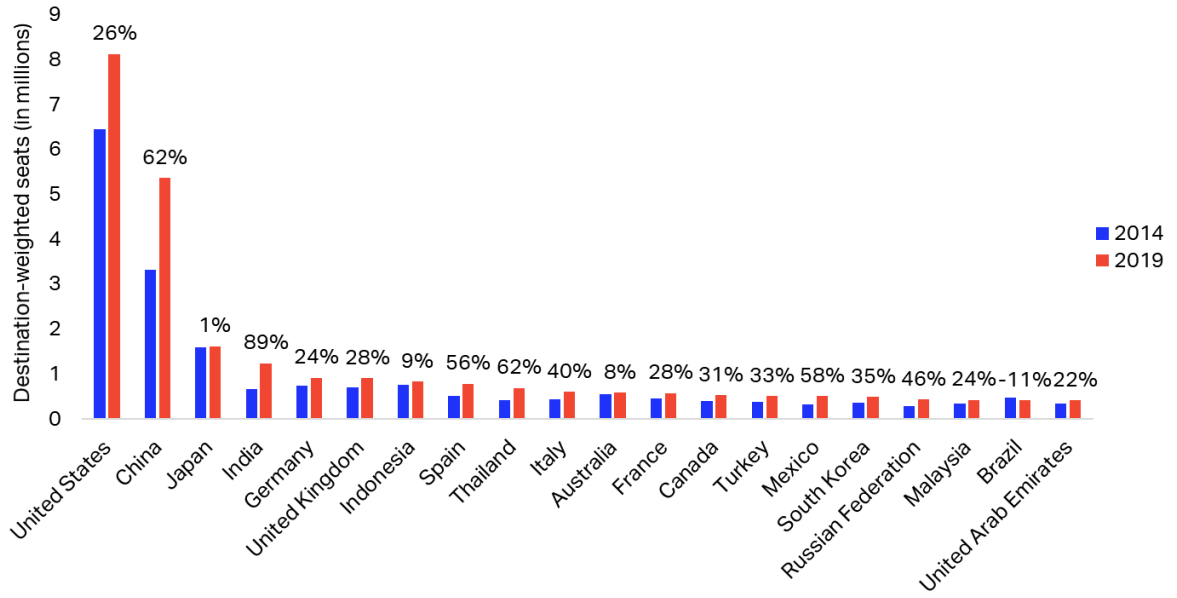
4.2. Air connectivity by country

4.2.1 Top 20 Most Connected Countries in the World in 2019

The United States was the most connected country in the world in 2019. It is closely followed by China with significant connectivity growth of 62% in the past five years.

Among the top 20 most connected countries in the world in 2019, India has seen the fastest connectivity growth from 2014 to 2019 (89%), replacing Indonesia as the fourth globally, having jumped from 7th position in 2014. One of the main reasons behind this jump was the significant growth in the Indian air transport sector– particularly in the domestic market segment (for a more detailed analysis of India's significant rise in air connectivity see case study in section 5.2). Figure 24 shows the top 20 most connected countries in 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 24: Top 20 most connected countries in the world in 2019 and air connectivity growth (2019 vs. 2014)

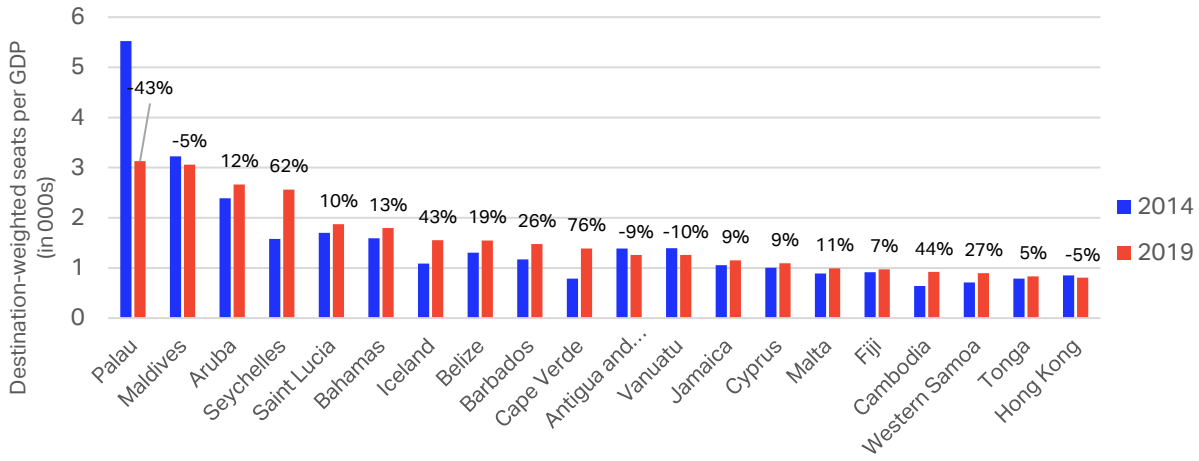


4.2.2 Top 20 Most Connected Countries in the World Relative to Economic Size

The level of connectivity will depend to some extent on the size of a country's economy. Larger economies will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy, can be used to measure and analyse the level of air connectivity. The following paragraph will examine air connectivity adjusting for the economic size of a country.

Palau, the Maldives, and Aruba have the highest connectivity levels relative to the size of their economies. By contrast, the United States, which has the highest absolute connectivity indicator, ranks 45th after adjusting for GDP. The top 20 most connected countries in the world weighted by GDP, are small states, almost all islands, and highly dependent on inbound tourism. The most connected country for this measure, Palau, experienced a decline of 43% of its connectivity over the five-year period following diplomatic tensions with China and the resulting dramatic decrease in the number of Chinese tourists flying to the island. Figure 25 shows the top 20 most connected countries in 2019 in terms of the connectivity indicator in 2014 and 2019 for each country as well as indicator's growth in percentage over the five-year period from 2014 to 2019 divided by its level of GDP[23].

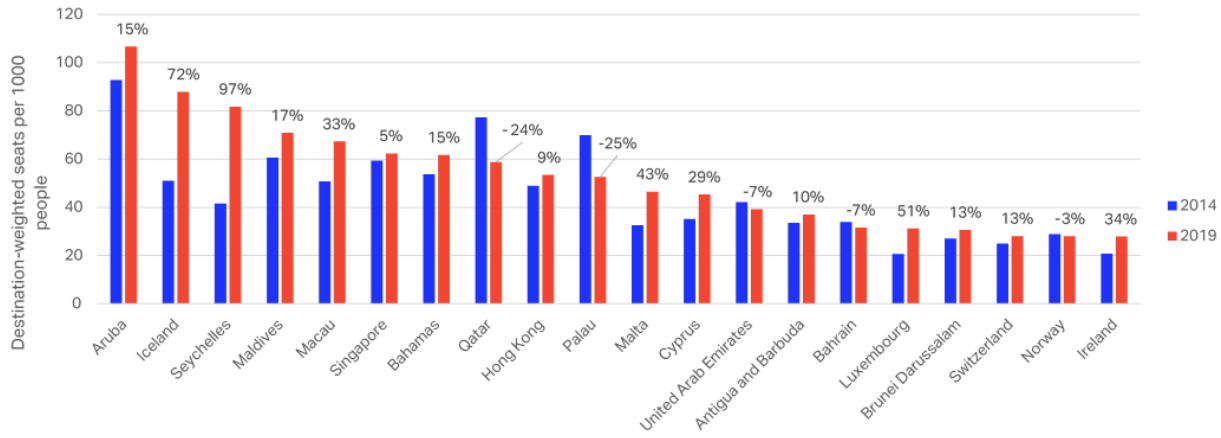
Figure 25: Top 20 most connected countries in the world in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 vs. 2014



4.2.3 Top 20 Most Connected Countries in the World Relative to Population Size

The level of connectivity will depend to some extent on the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, an alternative measure of air connectivity, which adjust for the size of a country's population, can be used to measure and analyse the level of air connectivity. The following paragraph will examine air connectivity adjusting for the population size of a country.

Figure 26: Top 20 most connected countries in the world in terms of air connectivity relative to its population size (2014 and 2019) and its growth (2019 vs. 2014)



While the top performers in air connectivity per GDP measure were small island states highly reliant on tourism, in the air connectivity per population indicator we see also the entrance of small states with strong economies such as Macau, Singapore, Qatar, Hong Kong, the United Arab Emirates and others as top performers for this indicator. Figure 26 shows the top 20 most connected countries in 2019 in terms of the connectivity indicator

in 2014 and 2019 for each country as well as indicator's growth in percentage over the five-year period from 2014 to 2019 divided by its population size[24].

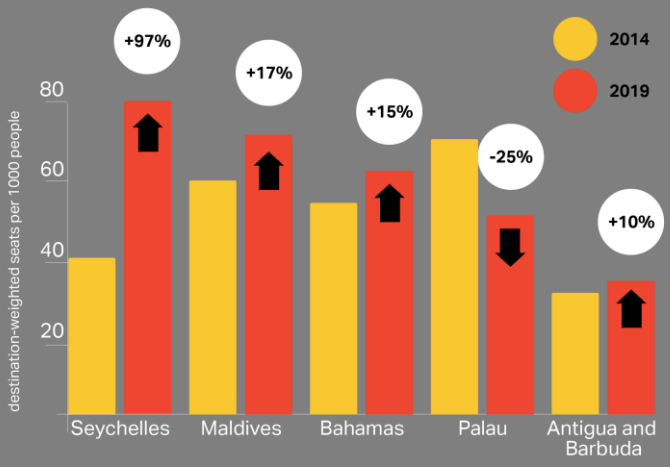
Case Study: Small Island States

Small island states depend strongly on connectivity provided by air transport. Increased air transport connections contribute to employment opportunities and bring about wider economic benefits through the aviation catalytic effects, ultimately facilitating economic growth and development.

The top 20 most connected countries in the world weighted by GDP (Figure 25), are almost all small island states. These states are highly dependent on inbound tourism. The relationship between aviation and economic growth is mainly through the facilitation of travel to support the tourism industry. This industry is the small island states' primary income earner. It stimulates still more economic activity, as tourists spend money at restaurants, hotels, retailers, tour operators, and other providers of consumer goods and services. In 2016, spending by foreign visitors who flew to small island states supported an estimated 1.6 million jobs and a $27.9 billion contribution to GDP. [1]

C0: Small island states in the world

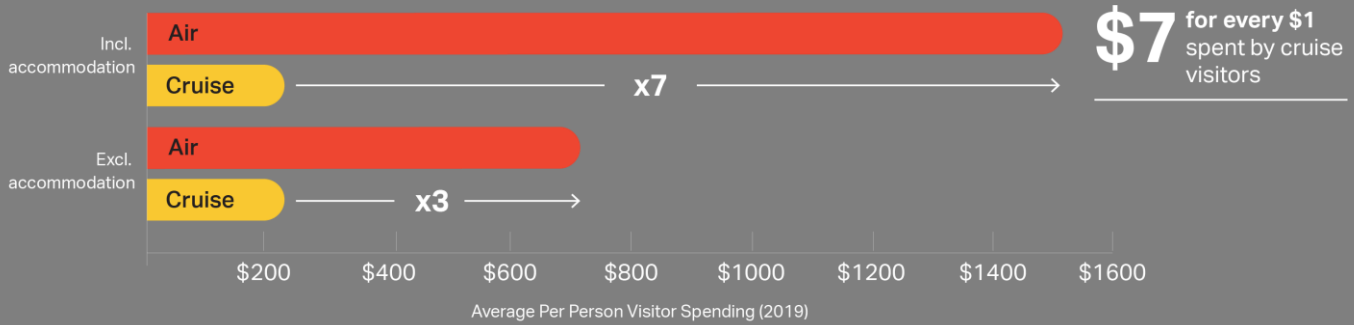
C1: Top 5 most connected small island states in terms of air connectivity per $billion of GDP (2014 and 2019) and its growth (2019 vs. 2014)



The top 5 most connected small island states, weighted by GDP, can be seen in C1. The most connected among the small island states is the Seychelles, closely followed by the Maldives. In the case of Palau, it becomes even more apparent that the small island states have high reliance on tourism. Palau's air connectivity adjusted by GDP, went down by 25% over a five-year period from 2014 to 2019 following diplomatic tensions with China and the resulting dramatic decrease in the number of Chinese tourists flying to the island.

In the small island state of Bermuda, tourists coming by air contribute more to islands' economy than cruise visitors. Air passengers spend 3 times more than cruise visitors (excluding accommodation).

C2: Average per visitor spending in Bermuda in 2019 for visitors coming by air and cruise, including and excluding accommodation

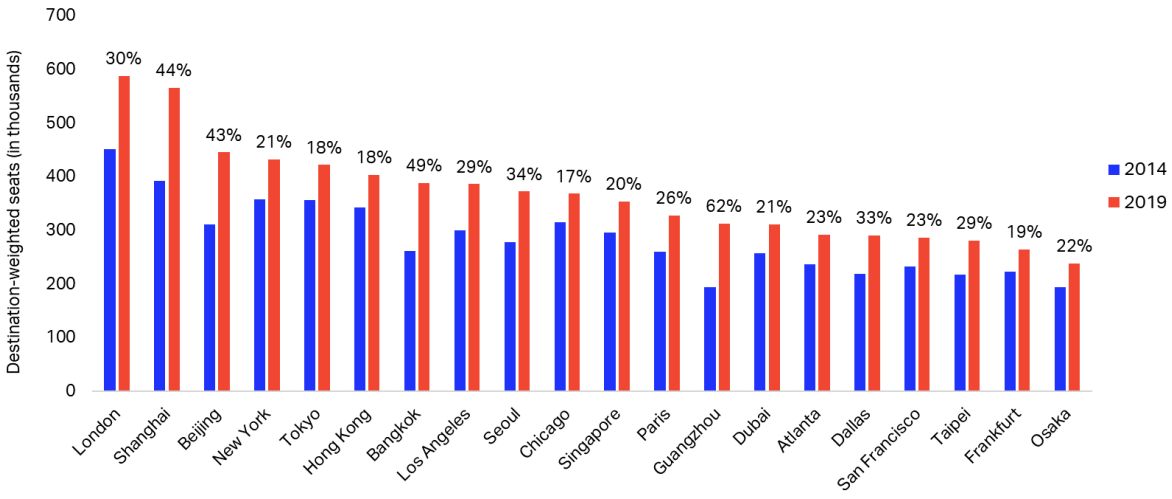


4.3. Air connectivity by city

4.3.1 Top 20 Most Connected Cities in the World

London (United Kingdom) is the most connected city in the world, followed by Shanghai and Beijing (China). Over the five-year period from 2014 to 2019, Beijing (China) jumped four positions, replacing New York (United States) as the 3rd most connected city in the world. Among the top 20 performers, Guangzhou (China), Bangkok (Thailand) and Shanghai (China) have had the highest growth rates in air connectivity score. Guangzhou in China has increased its connectivity significantly in the five-year period growing its connectivity by 62% from 2014 to 2019.
Figure 27 shows the top 20 most connected cities in 2019 in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 27: Top 20 most connected cities in the world in 2019 and air connectivity growth (2019 vs. 2014)



5. Regional Air Connectivity Overview

The objective of this chapter is to present the results of the IATA air connectivity index by looking into the most connected countries and cities in Africa, Asia, Europe, Latin America, the Middle East and North America. Chapter 5 also investigates the performance of countries and cities within the various regions.

5.1. Africa

Air transport can provide virtual bridges between cities in a continent that is geographically vast but not well-connected.

Africa is the world's second largest and second most populous continent in the world. Yet, approximately 60 percent of the continent's population lacks access to modern infrastructure, which isolates communities, prevents access to health care, education and jobs, and impedes economic growth, according to the Office of Special Advisor on Africa [25]. With 75% of Africa's road network unpaved[26], air transport's unique benefit is to connect cities that cannot be otherwise timely connected, enabling flows of key economic activities and people.

Africa is forecast to be the second fastest growing region in the world in the next 20 years.

The IATA/ Oxford Economics 20-year forecast places Africa as the second fastest growing region in the world in terms of air travellers. Economic growth across Africa, urbanization and a growing middle class are all driving the African aviation industry resurgence.[27]

- In Nigeria, a favourable demographic profile, combined with robust growth in living standards underpins strong average annual growth in air passenger demand. Over the forecast horizon, the Nigerian air transport market is expected to more than double, increasing by 2.8x relative to its current level.

- In Ethiopia, future growth in air travel will be driven by its large potential for catch-up in living standards over the long run and a young and growing population. Passenger traffic to, from and within the country is forecast to grow by 5.6% each year on average over the next 20 years.

There are substantial barriers to the further growth of air connectivity in the continent.

Africa is currently a less than ideal growth environment due to high taxes and charges, inadequate infrastructure, capacity and skills gaps, and a lack of connectivity across the continent. Lowering these barriers would help to unlock further economic potential of the region.

The Single African Air Transport Market (SAATM) is a significant step forward in opening the way for improvement in air connectivity within Africa.

Africa is the only region that presently has the institutional mandate to promote connectivity through the Single African Air Transport Market (SAATM). The SAATM is a significant step forward in opening the way for essential improvement in air connectivity within Africa. Research shows that if 12 key markets in Africa had open air services with each other, an additional $1.3 billion would be added to the GDP of those countries, creating an additional 155,000 jobs, saving travel times and making air travel more convenient and affordable for travellers.[28]

Air connectivity in Africa has been disrupted significantly due to the COVID-19 pandemic. The number of unique city pairs connecting Africa within the region and to the rest of the world reduced to under 100 unique city pairs in April 2020 compared to about 970 city pairs during the same period one year ago.

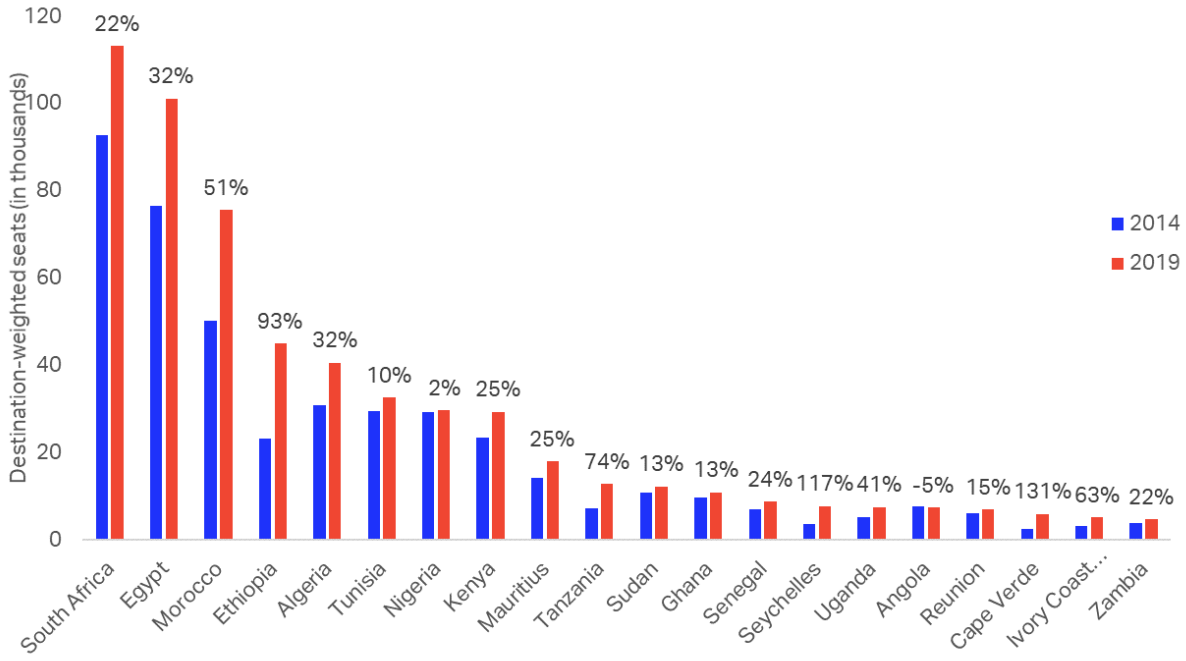
Restoring air connectivity in Africa is essential for economic recovery. Trade flows and Africa's exports are critically dependent on good air connectivity to sales markets. Kenya is a good illustration – the country exports of fresh-cut flowers transported by air has more than doubled in the past decade. It is the second largest export in Kenya, with more than 120,000 of fresh flowers flown by air every year. Air connectivity is also vital for supporting tourism flows; particularly relevant for countries in Africa heavily reliant on tourism spend as an economic engine. Every year 72 million international tourists arrive to Africa with 53% of those visitors travelling to Africa by air.

5.1.1 Country level results

Absolute air connectivity

South Africa was the most connected country in the Africa region in 2019, closely followed by Egypt in second position. Ethiopia has had a significant connectivity growth rate of 93%, jumping three positions in ranking over the five-year period from 2014 to 2019 (for a more detailed analysis of Ethiopia's significant rise in air connectivity see case study on Ethiopia). Figure 28 shows the top 20 most connected countries in 2019 in Africa in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 28: Top 20 most connected countries in Africa in 2019 and air connectivity growth (2019 vs. 2014)



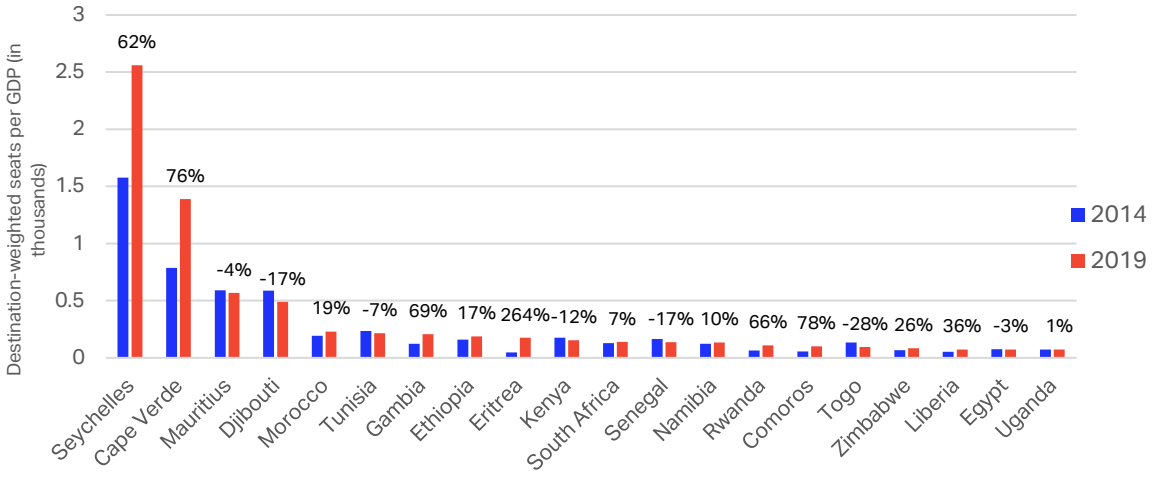
Relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Top 20 Most Connected Countries Relative to Economic Size

Seychelles has the highest connectivity levels in Africa relative to the size of its economy (Figure 29). Seychelles is followed by Cape Verde and Mauritius in the second and third place, two other small island states. As discussed in the case study on small island states, they are highly dependent on air transport to fly in tourists and vital supplies. Eritrea's air connectivity grew exponentially and much faster than the growth of its GDP in the five-year period. Figure 29 shows the top 20 most connected countries in 2019 in Africa, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its level of GDP.

Figure 29: Top 20 most connected countries in Africa in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 to 2014)



South Africa, which has the highest absolute connectivity indicator in Africa, ranks 15th after adjusting for GDP and 11th after adjusting for the population size. Djibouti's air connectivity per population declined by less than the per GDP as the Djibouti's GDP grew faster than its population.

Top 20 Most Connected Countries Relative to Population Size

Figure 30 shows the top 20 most connected countries in 2019 in Africa in terms of the connectivity indicator divided by its population size in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 30: Top 20 most connected countries in Africa in 2019 in terms of air connectivity divided by its population size (2014 and 2019)

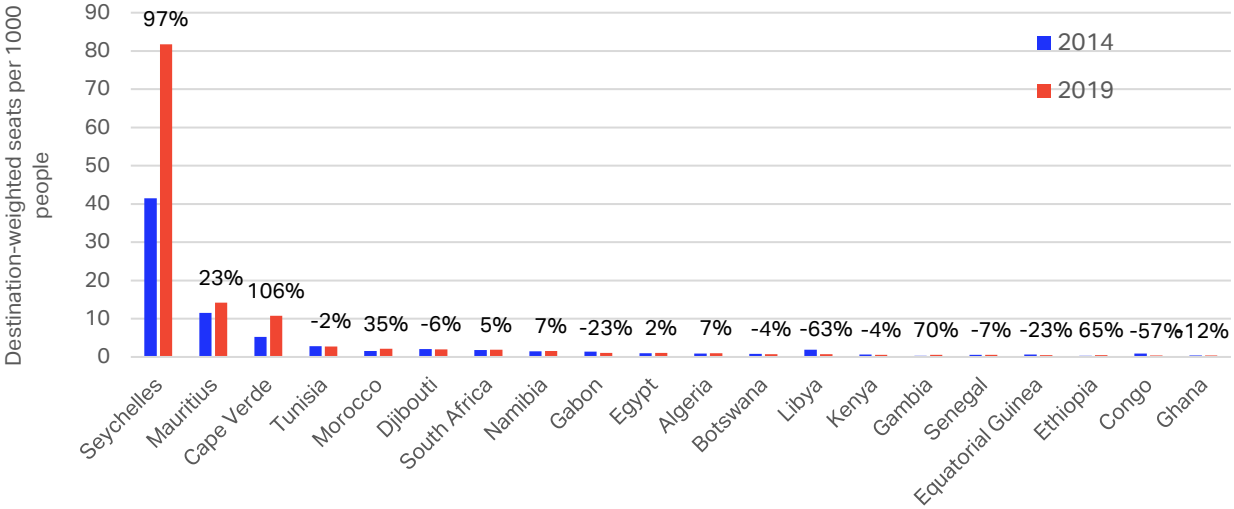
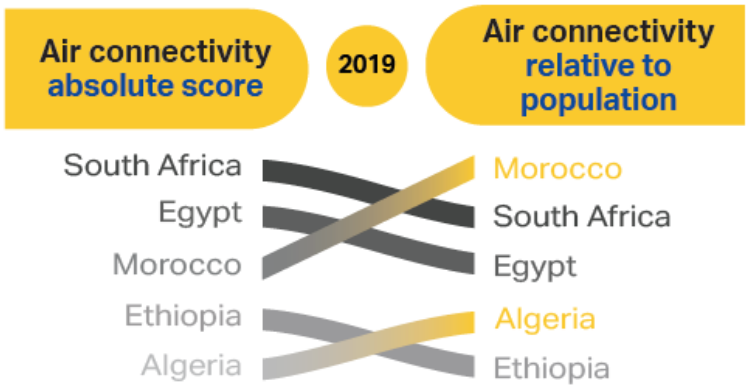


Figure 31 shows how the ranking of the top five most connected countries in terms of absolute connectivity changes once we rank them by their air connectivity relative to population score. For economic growth, it is relative air connectivity that matters.

Figure 31: Top 5 countries ranked in terms of absolute air connectivity and relative to population

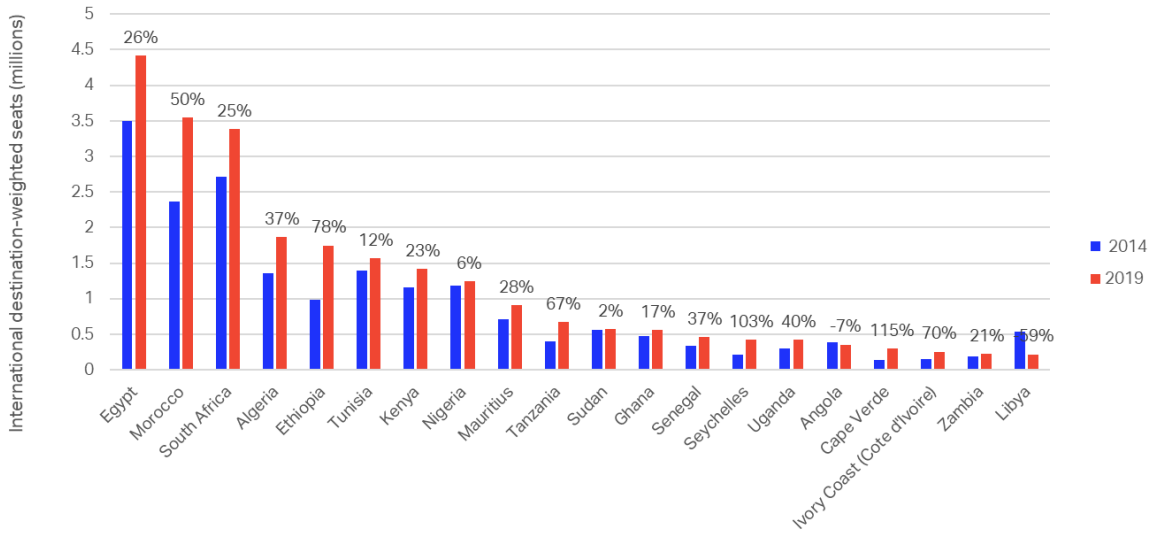


International air connectivity

Figure 32 shows the top 20 most connected countries in 2019 in Africa in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Comparing this chart to Figure 29 (total air connectivity), we can notice that South Africa has been replaced by Egypt as the most connected country internationally. This is mostly because South Africa's domestic market is around twice its international market while Egypt is mostly connected outside of the country.

Figure 32: Top 20 most internationally connected countries in Africa in 2019 and air connectivity growth (2019 vs. 2014)



Case Study: Ethiopia

Ethiopia's air connectivity has almost tripled in the last 10 years (C4). In the African ranking of air connectivity, Ethiopia's position went up to 5th jumping ahead of Tunisia, Nigeria and Kenya while in the global ranking it jumped 8 places. This significant connectivity growth was driven by several factors such as a successful airline, a favourable business environment and supporting demographics and growth of the economy.

Ethiopian Airlines

Ethiopia's government-owned airlines, Ethiopian Airlines plans to advance regional economic integration and connect Africa's fast-growing economies to the global market. Ethiopian Airlines is also the most profitable airline in Africa[1]. The airline has also been investing into access to the global and Africa's air network especially to connections to the United States and Asia and new connections within the region (Eritrea, Togo, Zambia, Guinea etc.)[1.8]

Favourable business environment

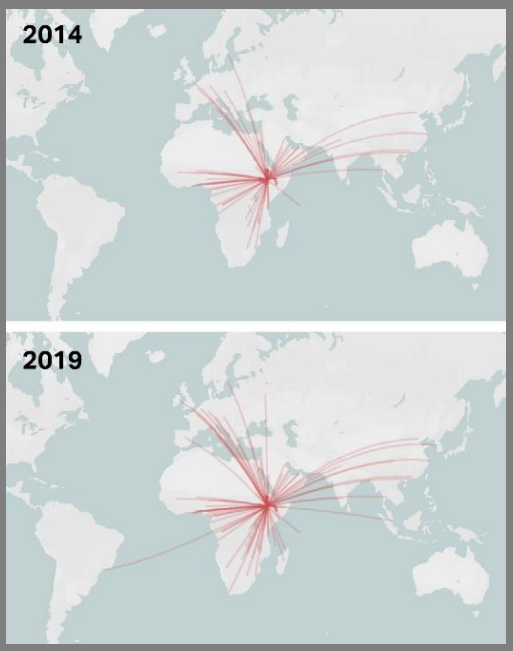
Political and regulatory reforms, including stabilization within the region (e.g. historic peace agreement with Eritrea), created a good environment for profitability growth and successful expansion. There was a major policy shift in privatization of enterprises. Efforts were made by the government to build infrastructure. Ethiopian Airports Enterprise goal to increase number of total airports in the country to 25 by 2020.

Demographics and economic growth

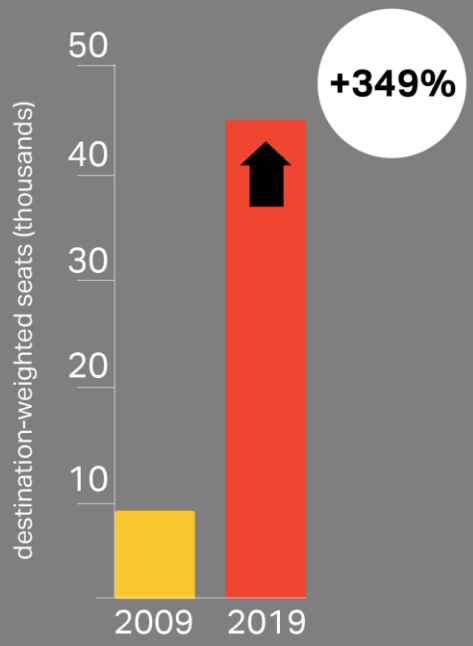
Ethiopia is Africa's second most-populous country and the continent's fastest growing economy. Future growth in air travel in Ethiopia will be driven by its large potential for catch-up in living standards over the long run and a young and growing population. Passenger traffic to, from and within the country is forecast to grow by 5.6% each year on average over the next 20 years. Aviation in Ethiopia is a high-growth sector with increasing demand for air transportation, both passenger and cargo, with the sector expanding at an average 20% growth rate.

Ethiopia's aviation industry has supported more than 1.3 million jobs in 2016 and contributed $4.2 billion to the GDP.

C3: Maps of Ethiopia's network of direct flights 2014, 2019 (source: SRS Analyzer)



C4: Ethiopia's air connectivity growth (2009 to 2019)



Case Study: Nigeria

Nigeria's air connectivity has grown by 26% in the last 10 years (C6). The country ranks 7th in the African air connectivity ranking. Considering the size of its population and economy, Nigeria is a significantly underserved country in terms of air connectivity.

Drivers of slow connectivity growth

The slow connectivity growth in Nigeria can be explained by the low capacity growth in the country. In the period under review, several Nigerian carriers such Bellview Airlines, Chanchangi Airlines, Virgin Nigeria, Medview Airlines ceased operation and Arik Air went into receivership stopping all its intercontinental service. This development resulted in an important capacity fall that impacted connectivity negatively. In 2017 in the heat of the Forex challenge (blocked funds), Continental Airlines also ceased operation into Nigeria.

Significant potential for growth

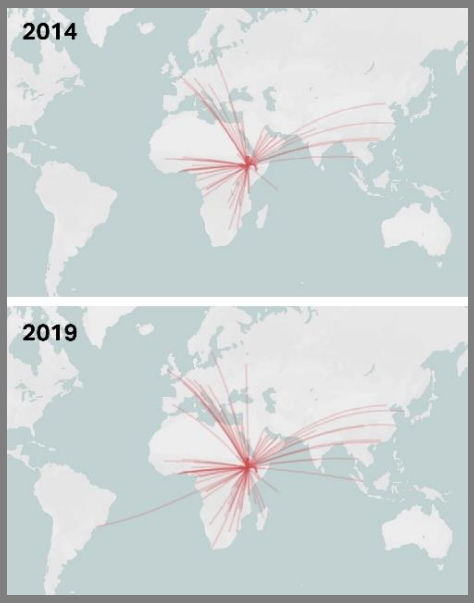
Notwithstanding the challenges, Nigeria has significant potential for future air connectivity growth. Nigeria is Africa's first and the world's seventh most populous country. The past 10 years the Nigerian economy has experienced healthy growth rates except for the last two years. A favorable demographic profile, combined with robust growth in living standards, underpins strong average annual growth in air passenger demand. However, in order to reach this potential and increase air transport connectivity, it is important to create an environment where existing businesses can flourish, and new business opportunities are created.

Improving the aviation business environment

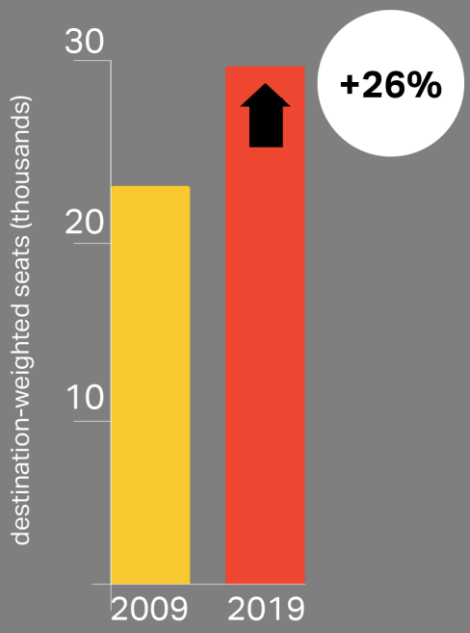
The level of air connectivity of a country depends on various factors that can be grouped into three categories: the size of the country, geographic and demographic factors and the ease of doing business. Only the last element – the ease of doing business - can be directly influenced by governments.

Nigeria's government has already endeavoured to improve the business environment for the aviation industry. Nigeria was one of the 11 Countries that signed up to the solemn commitment for the full implementation of the Yamoussoukro Decision in 2016- this can lead to increased air service levels and lower fares, which in turn stimulates additional traffic volumes, facilitates tourism, trade, investment and other sectors of the economy.

C5: Maps of Ngeria's network of direct flights 2014, 2019 (source: SRS Analyzer)



C6: Nigeria's air connectivity growth (2009 to 2019)



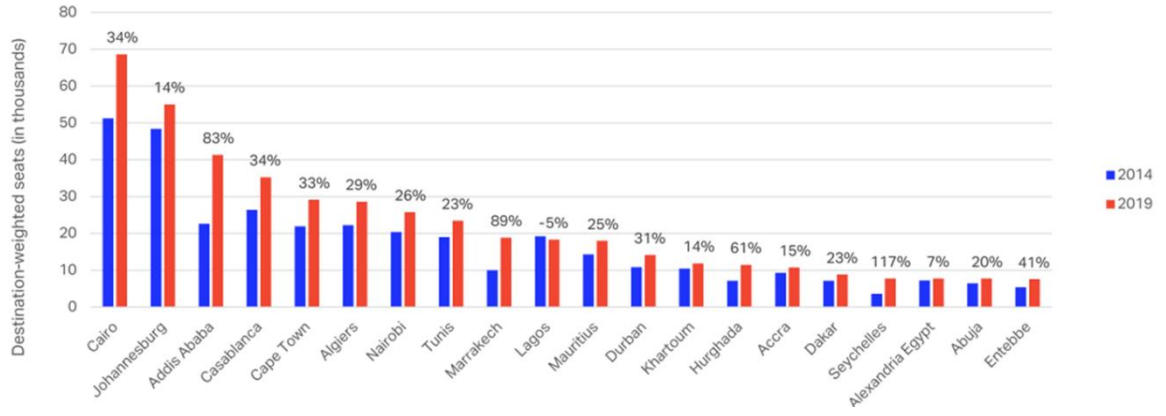
Moreover, Nigeria led the negotiations for and signed up the implementation of the new African Continental Free Trade Area in 2019, supported by aviation and the SAATM to promote the free movement of people, goods and services across the continent

City level results

Absolute air connectivity

In the Africa region, Cairo (Egypt) is the most connected city, followed by Johannesburg (South Africa) and Addis Ababa (Ethiopia). Addis Ababa's connectivity grew by 83% jumping two positions in the African ranking from 2014 to 2019. Addis Ababa is home to the most profitable airline in Africa, the Ethiopia Airlines. The strong growth in Addis Ababa's connectivity suggests that the Ethiopia Airlines hub strategy has been successful in increasing its access to the regional and global aviation network. Moreover, both Addis Ababa and Nairobi have grown their connectivity in routes between North America/Europe and Africa. By contrast, Lagos' air connectivity could have been impacted negatively (a 5% contraction over a five-year period) by the challenges faced by Nigerian carriers. Figure 33 shows the top 20 most connected cities in 2019 in Africa in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 33: Top 20 most connected cities in Africa in 2019 and air connectivity growth (2019 vs. 2014)

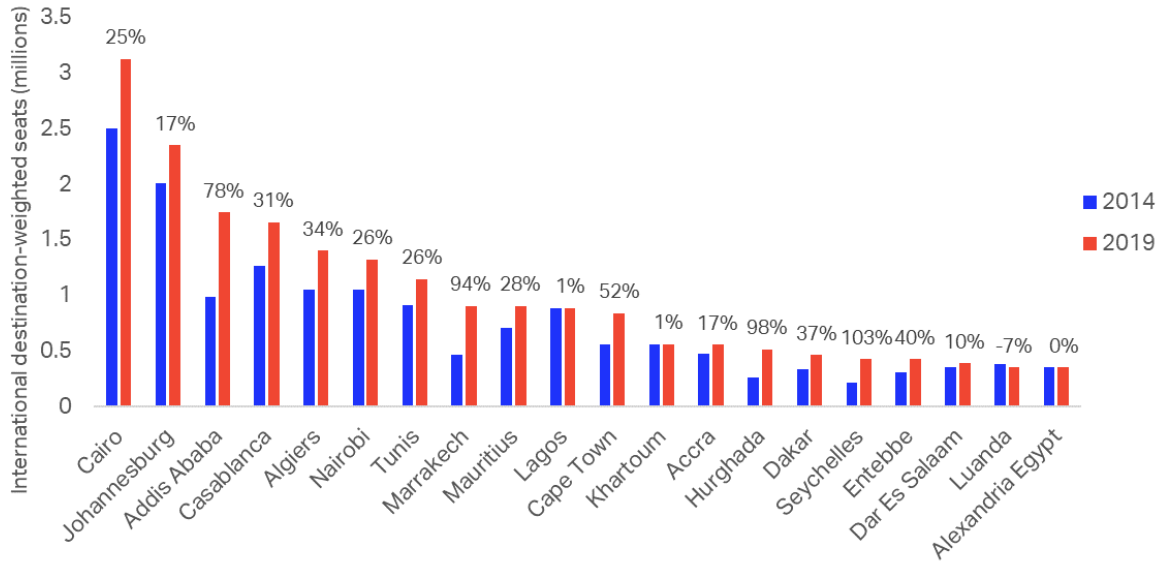


International air connectivity

Figure 34 shows the top 20 most connected cities in 2019 in Africa in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[29].

We see that Cape Town loses many positions in the international connectivity ranking as most of its connectivity comes from domestic connections while Johannesburg is more connected with international markets.

Figure 34: Top 20 most internationally connected cities in Africa in 2019 and air connectivity growth (2019 vs. 2014)



5.2. Asia Pacific

Most of world's top aviation markets in the next 20 years are set to be in the Asia Pacific.

In the next two decades five out of the ten largest air passenger markets will be in Asia Pacific. India and Indonesia are forecast to climb steadily up the ranks from 5th and 10th largest air transport market in the world to 3rd and 4th respectively by the mid-2030s. Thailand is expected to be the new entrants in the ranking by 2039.

The domestic Chinese market experienced the strongest air travel growth in the world in 2019. China remains on track to become the world's largest air transport market by the mid-2020s. Although its ageing population is much less supportive of growth than in many other countries in the region, strong expected gains in living standards will bolster air passenger growth over the long run.

Strong air travel growth is also expected in Vietnam in the next 20 years. In Vietnam, strong anticipated catch-up growth in both incomes and living standards is expected to result in the domestic market entering the ranks of the top 10 largest in the world in the future. Air connectivity links Vietnam to the global supply chain. Vietnam is one of the top 10 exporters globally of telecom and office products. The export of smartphones makes up around 22% of all exports in value-terms in Vietnam (2017).

Challenges remain in the region. The forecasted increase in travel traffic demand will need to be matched by modernisation of airports and airspace. Major airports in the region are already experiencing congestion and delay. Significant capital investment is required, and governments must play a proactive role in coordinating infrastructure planning and development. Another challenge for aviation in the region is the availability of the skills to ensure the availability of qualified personnel, including pilots, engineers and mechanics.

Air connectivity in Asia Pacific has been disrupted significantly due to the COVID-19 pandemic. Excluding China's domestic market -- which was the first to be affected by the pandemic, but also recovered the fastest -- the number of unique city pairs connecting Asia within the region and to the rest of the world reduced to about 5,720 unique city pairs in April 2020 compared to about 12,360 city pairs during the same period one year ago.

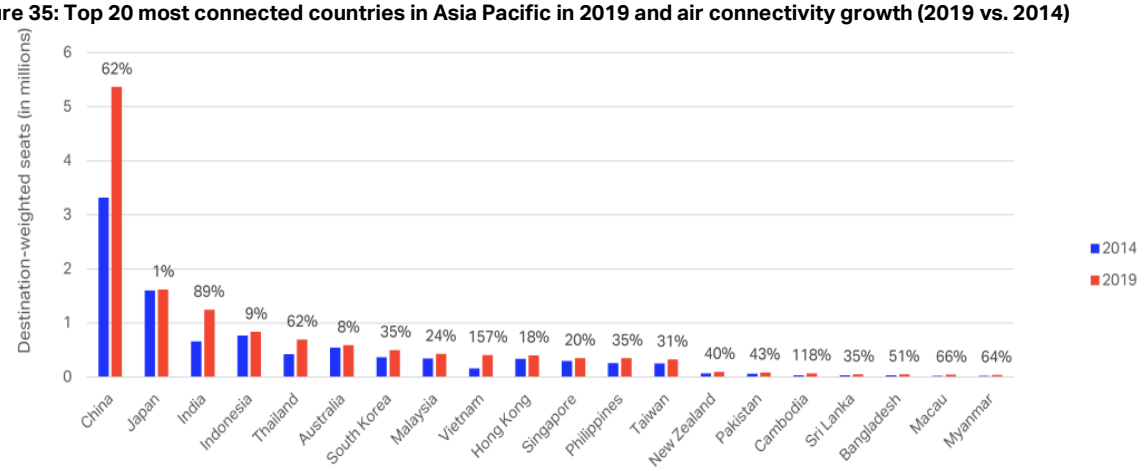
Restoring air connectivity in Asia is essential to support the recovery of its economies reliant on trade and linked into global supply chains -- trade itself has resulted from globalized supply chains and associated investment. Air transport is vital for manufactures' trade, particularly trade in components which is a major part of cross border trade today. Air connectivity is also vital for supporting tourism flows, especially relevant for countries in Asia which rely on tourism as a source of economic growth. Every year 360 million international tourists arrive to Asia with 44% of those visitors travelling to Asia by air.

5.2.1 Country level results

Absolute air connectivity

China is by far the highest connectivity in the Asia region in 2019, at almost three times larger than the next most connected country in the region, Japan. India has had a significant connectivity growth rate of 89%, replacing Indonesia to the third position in the Asia ranking of 2019. One of the main drivers of its connectivity growth was the increase in domestic traffic demand for travel in India. For a more detailed analysis of India's significant rise in air connectivity see case study on India). Figure 35 shows the top 20 most connected countries in 2019 in Asia in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 35: Top 20 most connected countries in Asia Pacific in 2019 and air connectivity growth (2019 vs. 2014)



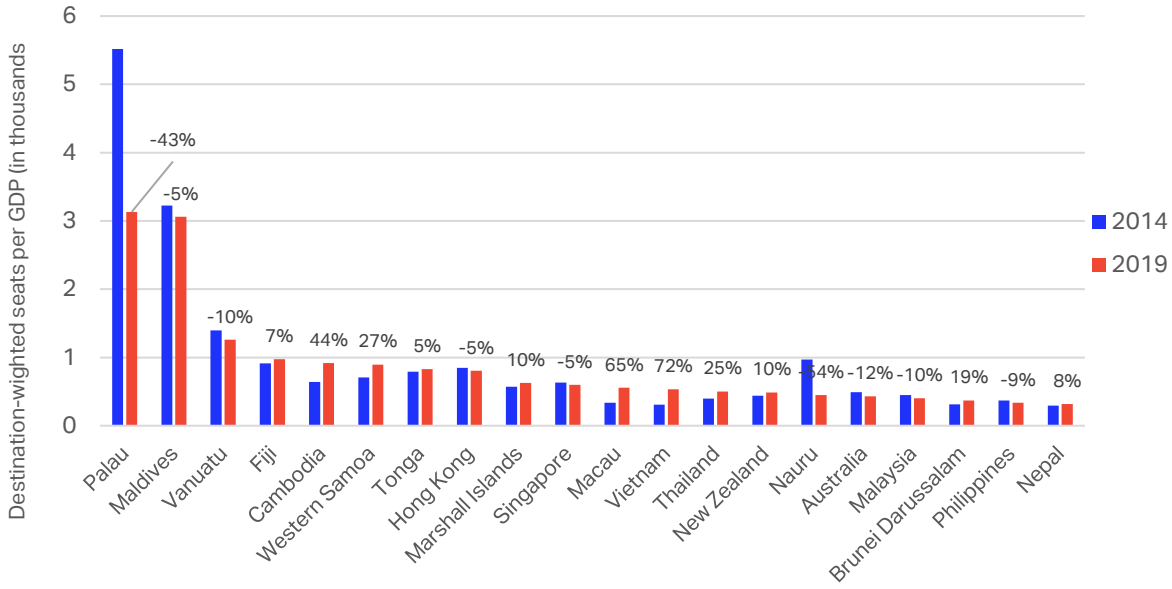
Relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Top 20 Most Connected Countries Relative to Economic Size

The Palau, Maldives and Vanuatu have highest connectivity levels, relative to the size of their economies, all three small island states (for a more detailed analysis of reasons behind the small island state's air connectivity, see case study in section 4.2). China, which has the highest absolute connectivity indicator, ranks 31st after adjusting for GDP. Figure 36 shows the top 20 most connected countries in 2019 in Asia, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its level of GDP.

Figure 36: Top 20 most connected countries in Asia in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 to 2014)



Top 20 Most Connected Countries Relative to Population Size

Figure 37 shows the top 20 most connected countries in 2019 in Asia, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its population size.

Figure 37: Top 20 most connected countries in Asia in 2019 in terms of air connectivity divided by its population size (2014 and 2019), and its growth (2019 to 2014)

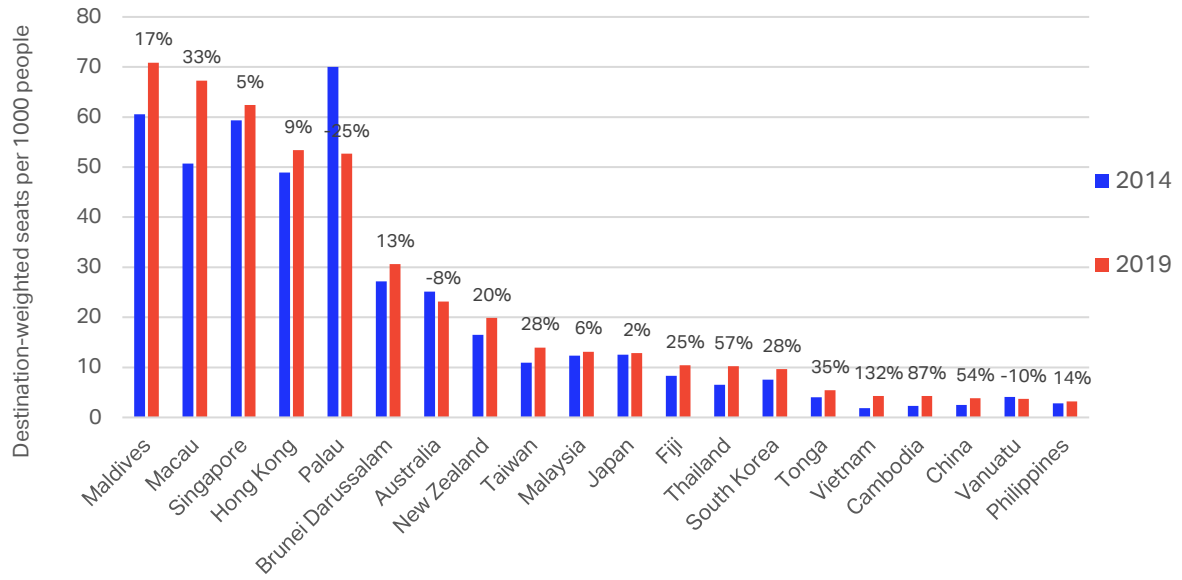
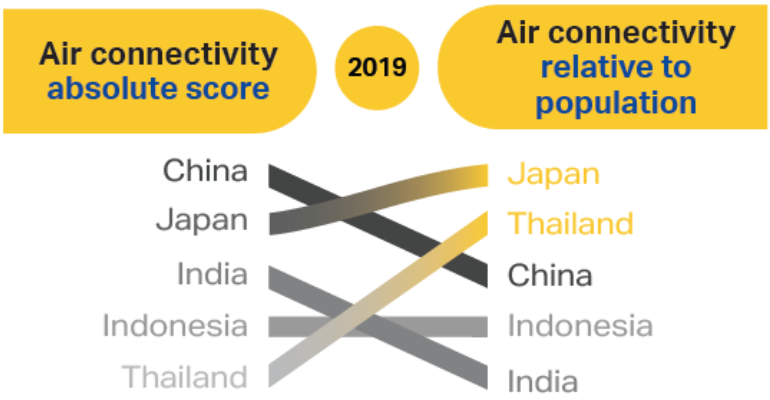


Figure 38 shows how the ranking of the top five most connected countries in terms of absolute connectivity changes once we rank them by their air connectivity relative to population score. For economic growth, it is relative air connectivity that matters.

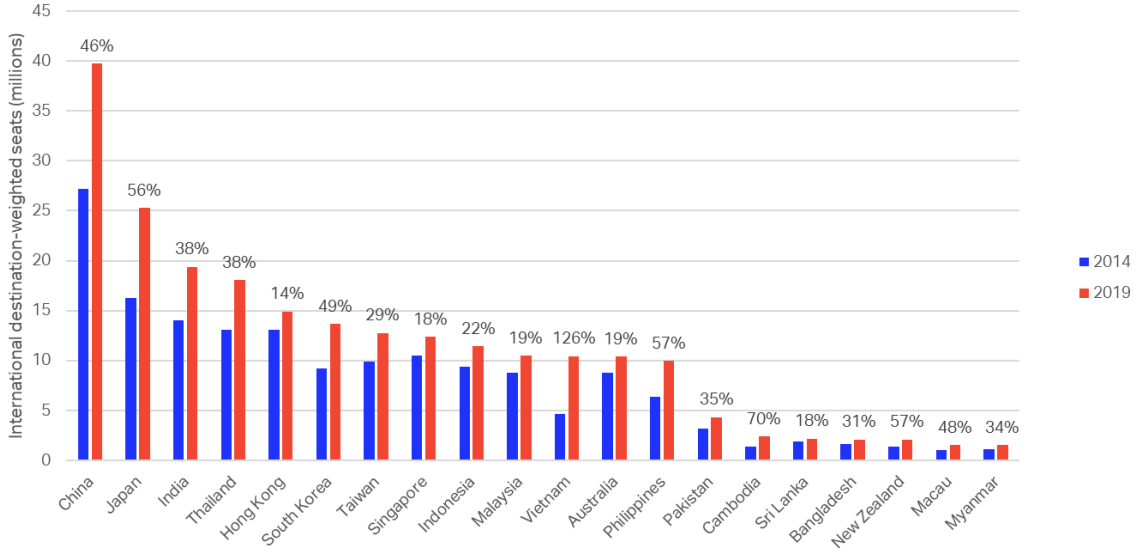
Figure 38: Top 5 countries ranked in terms of absolute air connectivity and relative to population



International air connectivity

Figure 39 shows the top 20 most connected countries in 2019 in Asia in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019. Given Indonesia's large domestic market is not surprising to see that Indonesia moves down in the ranking of international connectivity for Asia while Hong Kong, Singapore and Taiwan win several positions compared to the total air connectivity (Figure 35).

Figure 39: Top 20 most internationally connected countries in Asia Pacific in 2019 and air connectivity growth (2019 vs. 2014)



Case Study: India

India's air connectivity has grown by almost 240% in the last 10 years (C8). There were 2.6 million aircraft movements in 2018-19 (up 12.1% over 2017-18). In the global ranking of air connectivity, India's position went up to 4th place, jumping ahead of United Kingdom, Indonesia and Germany. India's connections to Asia-Pacific have grown the fastest over the last five years. This significant connectivity growth was driven by several factors such as demographics, domestic market demand and policy environment.

Demographics, increasing incomes and domestic market demand

India is the world's largest democracy with a population of more than 1.3 billion citizens. India's incomes are increasing along with the proportion of middle-class households. Given these demographic trends, the India domestic market is currently the fastest growing one (measured in terms of revenue passenger kilometres). Thus, aviation is placed to play an important role in connecting the country – both internally and with the rest of the world. To reach this aviation potential, there is a continuing need for rapid expansion in the domestic air network and airport infrastructure in India.

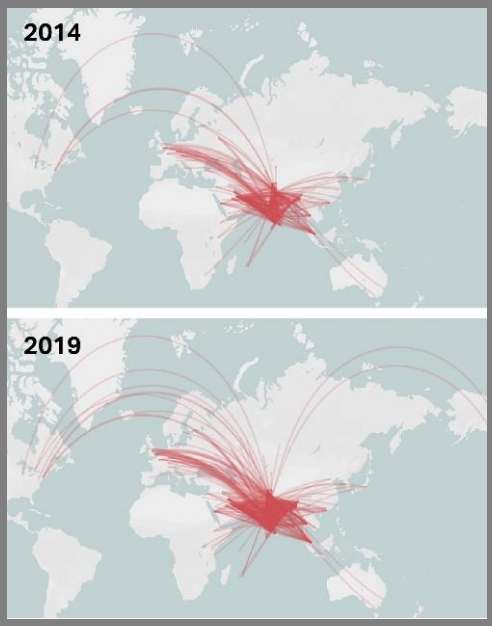
Policy environment

The policy environment has played a catalytic role in India's air connectivity growth.

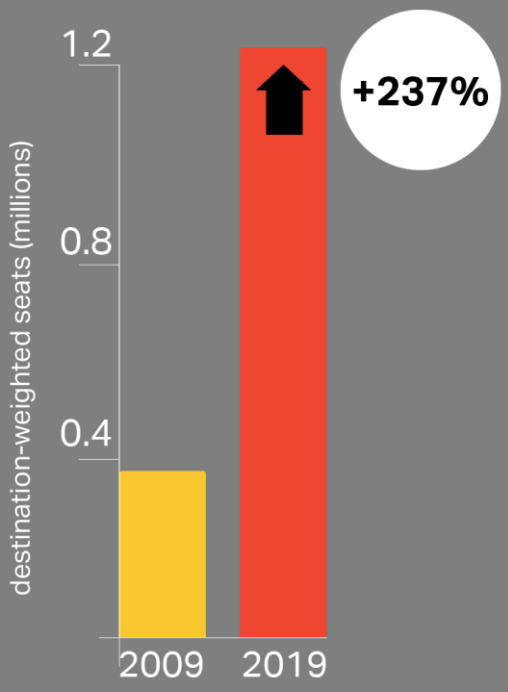
The Indian National Civil Aviation Policy has introduced several important initiatives and developments involving airline operations, safety and security, international traffic rights and maintenance, repair and overhaul (MRO) operations. It established a regional air connectivity scheme, the UDAN initiative - to make flying more affordable and convenient for the general population; with a further scheme planned to extend the UDAN framework to international routes as well. Within the framework of this programme, new airports and new routes have become operational, enhancing connectivity between far-flung and hitherto underserved areas of India. [1]

The Government of India (GoI) has granted "in principle" approval for development of 21 greenfield Airports in the country. Further, with the approval of the Cabinet, Airports Authority of India has successfully started the process for leasing of six airports under a Public-Private Partnership scheme.

C7: Maps of India's network of direct flights 2014, 2019 (source: SRS Analyzer)



C8: India's air connectivity growth (2009 to 2019)



Case Study: Vietnam

Vietnam's air connectivity has grown by almost 529% in the last 10 years (C10). In the global ranking of air connectivity, Vietnam's position went up 15 places since 2009 globally to 21st in 2019. Vietnam's connections to the Middle East have grown the fastest (156%) over the five past years just outpacing the much larger Asia-Pacific region (148%). This significant connectivity growth was driven by several factors such as the increase in demand for air transport and policy reforms.

Increasing demand for air transport

International tourist arrivals have been growing fast – in 2018, inbound tourism increased by 20% from the previous year, reaching 15.5 million arrivals. The government aimed to reach a target of 10% of GDP of contribution from the tourism sector by 2020.

Outbound traffic has also grown tremendously, driven by the rising middle class in Vietnam and the increasing propensity to travel abroad. Strong anticipated catch-up growth in both incomes and living standards in Vietnam was expected to result in the domestic market entering the ranks of the top 10 largest in the world in the future. Currently less than 50% of the Vietnamese population have taken at least one flight, reflecting the huge growth potential of the market.

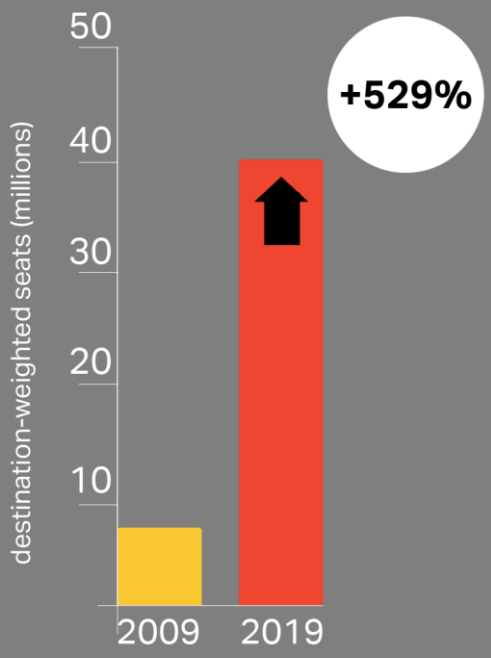
Government policies

Recognising the key role that aviation plays for Vietnam's economy, the Vietnam Ministry of Transport plans to spend $15.4 billion (VND350.5 trillion) to develop the aviation sector by 2030. It plans upgrade and to develop 28 airports with an annual air traffic capacity of 308 million passengers by 2030, with some of these projects done through public-private partnerships.

As a member of the Association of Southeast Asian Nations (ASEAN), Vietnam signed the ASEAN Open Skies Agreements in 2009 and 2010 which enabled liberalized air service agreements. This meant that more carriers are able to take advantage of the liberalisation of air routes, resulting in more competitive air fares and a more robust aviation market.

C9: Maps of Vietnam's network of direct flights 2014, 2019 (source: SRS Analyzer)

C10: Vietnam's air connectivity growth (2009 to 2019)

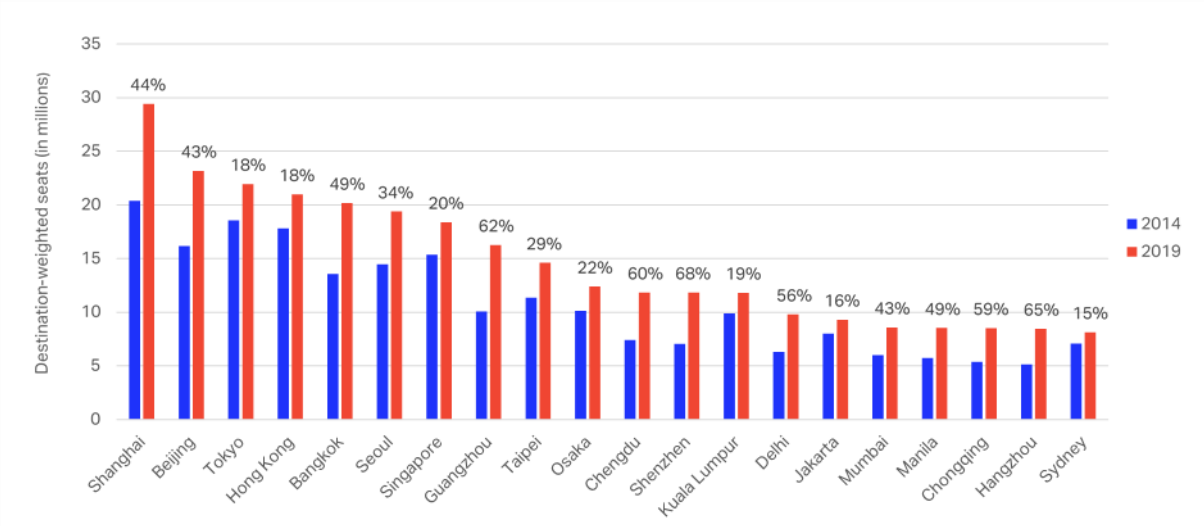


5.2.2 City level results

Absolute air connectivity

In Asia, Shanghai (China) is the most connected city, followed by Tokyo (Japan) and Beijing (China). Shenzhen, Guangzhou and Chengdu (China) have led the top 20 ranking cities in Asia in terms of air connectivity growth through their hub connectivity growth efforts. Delhi and Mumbai have also increased their connectivity levels substantially by expanding their connectivity in routes between Europe and India & Southeast Asia. Bangkok has had a connectivity growth rate of 48%, jumping two positions in the Asia ranking from 2014 to 2019. Figure 40 shows the top 20 most connected cities in 2019 in Asia in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

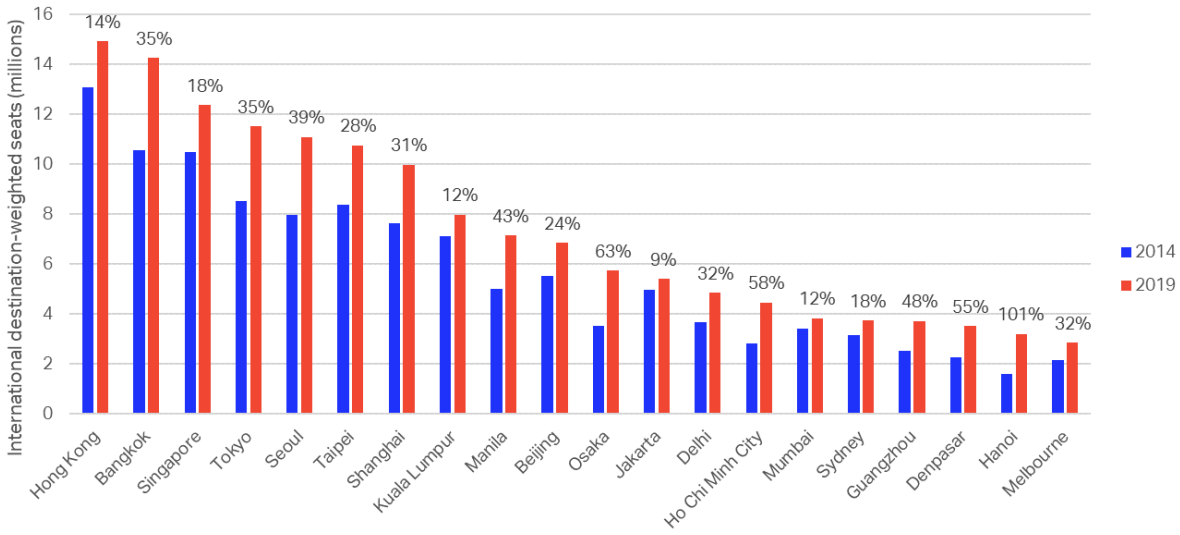
Figure 40: Top 20 most connected cities in Asia Pacific in 2019 and air connectivity growth (2019 vs. 2014)



International air connectivity

Figure 41 shows the top 20 most connected cities in 2019 in the Asia Pacific in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[30].

Figure 41: Top 20 most internationally connected cities in Asia Pacific in 2019 and air connectivity growth(2019 vs. 2014)



5.3. Europe

The air markets in emerging economies in Europe are driving growth in the continent.

Europe, particularly western Europe, is one of the most established regions of the world for air transport activity. However, emerging economies in eastern and central Europe are contributing to the overall growth in the region (7-8% RPK growth rate), with employment in the European aviation industry expected to grow 2.3% per annum to 2038.

- Relatively moderate increases in living standards, along with challenging demographic outlooks in many countries will result in only modest growth in the Western Europe aviation market over the long-run. However, bordering emerging markets to the East and South are forecast to generate much stronger growth for passenger flows to and from Western Europe.

- The Emerging Europe aviation market has a stronger growth outlook over the next 20 years than its larger western neighbour. Buoyed by the expected catch-up in living standards, the Eastern Europe market will grow by around 1.8x relative to its current level.

- Within Europe growth of 7.5% in terms of RPKs, the second strongest growth in 2019, is driven largely by the growth of the emerging markets in eastern Europe. Developed economies in Europe with more mature markets saw much slower air travel growth.

Rising challenges in the European aviation industry are environment concerts, uncertain economic outlook and capacity constraints.

The European industry is one of the most heavily regulated in the world in terms of passenger rights, consumer protection and the environment. Rising environment concerns have the capacity to impact heavily on transport choices in the future. Growth in direct connectivity in European airports has been weaker due to various reasons such as airline

consolidation, uncertain economic outlook, continued geopolitical risks, and increasing capacity constraints in Europe. However, international connectivity from Europe to the world keeps increasing on average. The difficulty in meeting projected demand is forecast to cost Europe 103 billion (€88.1 billion) in GDP.[31]

As part of its Challenges of Growth series, in 2018 Eurocontrol released a report forecasting air traffic in Europe in 2040 and the difficulty meeting projected demand. The forgone economic impact associated with this unmet demand is estimated to be $103 billion (€88.1 billion) in GDP, including direct activity at airports, indirect and induced impacts, and the lost tourism, trade and investment due to low-connectivity growth. Furthermore, most of this loss is in the general economy, not the airports or aviation sector.

Air connectivity in Europe has been disrupted significantly due to the COVID-19 pandemic. The number of unique city pairs connecting Europe within the region and to the rest of the world reduced by a factor of four. In April 2020, there were 2,110 unique city pairs compared to 9,010 city pairs during the same period one year ago.

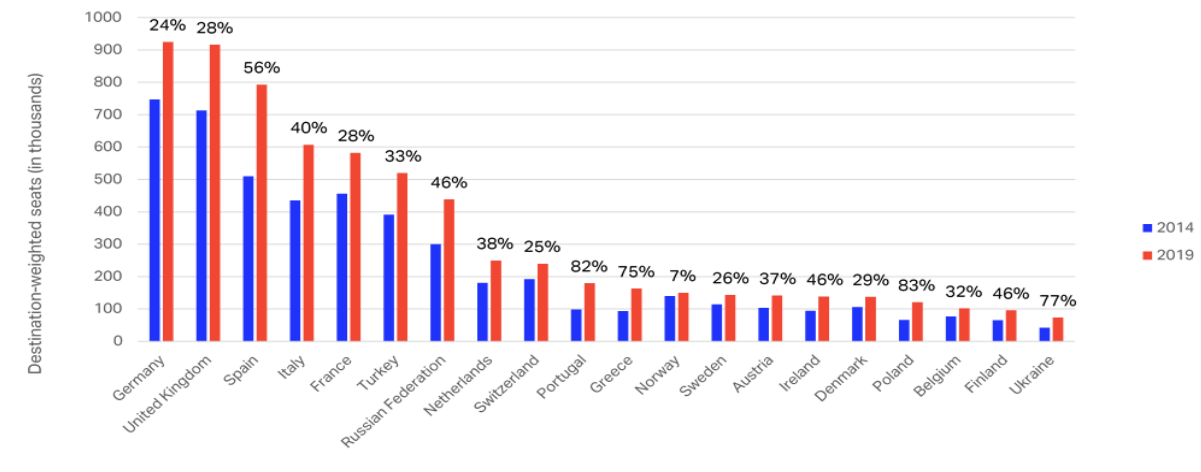
Air connectivity offers a lifeline for peripheral communities in Europe. In April 2020, 79 routes to remote communities and islands in the European Union interrupted, with 14 not recovered. This represents 60% of all Public Service Obligation (PSO) routes.

5.3.1 Country level results

Absolute air connectivity

The United Kingdom is the most connected country in the Europe region in 2019, closely followed by Germany in second position.
Greece's connectivity has grown with a significant rate of 75%, jumping five positions in the European ranking over the five-year period from 2014 to 2019. Despite the challenges in its economy, Greece has continued to be an attractive destination for inbound tourists, driving the air connectivity growth during this period.[32] Figure 42 shows the top 20 most connected countries in 2019 in Europe in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 42: Top 20 most connected countries in Europe in 2019 and air connectivity growth (2019 vs. 2014)



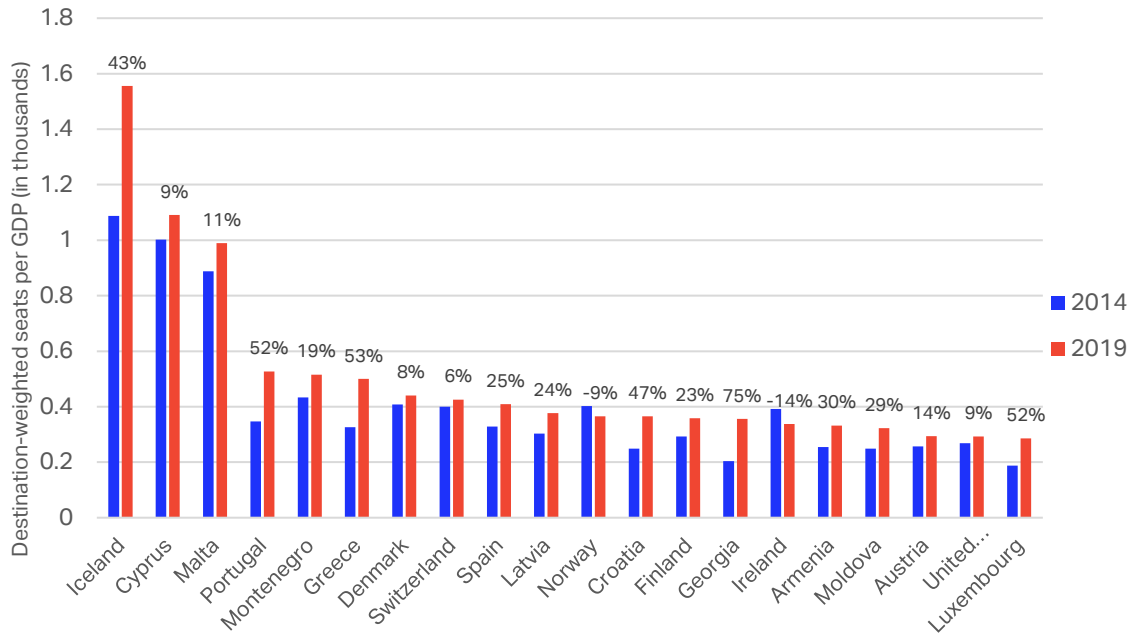
Relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Top 20 Most Connected Countries Relative to Economic Size

Iceland, Cyprus and Malta have highest connectivity levels, relative to the size of their economies (for a more detailed analysis of reasons behind the small island state's air connectivity, see the case study in section 4.2). The United Kingdom, which has the highest absolute connectivity indicator, ranks 16th after adjusting for GDP. Figure 43 shows the top 20 most connected countries in 2019 in Europe, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its level of GDP.

Figure 43: Top 20 most connected countries in Europe in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 to 2014)



Top 20 Most Connected Countries Relative to Population Size

Figure 44 shows the top 20 most connected countries in 2019 in Europe, in terms of the connectivity indicator divided by its population size in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 44: Top 20 most connected countries in Europe in 2019 in terms of air connectivity divided by its population size (2014 and 2019), and its growth (2019 to 2014)

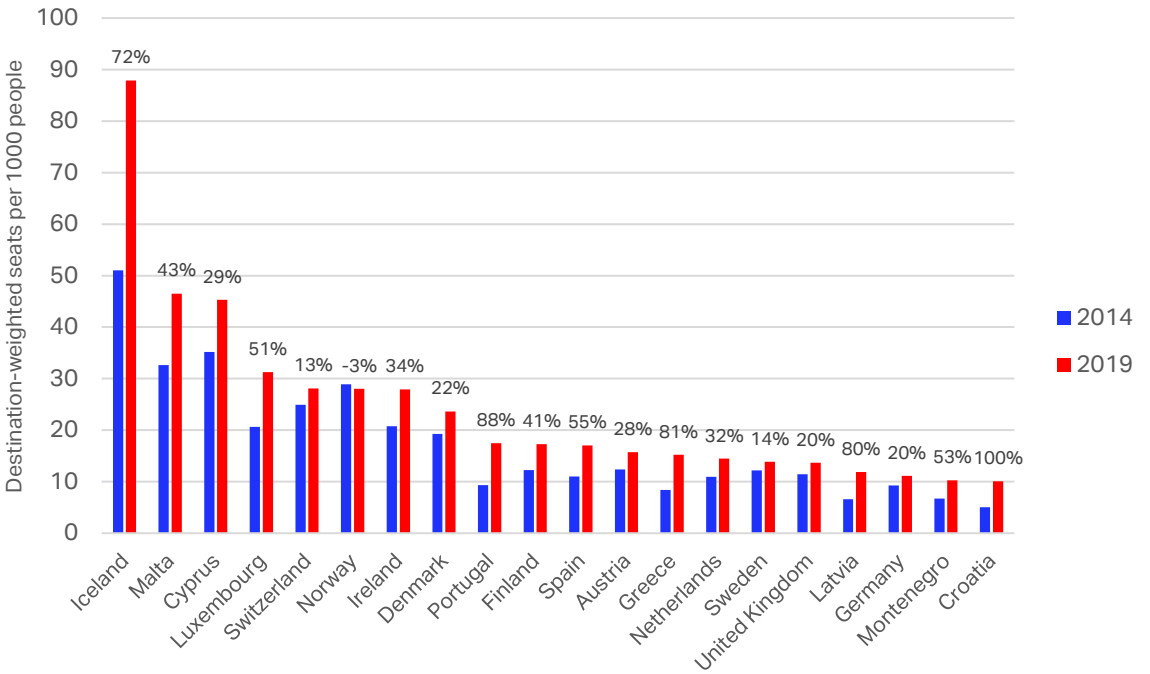
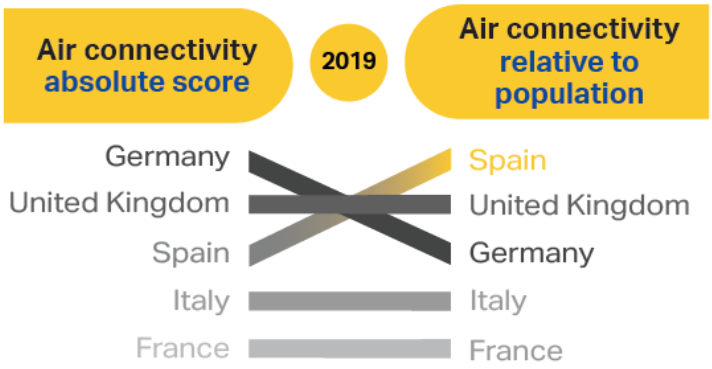


Figure 45 shows how the ranking of the top five most connected countries in terms of absolute connectivity changes once we rank them by their air connectivity relative to population score. For economic growth, it is relative air connectivity that matters.

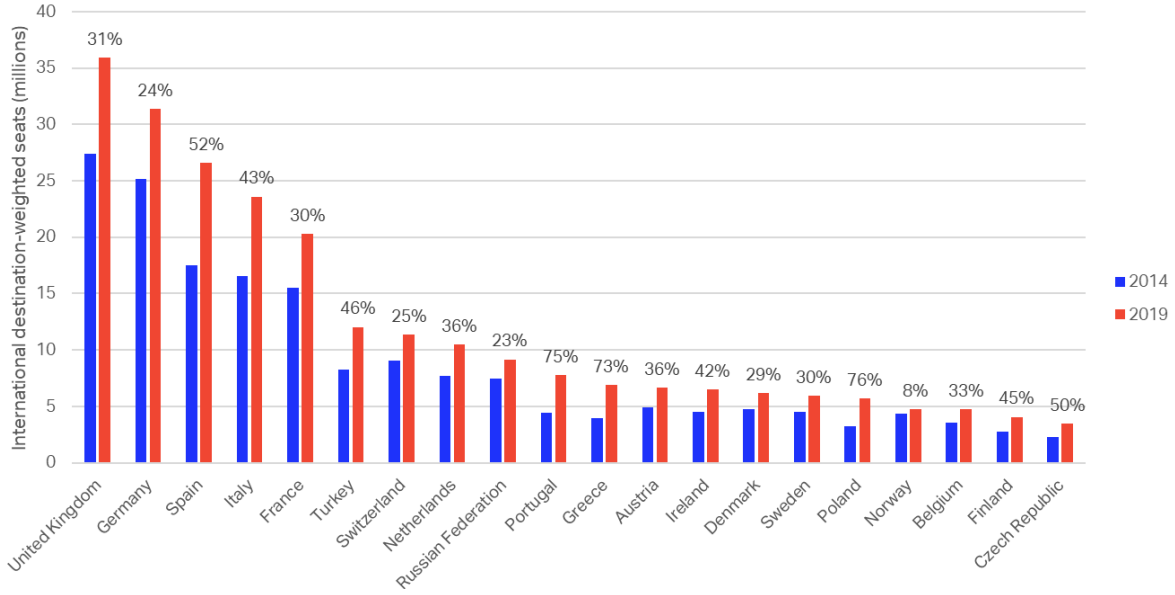
Figure 45: Top 5 countries ranked in terms of absolute air connectivity and relative to population



International air connectivity

Figure 46 shows the top 20 most connected countries in 2019 in Europe in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 46: Top 20 most internationally connected countries in Europe in 2019 and air connectivity growth (2019 vs. 2014)



Case Study: Iceland

Iceland's air connectivity has grown by more than five-fold in the last 10 years (C12). In the global ranking of air connectivity, Iceland's position went up by 11 places globally over the five-year period from 2014 to 2019. In terms of connectivity relative to the population size, Iceland is the 2nd most connected country in the world. Iceland's connections to North America have grown the fastest over the last five years. This significant connectivity growth was driven by several factors such as favourable geographic location, booming tourism industry, successful airline and supporting policy environment.

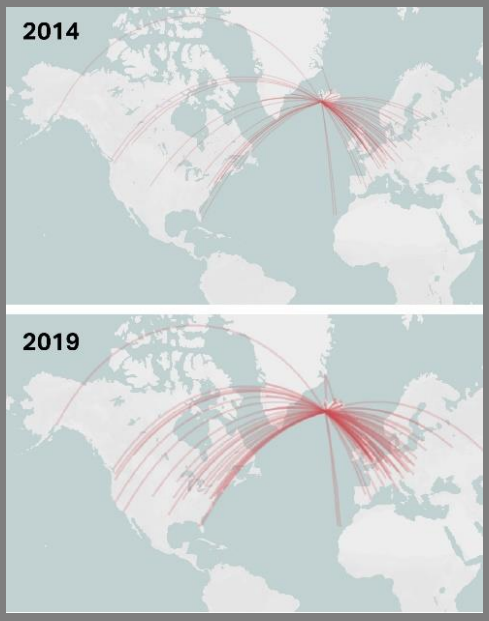
Geography
Iceland is a small island state. Air connectivity is vital to the country's economy, especially for tourism. Iceland enjoys a strategic geographical position making the island a favourable link between two continents.

Booming tourism industry
The number of foreign visitors to Iceland has increased by almost four times compared to 2010. The biggest annual increase was from 2015 to 2016, or 39%. Almost all visitors to Iceland came by air[1]. Also, tourism has been pivotal in bringing Iceland out of the financial crisis of 2008/2009.

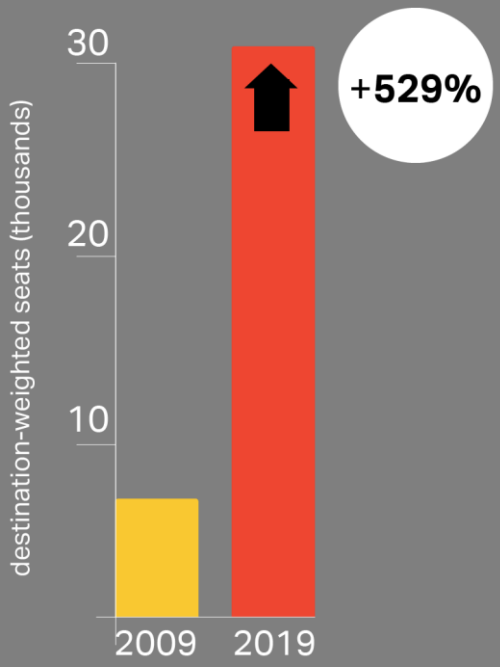
Airline network strategy
IcelandAir the flag carrier airline of Iceland. The airline has successfully expanded its network in North America giving more choice for Trans-Atlantic flights. It has also created incentives for travellers to stop over in Iceland for up to seven days which has helped to boost tourism.

Aviation Policy, Keflavik Airport's Major Development Plan (MDP)
The airport expects to invest about $1 billion over the next 7 to 8 years to make room for new airlines and routes as it touts itself as a hub between Europe and the U.S.

C11: Maps of Iceland's network of direct flights 2014, 2019 (source: SRS Analyzer)



C12: Iceland's air connectivity growth (2009 to 2019)



Case Study: Georgia

Georgia's air connectivity has grown by almost 493% in the last 10 years (C13). In the global ranking of air connectivity, Georgia's position went up by 14 places globally over the five-year period from 2014 to 2019. This significant connectivity growth was driven by several factors such as a favourable geographic location and business environment, as well as a booming tourism industry.

Geographic location

Since ancient times, as part of the Silk Road, the country has been a strategic link between Europe and Asia. This position will become even more important in the future as the centre of gravity of the global air transport network is set to move east and south.

Given this key strategic geographical position, the country has ambitions to develop itself as a transit hub. The rise of domestic airlines is a good sign for transit traffic given that major transit players favour their own hubs over Tbilisi (Turkish, FlyDubai and Ukraine International Airlines).

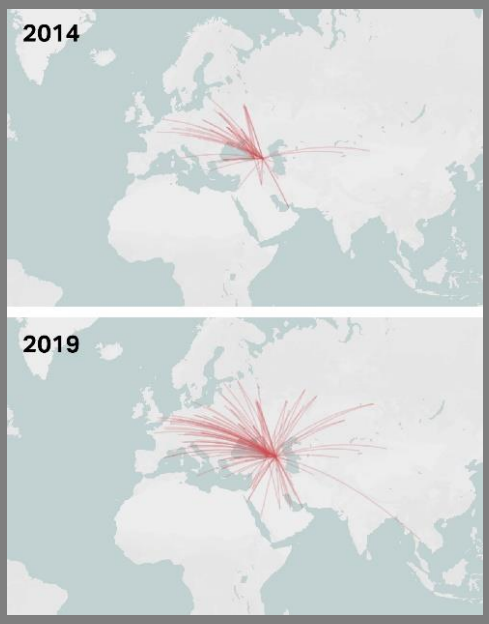
Favourable business environment

Georgia's aviation policy has been liberal despite being in a region where legacy thinking still prevails[1]. Georgia's three international airports have benefitted from a period of rapid traffic growth due to major infrastructure investments as well as government's investments in low cost airports. Wizz Air opened its base in 2016 in one low cost airport, Kutaisi. Wizz Air is currently the airline transporting the highest number of passengers in Georgia.

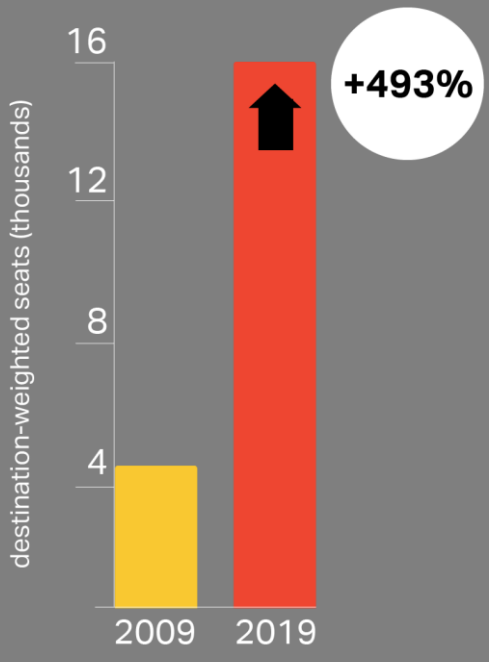
Booming tourism industry

Tourism in Georgia is booming. International tourist spend has increase by more than 10 times and visitor numbers by air increased by 47%. Georgia ranks 2nd in the WEF travel and tourism competitiveness index in EuroAsia. Visitors now account for 75% of Georgia's total passenger traffic and tourism contributes to more than 7% of the country's GDP.

C13: Maps of Georgia's network of direct flights 2014, 2019 (source: SRS Analyzer)



C14: Georgia's air connectivity growth (2009 to 2019)



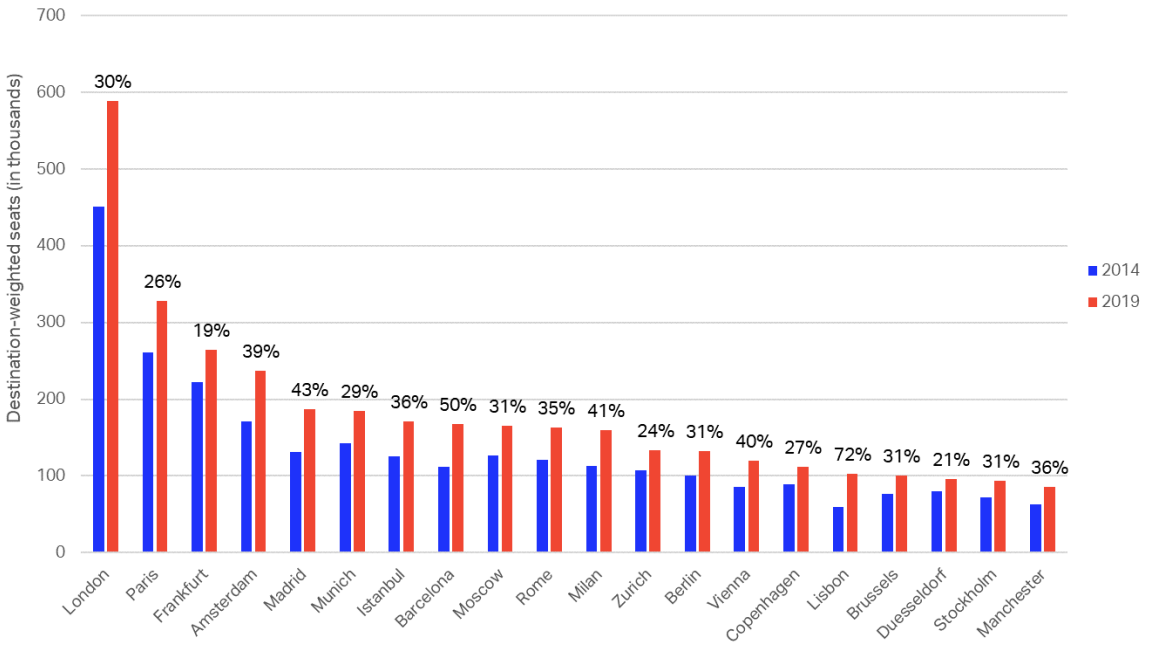
5.3.2 City level results

Absolute air connectivity

In Europe and globally, London keeps its positions as most connected city, London is followed by Paris and Frankfurt. Frankfurt has had significant network airlines expansions and is Europe's best airport in terms of direct connectivity.

Among the top 20 most connected cities in Europe, Lisbon has had the highest connectivity growth rate, 72% jumping 5 positions in the European ranking over the period from 2014 to 2019. Figure 47 shows the top 20 most connected cities in 2019 in Europe in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

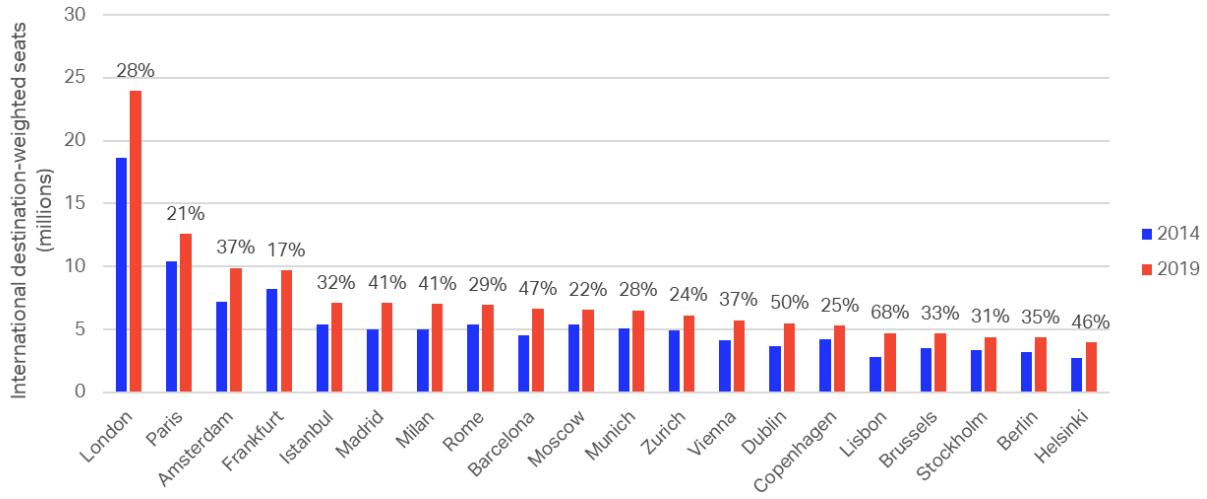
Figure 47: Top 20 most connected cities in Europe in 2019 and air connectivity growth (2019 vs. 2014)



International air connectivity

Figure 48 shows the top 20 most connected countries in 2019 in Europe in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[33].

Figure 48: Top 20 most internationally connected cities in Europe in 2019 and air connectivity growth (2019 vs. 2014)



5.4. Latin America and the Caribbean

The Latin American and Caribbean region's air market has potential to grow in the next 20 years.

The region has a healthy domestic aviation demand with a growing middle class. It also continues to benefit and grow from liberalised agreements on cross-border ownership that enabled pan-regional brands to emerge and lower prices in the region.

- Brazil is one of the largest domestic aviation markets in the world. However, economic instability in recent years has weighed upon growth in the Brazilian air transport market. The potential for expansion remains but a slower catch-up in living standards and a slower opening of markets is expected to delay Brazil's regaining its position among the world's top domestic markets.

The region has experienced a slow growth in air connectivity in the last five years.

In terms of air connectivity, the Latin America and the Caribbean region has grown with the lowest rate over the five-year period from 2014 to 2019 compared to the other regions. This is the result of various factors such as regional political instabilities, currency devaluations, volatile oil prices, congestions in major markets and heavy taxes. To reach its air connectivity growth potential, the region needs to overcome substantial barriers.

Continued investments in infrastructure will be needed to alleviate congestion in major markets, a critical priority in some areas.

The Latin America and Caribbean region is one of the more heavily taxed in the world. There are over 100 different taxes and fees imposed on air passengers in the region. Many of these taxes are not allocated to cover costs of aviation related services and infrastructure but, rather, to increase government revenue.

Additionally, this region pays the highest price for jet fuel in the world, making operations in the region less cost competitive. Another challenge remains training and recruiting an aviation-related labour force in the region.

Air connectivity in Latin America and the Caribbean has been disrupted significantly due to the COVID-19 pandemic. The number of unique city pairs connecting Latin America within the region and to the rest of the world reduced by more than a half. In April 2020, there were 680 unique city pairs compared to 1,780 city pairs during the same period one year ago.

5.4.1 Country level results

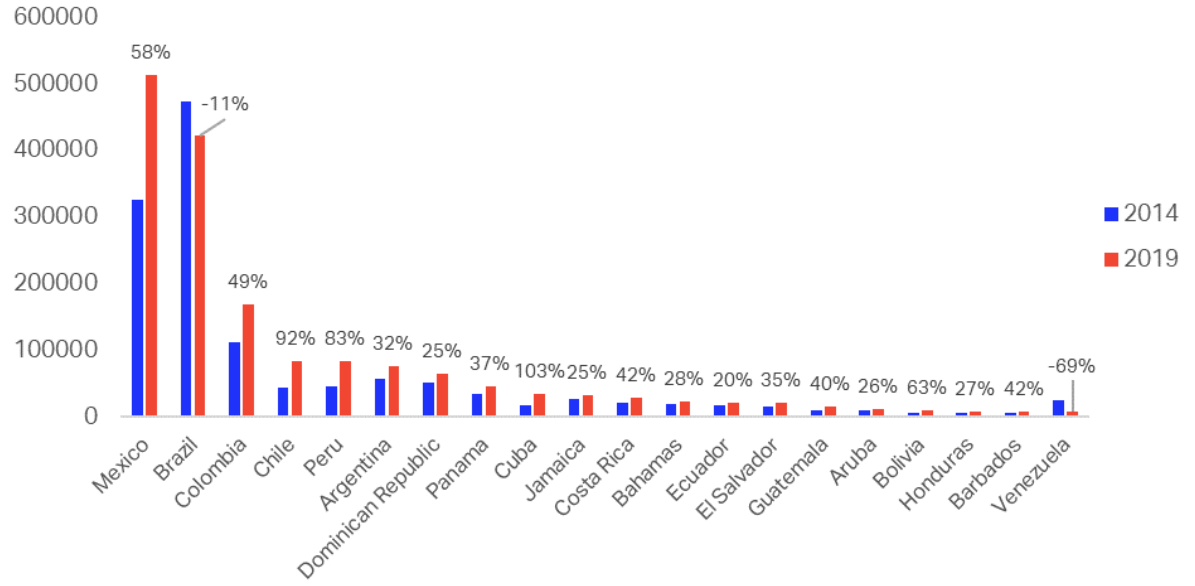
Absolute air connectivity

Mexico is the most connected country in the Latin America and Caribbean region in 2019, followed by Brazil in second position. Mexico's connectivity has grown with a significant rate of 58% over the five-year period from 2014 to 2019. A combination of strong catch-up growth in living standards and a young and fast-growing population in Mexico are forecast to generate the 7th largest addition of domestic passengers and, with the US, the 5th largest addition on a country-pair.

Cuba's connectivity score has grown by a significant 103% over a five-year period, jumping 5 positions in the Latin America and Caribbean ranking. Both Chile and Peru have also had a high connectivity growth rates of 92% and 83% respectively (for a more detailed analysis of Chile steady growth in air connectivity see the case study on Chile). In contrast, Brazil and Venezuela have experienced contractions in their connectivity levels.

Figure 49 shows the top 20 most connected countries in 2019 in Latin America and Caribbean in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 49: Top 20 most connected countries in the Latin America and Caribbean in 2019 and air connectivity growth (2019 vs. 2014)



Relative air connectivity

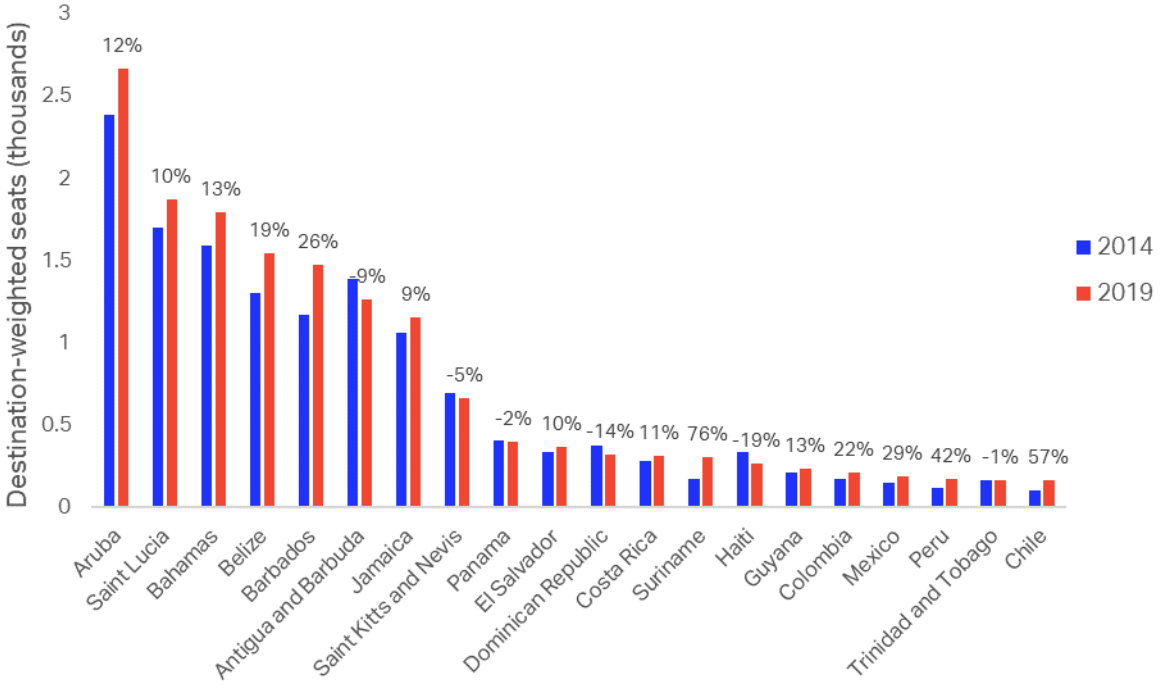
The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Top 20 Most Connected Countries Relative to Economic Size

Aruba, Saint Lucia and the Bahamas have highest connectivity levels relative to the size of their economies (for a more detailed analysis of reasons behind the small island state's air connectivity, see the case study in section 4.2). Brazil, which has the highest absolute connectivity indicator, ranks 21st after adjusting for GDP.

Figure 50 shows the top 20 most connected countries in 2019 in Latin America and Caribbean, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its level of GDP.

Figure 50: Top 20 most connected countries in the Latin America and Caribbean in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 to 2014)



Top 20 Most Connected Countries Relative to Population Size

Figure 51 shows the top 20 most connected countries in 2019 in Latin America and Caribbean, in terms of the connectivity indicator divided by its population size in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 51: Top 20 most connected countries in Latin America and Caribbean in 2019 in terms of air connectivity divided by its population size (2014 and 2019), and its growth (2019 to 2014)

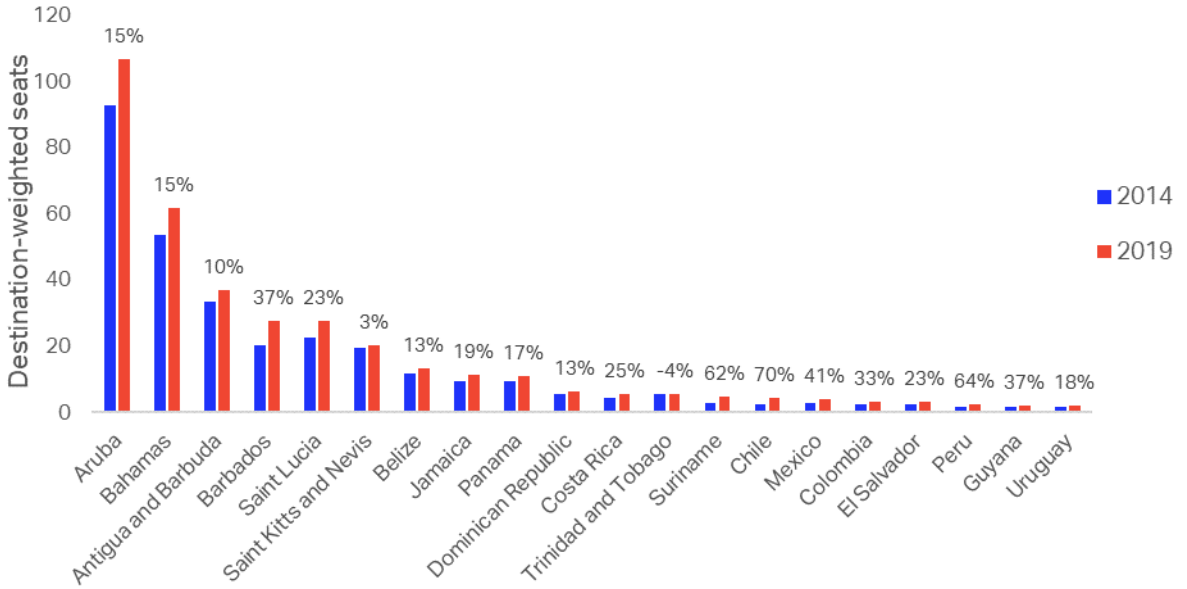


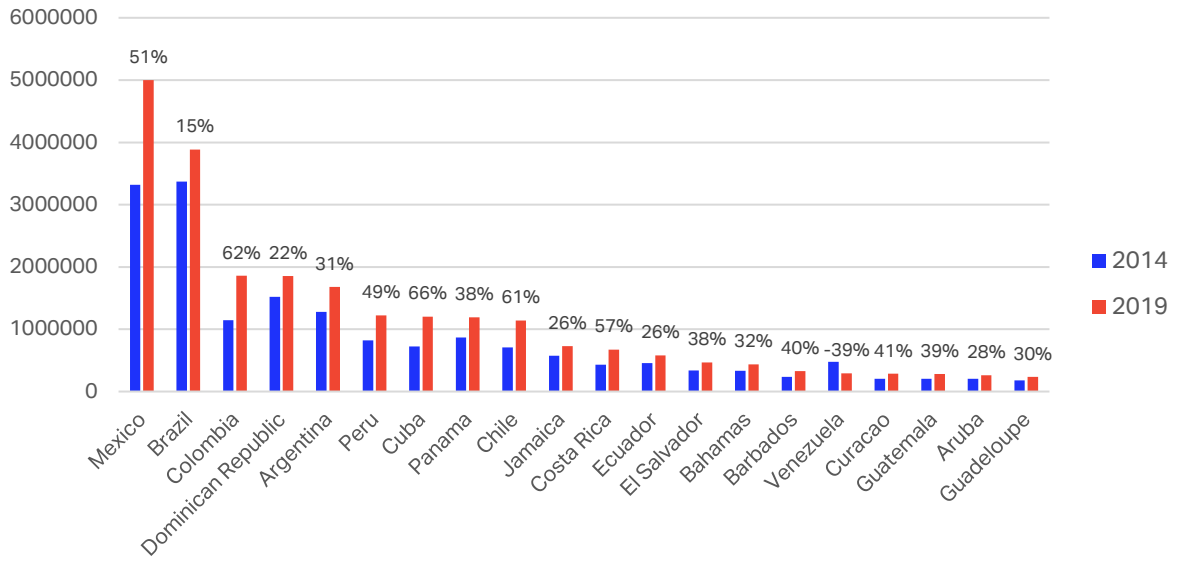
Figure 52 shows how the ranking of the top five most connected countries in terms of absolute connectivity changes once we rank them by their air connectivity relative to population score. For economic growth, it is relative air connectivity that matters.

Figure 52: Top 5 countries ranked in terms of absolute air connectivity and relative to population

International air connectivity

Brazil's overall air connectivity has been declining in recent years, while its international connectivity has been improving over the same time period. Figure 53 shows the top 20 most connected countries in 2019 in Latin America and Caribbean in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 53: Top 20 most internationally connected countries in Latin America and the Caribbean in 2019 and air connectivity growth (2019 vs. 2014)



Case Study: Chile

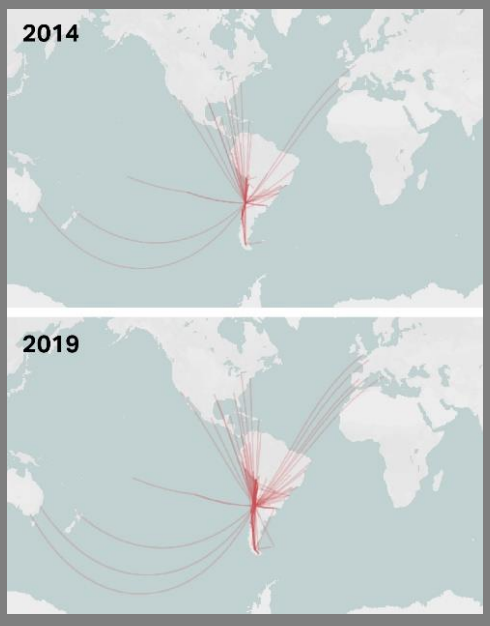
Chile's air connectivity almost tripled in the last 10 years (C16). It is the 3rd most connected country in Latin America and the Caribbean in 2019, jumping ahead of Peru, Argentina and the Dominican Republic. Chile ranks 46th in world, jumping by six positions over the period of five years 2014-2019.

Chile's steady connectivity growth is driven by political stability despite recent unrest, among other reasons. Despite the difficulties in the region, IATA's Director General praised Chile for reductions in 2019 in the airport facility charge.[1]

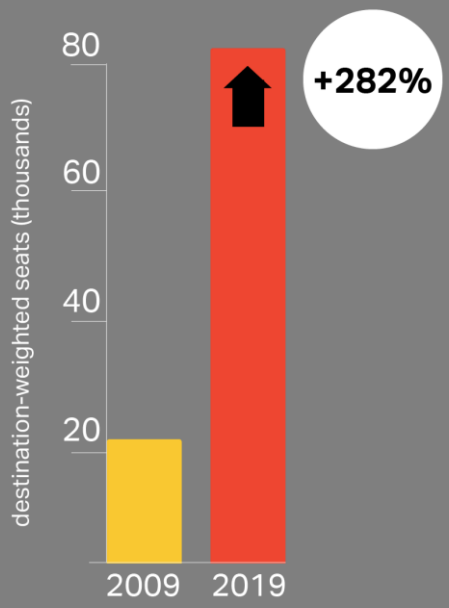
Chile is a rare case of good connectivity despite challenging geography. It shows an important story of steady growth in a region impacted by volatilities and instabilities and a challenging geography.

The air transport sector makes a major contribution to Chile's economy. Aviation supported a total of 189,000 jobs and contributed a total of $7.1 billion to the GDP in Chile.

C15: Maps of Chile's network of direct flights 2014, 2019 (source: SRS Analyzer)



C16: Chile's air connectivity growth (2009 to 2019)



Case Study: Panama

Panama's air connectivity has more than doubled in the last 10 years (C17). Panama ranks 7th in the Latin America and Caribbean ranking of air connectivity, while Panama City is the 5th most connected city in the region. In terms of connectivity/GDP ranking (not including in the analysis the small island states of the Caribbean), Panama is the top performing country in the region. Panama's connections to Europe have grown the fastest compared to other regions over the last five years.

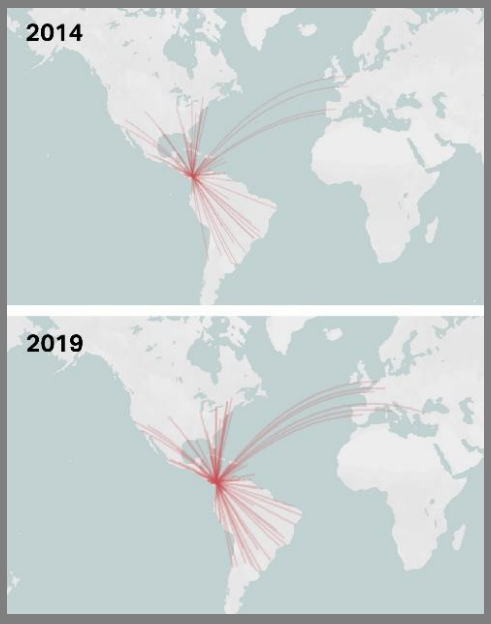
The significant connectivity growth was driven by several factors such as favourable geographical location, and a supportive policy environment.

Favourable geographic location: Panama is an important hub for the Latin America and Caribbean region.

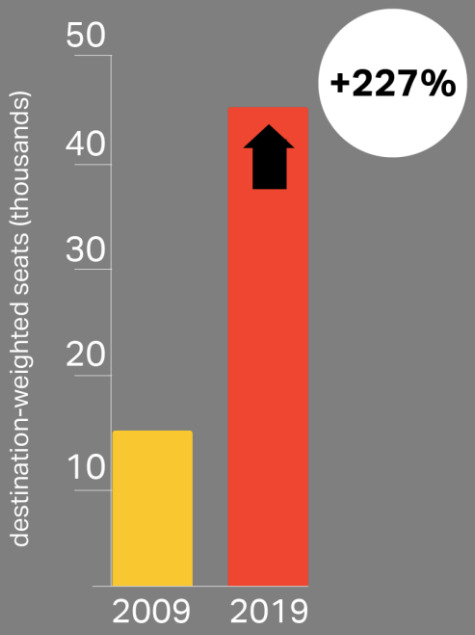
Government holistic strategy: Panama has created a supportive policy environment.

The air transport sector makes a major contribution to Panama's economy. 256,000 jobs are supported by air transport and tourists arriving by air. Overall, the industry contributes around $8.8 billion annually to Panama's GDP.

C17: Maps of Panama's network of direct flights 2014, 2019 (source: SRS Analyzer)



C18: Panama's air connectivity growth (2009 to 2019)



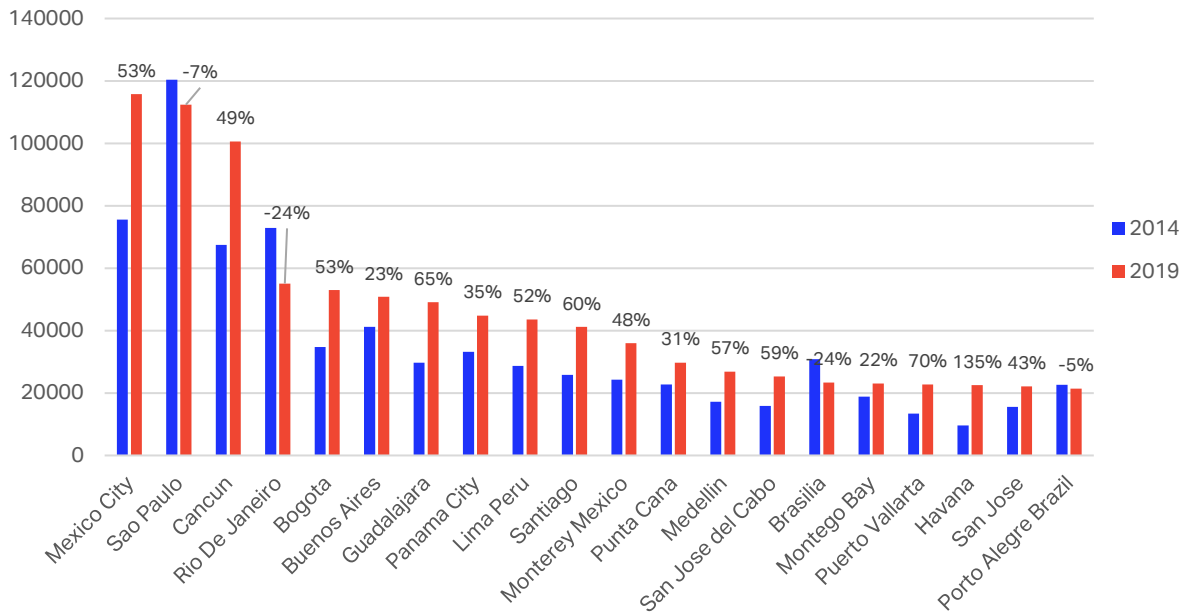
5.4.2 City level results

Absolute air connectivity

In the Latin America and Caribbean region, Mexico City is the most connected city, followed by Sao Paulo, despite the contractions it has experienced in their connectivity levels. Sao Paulo's and Rio de Janeiro's air connectivity shrank by 7% and 24% respectively over the five-year period 2014 to 2019. Havana has had a significant connectivity growth rate of 135%, jumping 14 positions in the ranking from 2014 to 2019 in the Latin America and Caribbean ranking.

Figure 54 shows the top 20 most connected cities in 2019 in Latin America and Caribbean in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

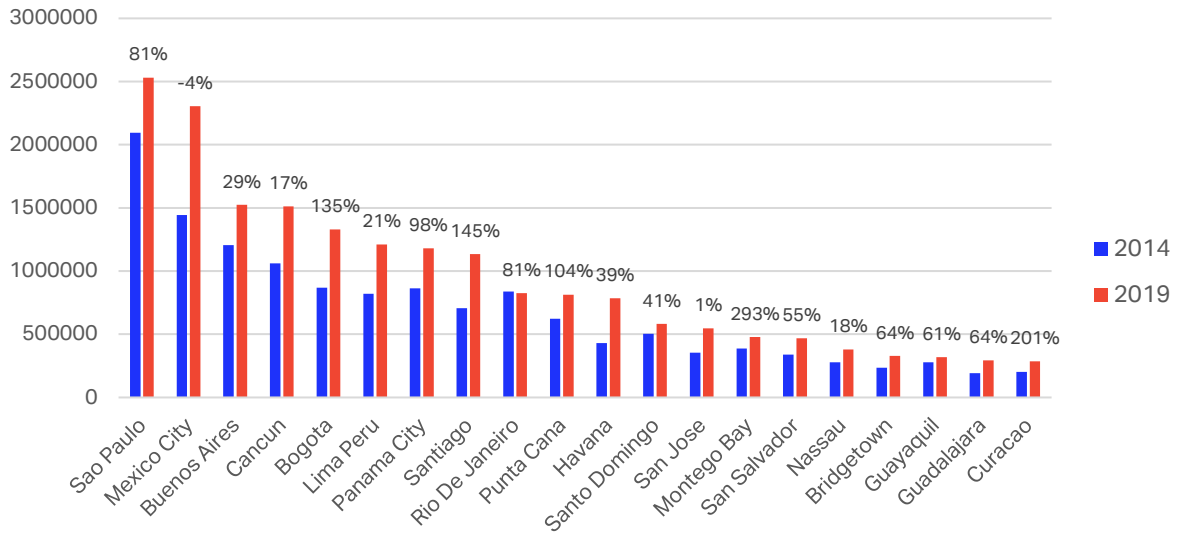
Figure 54: Top 20 most connected cities in Latin America and Caribbean in 2019 and air connectivity growth (2019 vs. 2014)



International air connectivity

Figure 55 shows the top 20 most connected cities in 2019 in Latin America and Caribbean in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[34].

Figure 55: Top 20 most internationally connected cities in Latin America and the Caribbean in 2019 and air connectivity growth (2019 vs. 2014)



5.5. Middle East

The Middle East region continues to consolidate its position as a hub region connecting the European and Asia-Pacific markets.

The geographic position of the region, with most of the world's population being reachable within eight hours of flying time, has enabled airlines in the region to capture a large share of the long-haul travel market.[35] The region is the one of the fastest growing in terms of air connectivity, growing by 40% over the five-year period during 2014-2019.

- In Saudi Arabia, high living standards underpin air passenger demand growth. Aided by favourable population trends, the Saudi domestic market is expected to cement its place in the ranks of the top-20 largest over the forecast horizon.

The Middle East is home to successful carriers and large airport hubs.

Airlines from this region are some of the most ambitious in the world, including Emirates, Etihad and Qatar Airways, boasting modern fleets. Moreover, the Middle East is home to some of the world's largest hub airports. With traffic expected to increase dramatically in the coming decades, in the air and on the ground, capacity needs addressing urgently.

There are challenges in the region.

The aviation industry of the Gulf Co-operation Council (GCC) has witnessed a slowdown in the past two years. This can be attributed to a number of factors including low global oil prices—which depressed overall economic growth in the region in 2014-17—rising geopolitical tensions and increasing intra-regional competition between the majority state-owned airlines.

Tourist arrivals in the Middle East—especially in countries like Jordan—fell in 2015-17 on the back of increased security concerns in those years. [36]

Significant investment is required in infrastructure, as is political commitment to market liberalisation. According to a 2015 assessment, the average flight in the region is delayed by 29 minutes (and this could reach 59 minutes by 2025 without action) due to air traffic control capacity and staffing issues. That assessment also concludes that the benefits of investment in air traffic management could be over $16 billion over the next ten years.[37]

Air connectivity in the Middle East has been disrupted significantly due to the COVID-19 pandemic. The number of unique city pairs connecting the Middle East within the region and to the rest of the world reduced by more than a half. In April 2020, there were 440 unique city pairs connected with regular air passenger service compared to 1,060 city pairs during the same period one year ago. Long-haul hub operations are particularly disrupted due on ongoing travel restrictions.

Restoring air connectivity in the Middle East is essential to support the recovery of its economies. Air transport is vital for enabling and supporting trade. Air connectivity is also vital for supporting tourism flows, especially relevant for countries in the Middle East which rely on tourism as a source of economic growth. Every year 65 million international tourists arrive to the Middle East with 61% of those visitors travelling to the region by air. For instance, inbound tourism contributes significantly to United Arab Emirates' economy. In 2018, 22.3 million international tourists arrived in the country with 88% of which tourists arrive by air, spending $18 billion in the country.

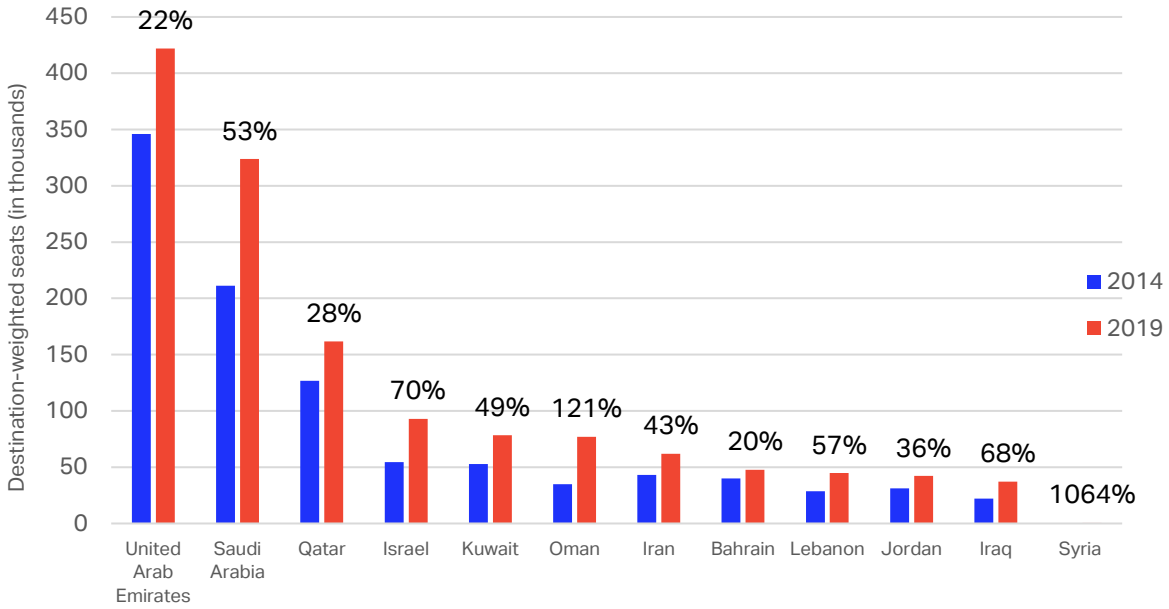
5.5.1 Country level results

Absolute air connectivity

The United Arab Emirates was the most connected country in the Middle East region in 2019, followed by Saudi Arabia in second position. Oman, Israel and Iraq have had significant connectivity growth rates of 121%, 70% and 68% respectively, over the five-year period from 2014 to 2019. Figure 56 shows the top 20 most connected countries in 2019 in the Middle East in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Relative air connectivity

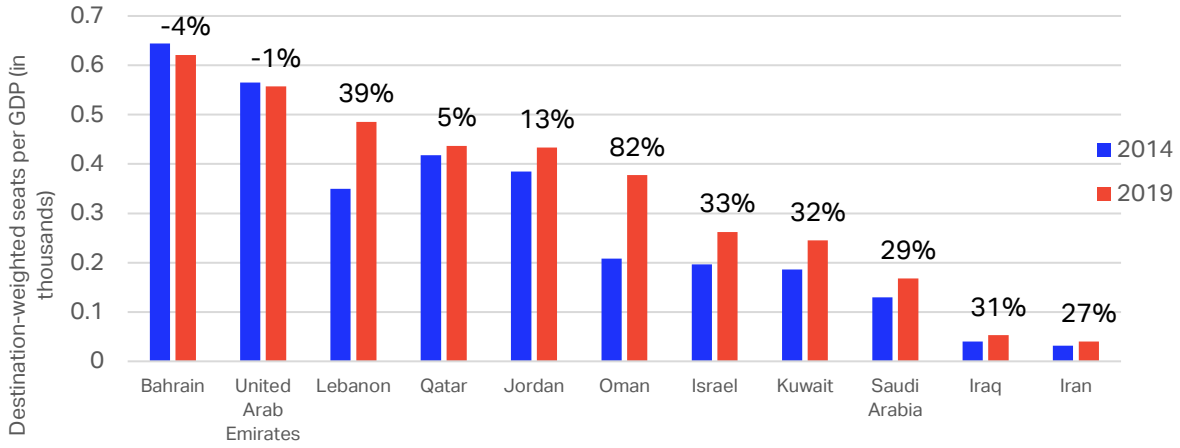
Figure 56: Countries in the Middle East in 2019 and air connectivity growth (2019 vs. 2014)



The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Bahrain, the United Arab Emirates and Lebanon have highest connectivity levels, relative to the size of their economies. Bahrain's and UAE's connectivity growth has lagged behind the GDP's while Oman's connectivity has been growing a much faster pace than its GDP. Figure 57 shows the top 20 most connected countries in 2019 in the Middle East, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its level of GDP.

Figure 57: Countries in the Middle East in 2019 in terms of air connectivity per $billion of GDP (2014 and 2019), and its growth (2019 to 2014)



Qatar, one of the counties with the smallest population in the region and third in terms of air connectivity, ranks first in terms of air connectivity per population. However, its connectivity levels have grown slower than its population in the last five years showing a negative growth in terms of air connectivity per population. Figure 59 shows the top 20 most connected countries in 2019 in the Middle East, in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its population size.

Figure 59: Countries in the Middle East in 2019 in terms of air connectivity divided by its population size (2014 and 2019), and its growth (2019 to 2014)

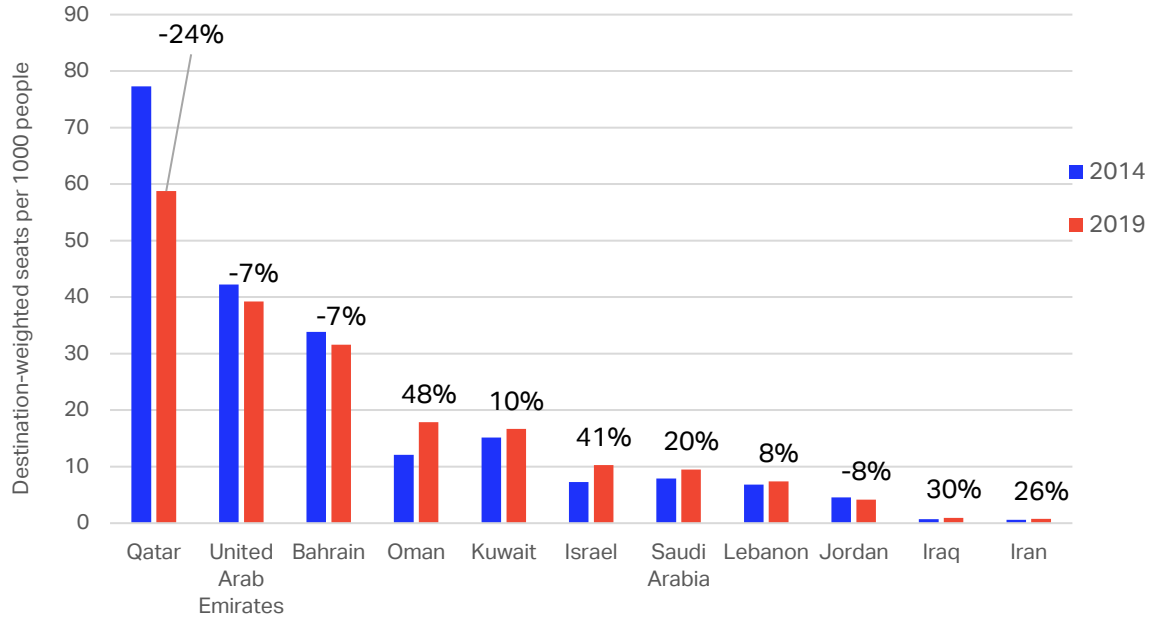
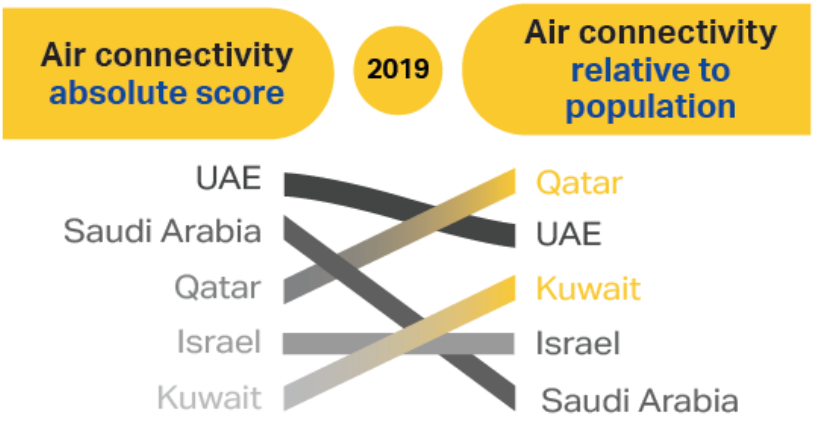


Figure 60 shows how the ranking of the top five most connected countries in terms of absolute connectivity changes once we rank them by their air connectivity relative to population score. For economic growth, it is relative air connectivity that matters.

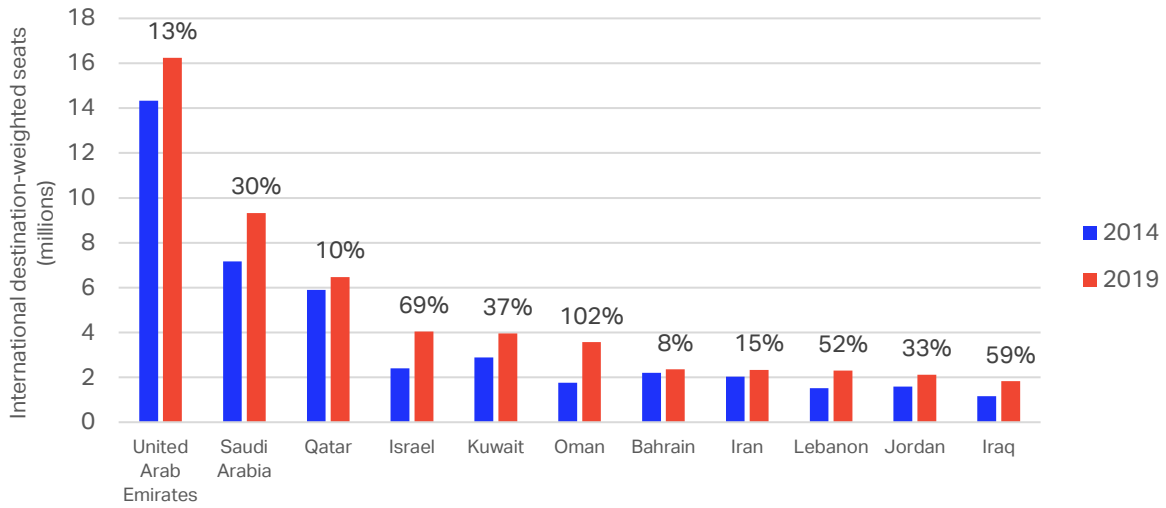
Figure 60: Top 5 countries ranked in terms of absolute air connectivity and relative to population



International air connectivity

Figure 61 shows the top 20 most connected countries in 2019 in the Middle East in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 61: Top 20 most internationally connected countries in the Middle East in 2019 and air connectivity growth (2019 vs. 2014)



Case Study: Qatar

Qatar's air connectivity has more than doubled in the last 10 years (C20). In the global ranking of air connectivity Qatar ranks 32nd and in the Middle East third. In terms of air connectivity per population, Qatar ranks first in the region with its population being one of the smallest in the region. Qatar's significant connectivity growth was driven by several factors such as favourable geographical location, successful airline and supporting policy environment.

Favourable geographical location

Qatar's location between East and West, South and North, and especially its geographical proximity to prime markets such as the Indian-Subcontinent, Asia and China make it a favourable hub.

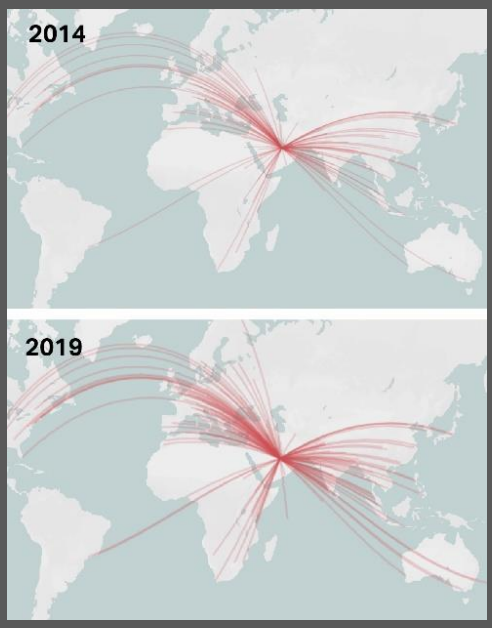
Successful airline network strategy

The connectivity in Doha is predominantly due to the network and scale of Qatar Airways. Qatar Airways was the 5th airline in the world in terms of Scheduled Passengers–Kilometres flown in 2019. It operates a hub and spoke model- nearly 85% of Qatar Airways' passengers are transfer passengers. The airlines places strong emphasis on service levels and passenger experience both in the air and on the ground. Recently, in the wake of frictions in the region, Qatar Airways has embarked on a network expansion program to tap into new territories. Qatar Airways has an extensive network and scope of cargo operations. The airline is in the global top 3 in terms of FTK and overall volume.

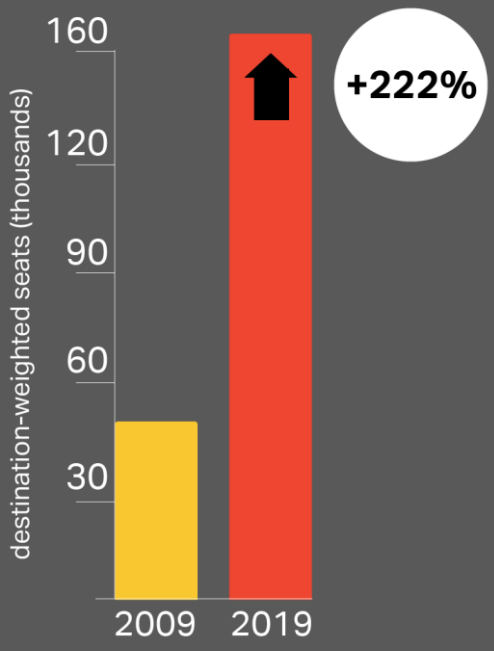
Supporting policy environment

The government of Qatar has traditionally invested into prime assets at the hub airport (Hamad Airport, Qatar Airways). Qatar has the most liberal visa regime in the region with nearly 100 nationalities eligible for visas on arrival or through the electronic platform. Qatar also has an open skies terms agreement with the EU, unlike many of the regional peers. Due to frictions in the region, Doha has lost over 90 flights a day to neighbouring countries (Saudi Arabia, Bahrain, Egypt and UAE), affecting the growth which has been subdued in the last 16-18 months.

C19: Maps of Qatar's network of direct flights 2014, 2019 (source: SRS Analyzer)



C20: Qatar's air connectivity growth (2009 to 2019)

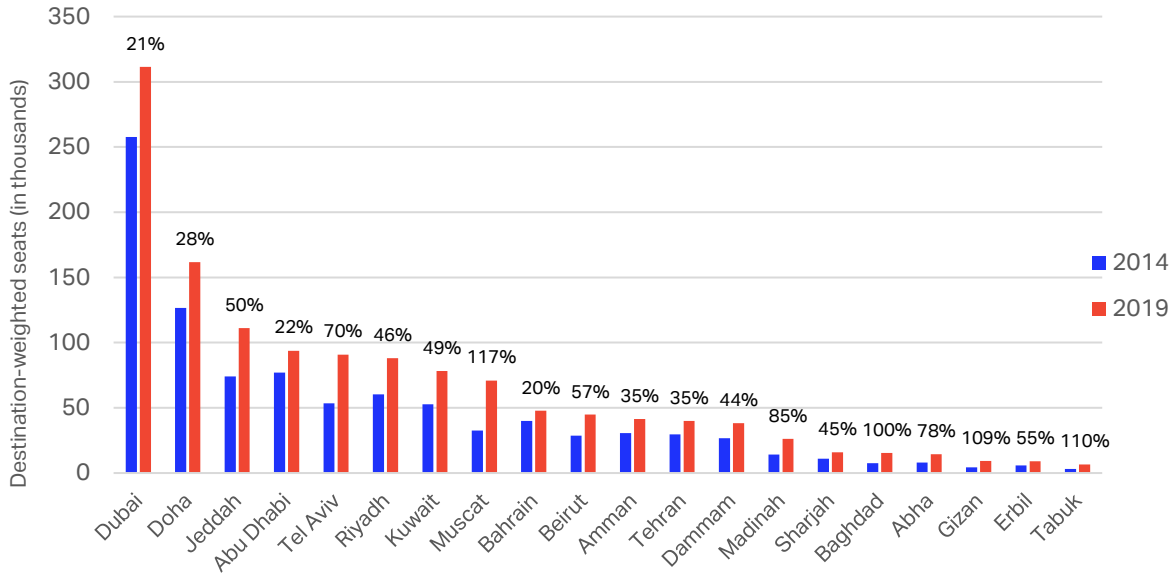


5.5.2 City level results

Absolute air connectivity

In the Middle East region, Dubai is the most connected city, followed by Doha and Jeddah. Muscat has had the highest connectivity growth among the top 20 cities in the region with a growth rate of 117%. Figure 62 shows the top 20 most connected cities in 2019 in the Middle East in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

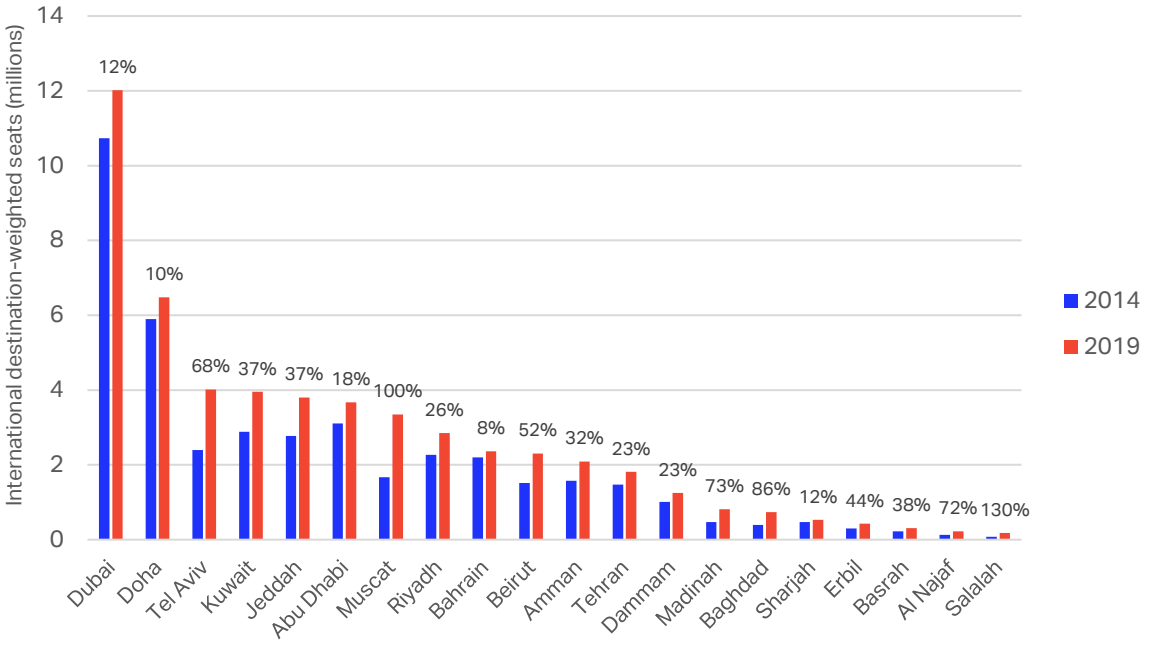
Figure 62: Top 20 most connected cities in the Middle East in 2019 and air connectivity growth (2019 vs. 2014)



International air connectivity

Figure 63 shows the top 20 most connected countries in 2019 in the Middle East in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[38].

Figure 63: Top 20 most internationally connected cities in the Middle East in 2019 and air connectivity growth (2019 vs. 2014)



5.6. North America

Air connectivity in North America has been disrupted significantly due to the COVID-19 pandemic. The number of unique city pairs connecting the United States and Canada within the region and to the rest of the world reduced by almost 2000 city pairs. In April 2020, there were 3,490 unique city pairs compared to 5,450 city pairs during the same period one year ago.

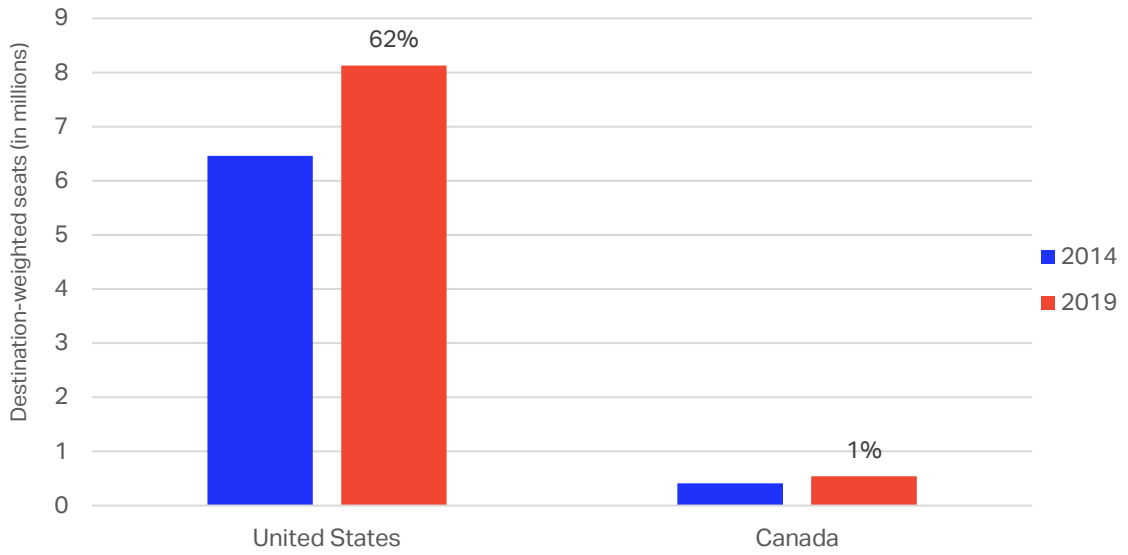
Restoring air connectivity in North America is essential to support economic recovery in the region. Air connectivity play a vital role in enabling trade, which itself has resulted from globalized supply chains and associated investment. Air transport is vital for manufactures' trade, particularly trade in components which is a major part of cross border trade today. Air connectivity is also vital for supporting tourism flows in the region. Every year 146 million international tourists arrive to North America with 60% of those visitors travelling to the region by air.

5.6.1 Country level results

Absolute air connectivity

The United States is the most connected country in North America in 2019. Figure 64 shows the countries in North America in 2019 in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 64: Countries in North America in 2019 and air connectivity growth (2019 vs. 2014)



Relative air connectivity

The level of connectivity will depend to some extent on the size of a country's economy and the size of its population. Larger economies with sizable populations will naturally be connected to a greater number of destinations and offer more available seats compared to smaller countries. An absolute air connectivity score is not necessarily a measure of quality. Therefore, various alternative measures of air connectivity, which adjust for the size of a country's economy or population, can be used to measure and analyse the level of air connectivity. The following paragraphs will examine air connectivity adjusting for the economic or population size of a country in addition to reporting absolute air connectivity.

Figure 65 shows countries in 2019 in North America in terms of the connectivity indicator divided by its level of GDP in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 65: Countries in the North America in 2019 in terms of air connectivity divided by its GDP (2014 and 2019), and its growth (2019 to 2014)

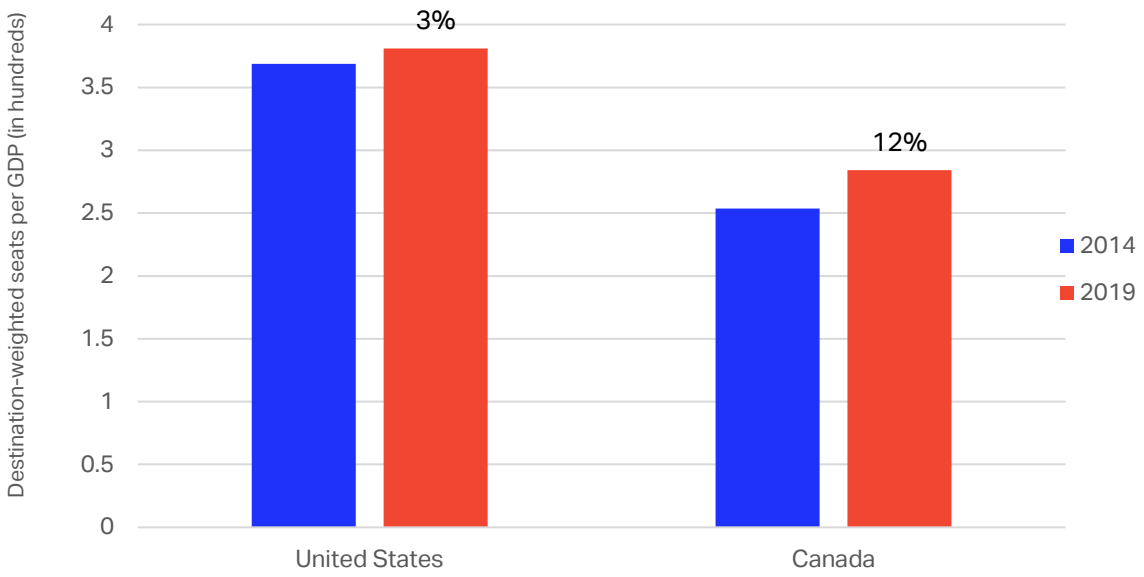
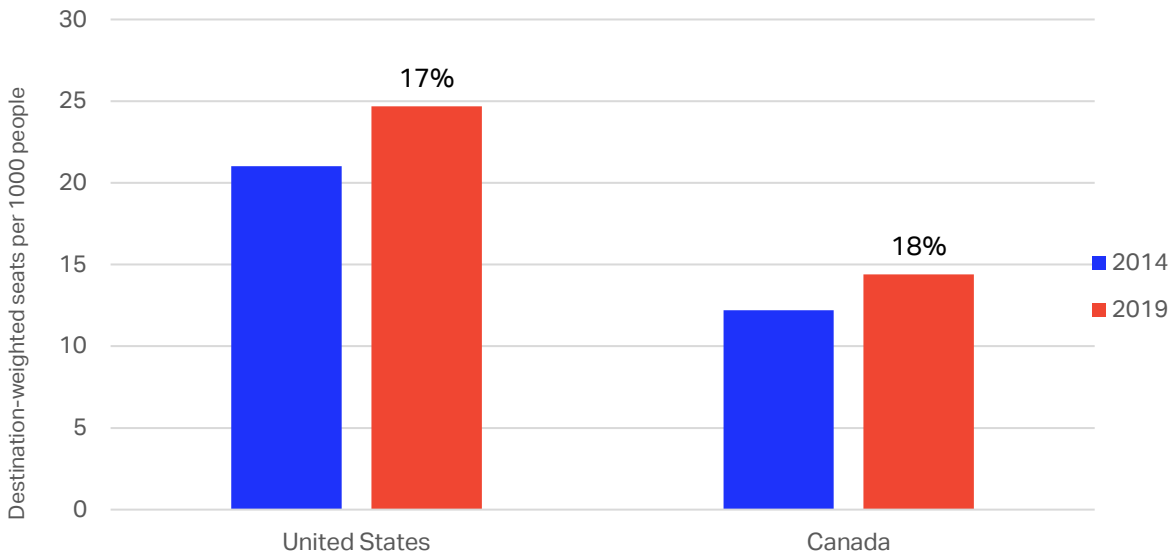


Figure 66 shows countries in 2019 in North America in terms of the connectivity indicator in 2014 and 2019 for each country, as well as indicator's growth in percentage over the five-year period from 2014 to 2019, divided by its population size.

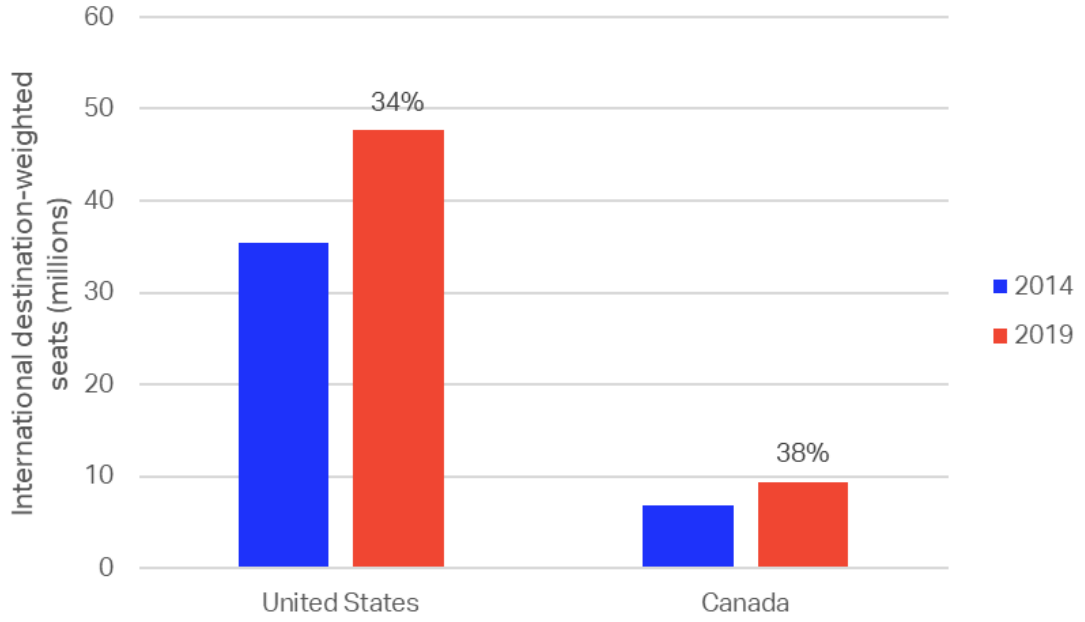
Figure 66: Countries in the North America in 2019 in terms of air connectivity divided by its population size (2014 and 2019), and its growth (2019 to 2014)



International air connectivity

Figure 67 shows the top 20 most connected countries in 2019 in North America in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

Figure 67: Top 20 most internationally connected countries in the North America in 2019 and air connectivity growth (2019 vs. 2014)



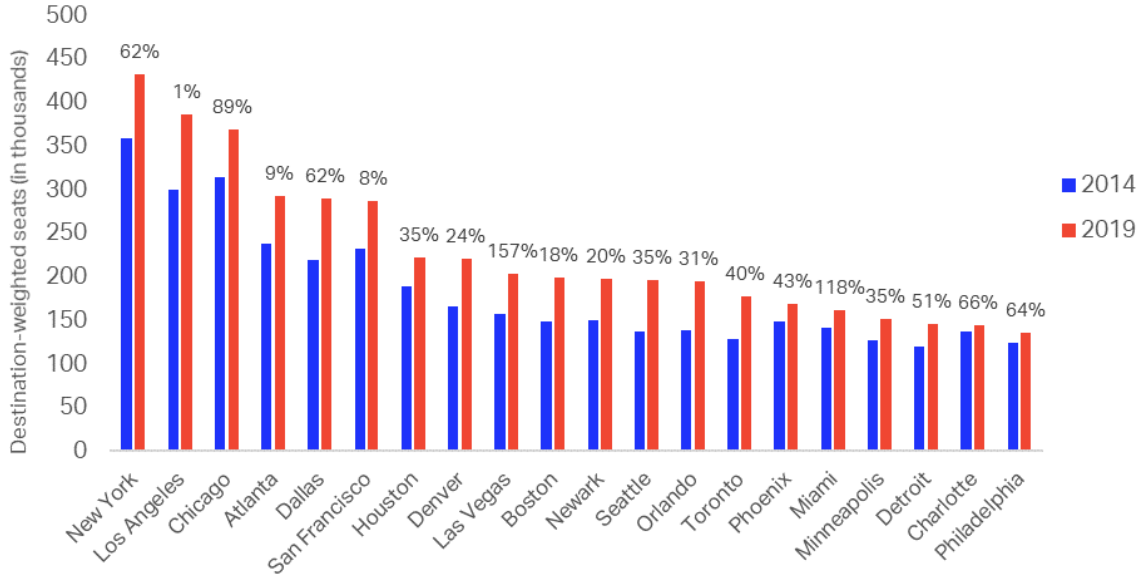
5.6.2 City level results

Absolute air connectivity

Figure 68 shows the top 20 most connected cities in 2019 in North America in terms of the connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019.

In North America, New York is the most connected city, followed by Los Angeles and Chicago. Las Vegas has had the highest connectivity growth among the top 20 cities in the region with a growth rate of 157%.

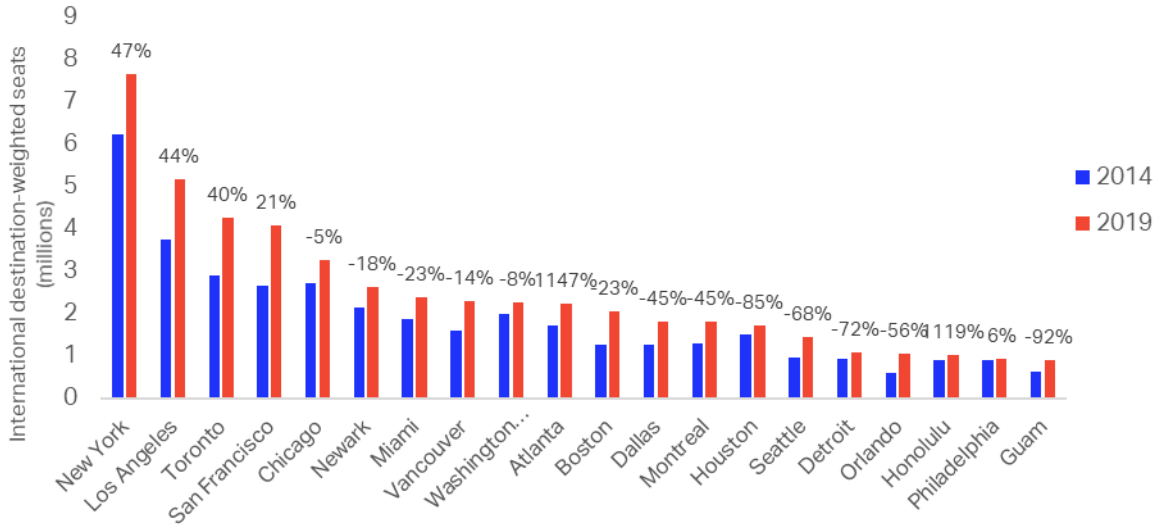
Figure 68: Top 20 most connected cities in North America in 2019 and air connectivity growth (2019 vs. 2014)



International air connectivity

Figure 69 shows the top 20 most connected cities in 2019 in North America in terms of the international connectivity indicator in 2014 and 2019, as well as the indicator's growth in percentage over the five-year period from 2014 to 2019[39]

Figure 69: Top 20 most internationally connected cities in North America in 2019 and air connectivity growth (2019 vs. 2014)



6. Improving Air Connectivity

6.1. Factors that impact air connectivity

Given the significant benefits that air transport creates, it is important to look at how air connectivity can be maintained and improved. Air connectivity is a function of many variables. In the long-term, the higher the growth in aviation traffic, the higher the growth in air connectivity. As discussed in Chapter 1, economic growth is a driver of air connectivity growth and vice versa. Given all the positive impacts, governments might be interested in influencing air connectivity and understanding the impact of their aviation policies on connectivity and the economy.

There are variables in the air connectivity function that cannot be influenced, such as geographic location, demographics and geopolitical issues. However, as successful countries in the world show (the Netherlands, Singapore, Iceland, etc.), policy makers and regulators can influence the policy and regulatory environment in which the industry operates, creating conditions that facilitate the development of air connectivity.

6.2. Air transport policy and air connectivity

Favourable air transport policy improves air connectivity and in doing so brings about tangible benefits (as discussed in chapter 2). Governments and policy makers can adapt their policies to support air connectivity with the view to encourage economic and social development in their respective countries or regions.

IATA has identified five key elements that determine the ease of doing business and therefore influence the level of air transport competitiveness of the country, and grouped these five elements into pillars that form the IATA Air Transport Regulatory Competitiveness Indicators: [40]

1. Passenger Facilitation
2. Cargo Facilitation
3. Supply Chain Competitiveness
4. Infrastructure
5. Smarter Regulations

These elements form an integral part of a regulatory measure which evaluates a country's air transport competitiveness called the Air Transport Regulatory Competitiveness Indicators (ATRCI). IATA defines air transport competitiveness as the set of institutions, policies, and factors that determine the level of connectivity of an economy, which in turn sets the level of economic benefits that the economy can derive from aviation.

By establishing effective and well-functioning institutions and developing policies aimed at encouraging growth in air connectivity, national governments could steer their economies in the direction of economic growth and prosperity.

6.3. Air connectivity and externalities

Air connectivity generates important economic benefits, as this report has shown. It supports the local and national economy by improving competitiveness and enhancing employment and economic growth opportunities. Air connectivity will continue to increasingly play a key role in connecting cities worldwide. Emerging regions stand to benefit the most from air connectivity growth. This trend will be particularly strong in these regions or in regions where no other feasible transportation alternatives exist.

All means of transport, like nearly all human activities, come with various negative external effects. The aviation industry recognises the urgent need to improve its environmental footprint, having committed to short, medium and long-term goals:

- An average improvement in fuel efficiency of 1.5% per year from 2009 to 2020
- A cap on net aviation CO2 emissions from 2020 (carbon-neutral growth)
- A reduction in net aviation CO2 emissions of 50% by 2050, relative to 2005 levels

The solution to the challenge of reducing environmental impact is not stopping air connectivity growth. It is in supporting growth while taking practical steps to reduce and minimize economic impact. Penalizing air connectivity growth will have a detrimental impact on economic development which will be more pronounced for emerging economies.

The industry is taking practical steps to tackle the environmental impact. These include:

Aviation has set targets. Aviation have an ambitious plan that meets the 2050 Paris Agreement's 2°C commitment to by cutting aviation emissions in half. The aviation industry is working with governments, scientists and environmental experts on R&D to help meet our targets even faster than 2050.

The efficiency of aircraft has improved continuously. The flight you take today produces half as much CO2 emissions as the same one 30 years ago.

New technologies are key. The aviation industry has spent a trillion dollars since 2009 on more fuel-efficient engines, lighter planes made of composites and other innovations to reduce CO2 emissions right now.

Sustainable fuels are a reality. The aviation industry is reducing its fuel use and changing its fuel types. In just a decade, sustainable aviation fuels and biofuels have gone from concept to reality on commercial flights. Now the industry is increasing production so they can be used at scale across the industry.

Efficient and sustainable city connections are possible. Working towards good efficient connections is an important part in climate change mitigation measures.

Offsetting works. By planting trees and funding renewable energy projects, it removes CO2 emissions and protects the climate, which is why we are investing in offsetting around the world. It is not the perfect long-term solution, but a gap filler until new technologies and sustainable fuels are able to take over.

Reduction of noise has progressed. The industry has been working to reduce noise, with significant progress: noise levels have halved in the past 10 years. It is estimated that the noise footprint of each new generation of aircraft is at least 15% lower than previous models.

Appendix A: Air connectivity scores for countries

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
United States	8,130,508	1	1	1	34%	26%
China	5,368,567	2	2	2	208%	62%
Japan	1,622,029	3	3	3	33%	1%
India	1,247,297	9	7	4	237%	89%
Germany	924,731	5	5	5	53%	24%
United Kingdom	916,314	4	6	6	51%	28%
Indonesia	838,855	13	4	7	236%	9%
Spain	793,379	6	9	8	42%	56%
Thailand	696,422	15	13	9	205%	62%
Italy	607,532	7	12	10	46%	40%
Australia	592,245	10	8	11	70%	8%
France	582,298	8	11	12	49%	28%
Canada	539,072	11	14	13	63%	31%
Turkey	519,726	23	15	14	265%	33%
Mexico	512,324	16	20	15	127%	58%
South Korea	500,951	14	16	16	115%	35%
Russian Federation	438,477	25	21	17	226%	46%
Malaysia	430,540	19	17	18	154%	24%
Brazil	422,917	12	10	19	62%	-11%
United Arab Emirates	421,965	18	18	20	140%	22%
Vietnam	409,894	36	28	21	529%	157%
Hong Kong	403,673	17	19	22	86%	18%
Singapore	353,748	20	22	23	110%	20%
Philippines	348,092	26	23	24	201%	35%
Taiwan	329,740	24	24	25	140%	31%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Saudi Arabia	323,732	35	25	26	337%	53%
Netherlands	249,411	22	27	27	73%	38%
Switzerland	239,979	21	26	28	63%	25%
Portugal	179,542	30	35	29	117%	82%
Colombia	168,097	43	32	30	251%	49%
Greece	162,980	28	37	31	82%	75%
Qatar	161,805	41	30	32	222%	28%
Norway	150,173	29	29	33	69%	7%
Sweden	143,064	33	31	34	87%	26%
Austria	140,985	34	34	35	87%	37%
Ireland	138,042	27	36	36	53%	46%
Denmark	137,251	31	33	37	73%	29%
Poland	120,933	42	42	38	141%	83%
South Africa	113,147	32	38	39	44%	22%
Belgium	101,273	37	39	40	62%	32%
Egypt	101,219	38	40	41	64%	32%
New Zealand	100,126	39	41	42	73%	40%
Finland	95,303	40	43	43	84%	46%
Israel	92,982	44	46	44	115%	70%
Pakistan	87,337	52	44	45	169%	43%
Chile	83,663	61	52	46	282%	92%
Peru	83,192	60	50	47	272%	83%
Kuwait	78,323	53	47	48	156%	49%
Oman	77,065	71	58	49	377%	121%
Morocco	75,684	46	49	50	89%	51%
Argentina	75,586	48	45	51	105%	32%
Ukraine	72,988	55	54	52	197%	77%
Cambodia	70,492	77	61	53	405%	118%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Czech Republic	69,367	45	51	54	67%	57%
Dominican Republic	64,970	50	48	55	99%	25%
Iran	61,825	49	53	56	81%	43%
Romania	60,999	51	57	57	87%	68%
Hungary	56,758	54	65	58	93%	93%
Sri Lanka	50,662	69	56	59	200%	35%
Bangladesh	50,616	67	59	60	192%	51%
Bahrain	47,721	47	55	61	28%	20%
Macau	45,681	65	69	62	137%	66%
Panama	45,631	76	60	63	227%	37%
Ethiopia	45,126	84	74	64	349%	93%
Lebanon	44,765	63	67	65	115%	57%
Jordan	42,142	64	62	66	111%	36%
Myanmar	41,024	97	71	67	573%	64%
Croatia	40,951	74	75	68	186%	83%
Algeria	40,686	58	63	69	77%	32%
Cyprus	39,703	57	68	70	71%	42%
Iraq	37,192	147	76	71	2129%	68%
Cuba	34,548	80	85	72	214%	103%
Tunisia	32,695	62	64	73	56%	10%
Kazakhstan	32,326	82	78	74	207%	61%
Jamaica	32,234	66	70	75	67%	25%
Bulgaria	32,119	73	83	76	120%	78%
Iceland	31,374	88	86	77	278%	93%
Nepal	29,854	90	79	78	278%	49%
Nigeria	29,753	56	66	79	26%	2%
Kenya	29,439	68	73	80	70%	25%
Costa Rica	29,049	72	77	81	80%	42%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Serbia	28,875	78	81	82	144%	52%
Maldives	26,354	94	80	83	282%	38%
Bahamas	23,523	70	82	84	40%	28%
Latvia	22,908	83	90	85	120%	60%
Malta	22,556	85	91	86	126%	68%
Ecuador	21,348	75	84	87	50%	20%
El Salvador	20,504	87	88	88	114%	35%
Uzbekistan	20,408	93	92	89	182%	58%
Luxembourg	19,202	101	97	90	249%	88%
Azerbaijan	19,009	107	87	91	287%	24%
Mauritius	18,034	86	89	92	81%	25%
Laos	17,158	123	103	93	423%	126%
Georgia	16,165	135	108	94	493%	130%
Lithuania	15,107	113	101	95	291%	86%
Guatemala	14,260	89	98	96	80%	40%
Brunei Darussalam	13,688	95	96	97	102%	33%
Afghanistan	13,131	115	95	98	257%	21%
Tanzania	12,931	110	105	99	219%	74%
Sudan	12,301	102	94	100	124%	13%
Aruba	11,944	92	100	101	58%	26%
Belarus	11,657	131	112	102	298%	78%
Ghana	11,004	98	99	103	85%	13%
Armenia	10,747	118	114	104	206%	73%
Estonia	10,643	117	111	105	201%	59%
Fiji	9,333	106	109	106	86%	33%
Albania	9,185	114	124	107	142%	72%
Senegal	8,865	91	106	108	17%	24%
Moldova	8,785	132	123	109	202%	64%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Bolivia	8,591	127	125	110	179%	63%
Mongolia	8,502	129	118	111	180%	39%
Honduras	8,123	100	113	112	45%	27%
Barbados	7,975	104	120	113	49%	42%
Seychelles	7,848	138	139	114	220%	117%
Slovenia	7,688	99	126	115	37%	48%
Uganda	7,574	124	122	116	132%	41%
Venezuela	7,548	59	72	117	-67%	-69%
Trinidad and Tobago	7,545	96	104	118	15%	0%
Kyrgyzstan	7,493	160	107	119	451%	6%
Angola	7,424	116	102	120	102%	-5%
Cayman Islands	7,205	108	121	121	62%	28%
Uruguay	7,136	119	119	122	103%	23%
Reunion	7,076	109	116	123	65%	15%
Montenegro	6,410	144	134	124	257%	54%
Bosnia and Herzegovina	6,114	142	141	125	207%	87%
Cape Verde	6,007	158	149	126	339%	131%
Turks and Caicos Islands	5,994	133	130	127	111%	35%
Sint Maarten	5,963	103	115	128	10%	-4%
Turkmenistan	5,815	137	110	129	136%	-15%
Curacao	5,802	111	131	130	46%	32%
Haiti	5,794	112	117	131	47%	-6%
Bermuda	5,689	105	127	132	13%	13%
Guadeloupe	5,670	121	129	133	70%	25%
Belize	5,427	125	136	134	66%	41%
Ivory Coast (Cote d'Ivoire)	5,213	143	142	135	162%	63%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Saint Lucia	4,995	130	138	136	69%	34%
Macedonia	4,969	150	148	137	232%	84%
Martinique	4,910	126	133	138	57%	18%
Zambia	4,773	134	135	139	73%	22%
Slovakia	4,666	128	157	140	52%	156%
Libya	4,647	81	93	141	-58%	-60%
French Polynesia	4,606	122	140	142	40%	28%
Tajikistan	4,286	151	128	143	188%	-12%
Paraguay	4,273	152	143	144	190%	34%
Cameroon	4,071	139	137	145	77%	7%
Namibia	3,779	136	145	146	42%	28%
Antigua and Barbuda	3,446	141	147	147	64%	22%
Zimbabwe	3,392	140	150	148	53%	43%
Papua New Guinea	3,333	145	146	149	96%	15%
Rwanda	3,272	187	165	150	1030%	158%
Nicaragua	2,877	120	132	151	-17%	-31%
Gibraltar	2,845	163	155	152	137%	37%
Suriname	2,844	156	161	153	108%	85%
Madagascar	2,649	146	151	154	57%	15%
Mali	2,590	148	156	155	57%	42%
Mozambique	2,349	161	152	156	83%	10%
Democratic Republic of the Congo	2,276	154	154	157	61%	8%
Bonaire, Saint Eustatius & Saba	2,245	159	163	158	65%	60%
Gabon	2,194	157	153	159	60%	3%
Djibouti	2,110	165	159	160	100%	24%
New Caledonia	2,012	153	158	161	40%	15%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Somalia	1,983	198	190	162	1291%	423%
Bhutan	1,924	199	184	163	1762%	240%
Eritrea	1,851	183	189	164	419%	368%
Botswana	1,817	162	160	165	43%	15%
Congo	1,690	155	144	166	20%	-45%
Guyana	1,675	178	166	167	197%	43%
Burkina Faso	1,566	173	168	168	135%	40%
Togo	1,437	175	162	169	122%	-1%
Niger	1,386	169	172	170	79%	43%
Grenada and South Grenadines	1,381	180	176	171	170%	59%
Gambia	1,352	186	182	172	327%	129%
French Guiana	1,249	166	167	173	25%	11%
Saint Kitts and Nevis	1,161	167	171	174	31%	16%
Mauritania	1,137	177	175	175	87%	27%
Cook Islands	1,123	179	179	176	112%	48%
Western Samoa	1,106	171	181	177	46%	60%
North Korea	1,087	191	173	178	388%	13%
Vanuatu	1,078	168	174	179	26%	13%
Guinea	970	172	185	180	35%	72%
Malawi	914	176	178	181	42%	20%
Palau	895	182	164	182	135%	-33%
Benin	849	164	170	183	-20%	-21%
South Sudan	843	193	169	184	292%	-23%
East Timor	805	189	186	185	246%	73%
Western Sahara	728	201	194	186	620%	232%
Equatorial Guinea	671	149	183	187	-55%	16%
Chad	649	170	177	188	-15%	-21%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Syria	583	79	209	189	-95%	1064%
Tonga	544	184	187	190	55%	34%
Greenland	523	185	188	191	53%	32%
Mayotte	502	206	208	192	696%	897%
Liberia	477	197	191	193	184%	51%
Solomon Islands	342	190	193	194	51%	32%
Saint Vincent and Grenadines	335	205	203	195	414%	366%
Guinea Bissau	324	204	206	196	333%	420%
Norfolk Island	284	188	192	197	11%	3%
British Virgin Islands	234	181	196	198	-46%	10%
Burundi	218	195	199	199	24%	31%
Swaziland	188	192	195	200	-13%	-12%
Lesotho	187	196	197	201	10%	-8%
Sierra Leone	161	174	180	202	-75%	-78%
Comoros	146	208	205	203	238%	116%
Marshall Islands	135	200	202	204	33%	36%
Sao Tome and Principe	125	202	204	205	61%	74%
Central African Republic	109	194	207	206	-47%	86%
Nauru	72	218	200	207	10596%	-43%
Niue	67	211	210	208	204%	50%
Dominica	52	203	201	209	-33%	-55%
Micronesia	45	209	211	210	10%	28%
Saint Pierre and Miquelon	45	212	214	211	408%	117%
Kiribati	38	216	212	212	652%	9%
Christmas Island	30	210	198	213	23%	-82%

Economy	Air connectivity score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Anguilla	29	207	213	214	-52%	19%
Cocos (Keeling) Islands	23	213	218	215	205%	2997%
Falkland Islands	16	217	217	216	2166%	1547%
Wallis and Futuna Islands	6	215	215	217	-19%	-8%
Montserrat	2	214	216	218	-69%	-10%
Tuvalu	1	219	219	219	47%	116%

Appendix B: Air connectivity per population

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Aruba	106.65	1	1	2	44%	15%
Bahamas	61.74	2	6	8	25%	15%
Macau	67.28	3	8	6	89%	33%
Singapore	62.39	4	5	5	85%	5%
Bahrain	31.58	5	13	14	0%	-7%
Hong Kong	53.40	6	9	9	72%	9%
Qatar	58.77	7	2	7	92%	-24%
Cyprus	45.32	8	12	11	55%	29%
Seychelles	81.75	9	11	3	190%	97%
Iceland	87.88	10	7	1	238%	72%
Antigua and Barbuda	37.05	11	14	15	48%	10%
Malta	46.51	12	15	12	92%	43%
Maldives	70.84	13	4	4	223%	17%
United Arab Emirates	39.26	14	10	13	83%	-7%
Palau	52.67	15	3	10	163%	-25%
Ireland	27.89	16	22	20	41%	34%
United States	24.69	17	21	24	25%	17%
Barbados	27.79	18	24	21	44%	37%
Switzerland	28.08	19	19	19	47%	13%
Norway	28.04	20	16	17	52%	-3%
Saint Lucia	27.75	21	20	22	55%	23%
Brunei Darussalam	30.62	22	17	18	72%	13%
Saint Kitts and Nevis	20.36	23	25	26	18%	3%
Australia	23.16	24	18	23	46%	-8%
Denmark	23.64	25	26	25	64%	22%
New Zealand	19.88	26	27	27	49%	20%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Spain	17.00	27	40	31	41%	55%
Luxembourg	31.27	28	23	16	181%	51%
Belize	13.37	29	37	43	32%	13%
Canada	14.39	30	34	34	46%	18%
United Kingdom	13.70	31	39	41	40%	20%
Finland	17.27	32	33	30	77%	41%
Japan	12.85	33	30	40	34%	2%
Austria	15.75	34	31	36	74%	28%
Kuwait	16.66	35	28	29	90%	10%
Netherlands	14.47	36	41	38	65%	32%
Sweden	13.86	37	35	37	69%	14%
Greece	15.21	38	47	35	88%	81%
Mauritius	14.23	39	38	33	79%	23%
Portugal	17.49	40	44	32	124%	88%
Germany	11.15	41	45	45	48%	20%
Jamaica	11.21	42	43	47	59%	19%
Italy	10.07	43	51	54	44%	38%
France	8.98	44	52	58	43%	23%
Malaysia	13.13	45	32	42	117%	6%
Taiwan	13.97	46	42	39	135%	28%
Fiji	10.43	47	48	48	76%	25%
Belgium	8.84	48	54	57	52%	24%
Israel	10.27	49	53	53	77%	41%
Oman	17.90	50	36	28	219%	48%
Lebanon	7.38	51	55	60	48%	8%
Trinidad and Tobago	5.46	52	59	69	10%	-4%
Latvia	11.88	53	57	46	146%	80%
South Korea	9.66	54	50	51	104%	28%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Czech Republic	6.52	55	67	62	64%	54%
Panama	10.82	56	46	44	179%	17%
Vanuatu	3.69	57	68	83	1%	-10%
Costa Rica	5.72	58	65	66	58%	25%
Dominican Republic	6.27	59	60	63	80%	13%
Tonga	5.44	60	69	65	56%	35%
Thailand	10.25	61	58	49	194%	57%
Croatia	10.09	62	63	56	212%	100%
Hungary	5.82	63	72	67	98%	98%
Jordan	4.18	64	66	72	43%	-8%
Montenegro	10.29	65	56	55	255%	53%
Saudi Arabia	9.50	66	49	50	242%	20%
Slovenia	3.72	67	78	75	34%	45%
Cape Verde	10.75	68	62	52	291%	106%
Estonia	8.07	69	64	59	204%	61%
Suriname	4.76	70	71	78	82%	62%
Mexico	4.07	71	73	74	104%	41%
Tunisia	2.77	72	75	93	39%	-2%
Turkey	6.26	73	61	61	219%	16%
Marshall Islands	2.41	74	91	94	24%	26%
Bulgaria	4.61	75	84	70	139%	93%
Libya	0.71	76	90	136	-62%	-63%
Equatorial Guinea	0.49	77	130	164	-70%	-23%
Serbia	4.15	78	76	79	157%	60%
Romania	3.12	79	97	85	96%	76%
El Salvador	3.06	80	82	89	96%	23%
South Africa	1.92	81	95	103	23%	5%
Brazil	2.01	82	83	101	49%	-18%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Poland	3.18	83	98	84	142%	84%
China	3.83	84	81	81	194%	54%
Chile	4.38	85	77	73	238%	70%
Namibia	1.54	86	106	109	19%	7%
Albania	3.20	87	96	88	147%	75%
Djibouti	1.96	88	89	100	52%	-6%
Philippines	3.21	89	74	86	153%	14%
Morocco	2.13	90	102	105	69%	35%
Lithuania	5.43	91	79	68	344%	112%
Armenia	3.62	92	88	82	206%	73%
Mongolia	2.58	93	86	98	131%	14%
Dominica	0.73	94	101	134	-33%	-55%
Colombia	3.34	95	80	87	213%	33%
Indonesia	3.14	96	70	77	195%	-5%
Uruguay	2.03	97	100	99	95%	18%
Cambodia	4.27	98	85	76	333%	87%
Ecuador	1.24	99	114	112	28%	3%
Russian Federation	2.99	100	87	90	217%	42%
Argentina	1.68	101	107	107	83%	17%
Gabon	1.05	102	109	119	20%	-23%
Sri Lanka	2.31	103	92	91	174%	23%
Moldova	2.48	104	105	92	204%	65%
Egypt	1.02	105	115	117	27%	2%
Venezuela	0.27	106	119	150	-66%	-68%
Peru	2.56	107	104	95	233%	64%
Vietnam	4.29	108	93	80	466%	132%
Guyana	2.13	109	103	104	184%	37%
Macedonia	2.39	110	111	97	228%	82%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Georgia	4.35	111	94	71	512%	137%
Honduras	0.85	112	123	125	21%	7%
Algeria	0.94	113	117	118	43%	7%
Kazakhstan	1.73	114	112	108	167%	40%
Botswana	0.76	115	122	130	19%	-4%
Nicaragua	0.44	116	126	131	-27%	-39%
Senegal	0.53	117	134	138	-12%	-7%
Slovakia	0.86	118	149	123	50%	153%
Guatemala	0.81	119	127	126	46%	14%
Azerbaijan	1.89	120	99	102	243%	10%
Ukraine	1.74	121	116	111	225%	93%
Laos	2.40	122	113	96	349%	94%
Bosnia and Herzegovina	1.75	123	118	110	228%	100%
Turkmenistan	0.97	124	108	116	98%	-29%
Iran	0.74	125	133	122	59%	26%
Kenya	0.60	126	132	133	30%	-4%
Solomon Islands	0.53	127	139	141	22%	6%
Haiti	0.52	128	131	128	29%	-17%
Congo	0.37	129	120	144	-6%	-57%
Bolivia	0.74	130	136	129	136%	38%
India	0.92	131	135	120	195%	65%
Belarus	1.23	132	128	115	300%	79%
Nepal	1.05	133	124	114	257%	41%
Papua New Guinea	0.39	134	141	143	44%	-15%
Uzbekistan	0.62	135	140	140	135%	32%
Kyrgyzstan	1.17	136	110	113	361%	-11%
Ghana	0.36	137	143	145	44%	-12%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Paraguay	0.60	138	137	132	150%	16%
East Timor	0.62	139	142	124	179%	39%
Zambia	0.26	140	150	151	27%	-10%
Tajikistan	0.46	141	129	135	132%	-29%
Pakistan	0.43	142	145	137	121%	18%
Mauritania	0.28	143	152	152	48%	0%
Gambia	0.58	144	148	153	216%	70%
Zimbabwe	0.23	145	156	155	25%	18%
Angola	0.25	146	146	154	50%	-30%
Nigeria	0.15	147	158	165	-3%	-22%
Bhutan	2.32	148	121	106	1481%	189%
Sudan	0.28	149	153	146	103%	2%
Afghanistan	0.36	150	144	147	174%	-7%
Myanmar	0.77	151	138	127	526%	53%
Ethiopia	0.47	152	151	142	283%	65%
Benin	0.07	153	165	171	-40%	-40%
Mali	0.14	154	163	166	16%	5%
Bangladesh	0.30	155	155	148	162%	36%
Cameroon	0.16	156	157	163	39%	-16%
Uganda	0.19	157	159	158	72%	4%
Sierra Leone	0.02	158	164	180	-80%	-83%
Togo	0.18	159	154	162	71%	-23%
Ivory Coast (Cote d'Ivoire)	0.20	160	161	160	103%	26%
Tanzania	0.23	161	160	156	137%	29%
Lesotho	0.09	162	167	167	3%	-14%
Madagascar	0.10	163	166	168	19%	-13%
Chad	0.05	164	171	169	-34%	-38%

Economy	Air connectivity per 1000 people 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Eritrea	0.30	165	172	139	319%	278%
Guinea	0.07	166	175	174	5%	33%
Nauru	5.54	167	29	64	8128%	-56%
Comoros	0.17	168	168	161	159%	65%
Iraq	0.95	169	125	121	1619%	30%
Mozambique	0.08	170	170	170	39%	-16%
Kiribati	0.33	171	147	149	549%	-6%
Niger	0.06	172	174	175	22%	-3%
Central African Republic	0.02	173	180	177	-56%	53%
Liberia	0.10	174	169	159	118%	16%
Tuvalu	0.06	175	177	173	34%	97%
Burkina Faso	0.08	176	173	172	75%	4%
Malawi	0.05	177	176	176	7%	-10%
Rwanda	0.26	178	162	157	786%	102%
Burundi	0.02	179	179	178	-9%	-3%
Democratic Republic of the Congo	0.02	180	178	179	19%	-20%

Appendix C: Air connectivity per GDP

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Palau	3,130	2	1	1	62%	-43%
Maldives	3,062	3	2	2	76%	-5%
Aruba	2,664	1	3	3	24%	12%
Saint Lucia	1,874	5	4	5	24%	10%
Bahamas	1,795	4	5	6	7%	13%
Seychelles	2,559	6	6	4	71%	62%
Vanuatu	1,260	7	7	12	-15%	-10%
Antigua and Barbuda	1,262	10	8	11	14%	-9%
Belize	1,546	8	9	8	12%	19%
Barbados	1,477	9	10	9	27%	26%
Iceland	1,556	21	11	7	143%	43%
Jamaica	1,152	13	12	13	33%	9%
Cyprus	1,091	15	13	14	31%	9%
Nauru	448	178	14	36	3022%	-54%
Fiji	974	14	15	16	16%	7%
Malta	989	11	16	15	12%	11%
Hong Kong	804	19	17	20	13%	-5%
Tonga	831	17	18	19	5%	5%
Cape Verde	1,390	25	19	10	184%	76%
Western Samoa	896	12	20	18	3%	27%
Saint Kitts and Nevis	660	18	21	21	-12%	-5%
Bahrain	621	16	22	23	-22%	-4%
Cambodia	920	29	23	17	117%	44%
Singapore	600	22	24	24	10%	-5%
Mauritius	569	23	25	25	6%	-4%
Djibouti	489	24	26	33	-6%	-17%
Marshall Islands	628	20	27	22	-7%	10%
United Arab Emirates	557	31	28	26	43%	-1%
Australia	432	32	29	40	11%	-12%
Malaysia	404	38	30	43	28%	-10%
New Zealand	485	28	31	35	11%	10%
Montenegro	515	58	32	30	132%	19%

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Qatar	437	47	33	38	59%	5%
Denmark	440	35	34	37	25%	8%
Panama	396	48	35	44	48%	-2%
Norway	365	41	36	50	22%	-9%
Switzerland	425	34	37	41	15%	6%
Thailand	501	45	38	31	79%	25%
Ireland	338	26	39	54	-29%	-14%
Jordan	434	39	40	39	41%	13%
Dominican Republic	321	36	41	58	-3%	-14%
Philippines	337	55	42	55	37%	-9%
United States	381	30	43	45	-9%	3%
Kyrgyzstan	289	111	44	65	215%	-20%
Lebanon	485	37	45	34	49%	39%
Portugal	527	40	46	29	73%	52%
Macau	556	27	47	27	18%	65%
El Salvador	368	52	48	49	41%	10%
Haiti	271	53	49	69	6%	-19%
Spain	409	33	50	42	9%	25%
Greece	500	50	51	32	88%	53%
Japan	282	43	52	68	-2%	-12%
Brunei Darussalam	371	57	53	48	62%	19%
Vietnam	532	72	54	28	190%	72%
Latvia	377	49	55	47	41%	24%
Nepal	320	80	56	59	101%	8%
Finland	358	51	57	52	37%	23%
Indonesia	224	91	58	84	67%	-22%
Costa Rica	314	42	59	60	6%	11%
United Kingdom	293	46	60	64	6%	9%
Austria	293	59	61	63	34%	14%
Libya	59	136	62	149	-4%	-77%
Armenia	332	68	63	56	72%	30%
Canada	284	54	64	67	12%	12%
Sweden	256	61	65	71	23%	2%
Moldova	322	69	66	57	69%	29%

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Croatia	365	77	67	51	121%	47%
Tunisia	217	64	68	86	7%	-7%
Taiwan	253	74	69	72	46%	9%
Solomon Islands	232	44	70	77	-18%	5%
Turkey	229	98	71	80	82%	4%
Netherlands	248	66	72	74	27%	14%
Tajikistan	129	106	73	115	27%	-40%
Guyana	238	86	74	76	70%	13%
Oman	377	95	75	46	195%	82%
South Korea	225	75	76	83	32%	8%
Georgia	356	100	77	53	215%	75%
Italy	249	62	78	73	21%	23%
Germany	207	67	79	89	7%	5%
Israel	262	60	80	70	25%	33%
Laos	294	90	81	62	117%	50%
Morocco	229	63	82	79	13%	19%
Luxembourg	286	94	83	66	123%	52%
Kuwait	245	87	84	75	79%	32%
Kiribati	153	168	85	109	378%	-18%
Serbia	223	93	86	85	73%	21%
Estonia	226	97	87	82	79%	24%
China	196	82	88	90	25%	8%
Colombia	214	105	89	87	106%	22%
Kenya	154	70	90	108	-19%	-12%
Mongolia	181	79	91	95	12%	4%
France	191	73	92	92	10%	10%
Suriname	306	65	93	61	54%	76%
Afghanistan	172	113	94	100	90%	0%
Albania	227	85	95	81	56%	34%
Trinidad and Tobago	167	76	96	104	0%	-1%
Senegal	137	56	97	113	-41%	-17%
Honduras	157	71	98	107	-15%	-3%
Sri Lanka	166	103	99	105	51%	3%
Ethiopia	187	99	100	94	53%	17%

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Belgium	178	83	101	97	19%	13%
Mexico	193	92	102	91	45%	29%
Dominica	67	102	103	143	-39%	-54%
Brazil	121	107	104	117	19%	-15%
Czech Republic	167	84	105	103	12%	22%
Nicaragua	83	78	106	133	-49%	-39%
Bulgaria	188	96	107	93	48%	38%
Togo	96	114	108	128	8%	-28%
South Africa	139	88	109	112	2%	7%
Saudi Arabia	168	132	110	102	161%	29%
Namibia	135	81	111	114	-15%	10%
Gambia	208	117	112	88	159%	69%
Peru	172	115	113	101	99%	42%
Hungary	173	89	114	99	27%	48%
Ukraine	179	120	115	96	143%	62%
Papua New Guinea	102	109	116	123	4%	-7%
Chile	165	121	117	106	128%	57%
Congo	52	124	118	158	-23%	-50%
Myanmar	115	160	119	118	202%	11%
Lithuania	149	135	120	110	138%	49%
Bhutan	231	172	121	78	744%	131%
Macedonia	145	128	122	111	121%	50%
Ecuador	106	104	123	122	-3%	9%
Romania	113	110	124	119	18%	24%
Azerbaijan	101	163	125	125	178%	11%
India	109	118	126	121	40%	21%
Guatemala	93	116	127	131	8%	10%
Slovenia	96	108	128	129	-4%	14%
Bosnia and Herzegovina	123	141	129	116	113%	48%
Turkmenistan	48	144	130	159	-13%	-43%
Uruguay	84	123	131	132	24%	4%
Bolivia	97	129	132	127	47%	22%
Russian Federation	101	154	133	124	128%	30%

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Egypt	73	119	134	139	-5%	-3%
Uzbekistan	76	126	135	136	14%	4%
Uganda	72	137	136	140	19%	1%
Pakistan	73	150	137	138	54%	7%
Mozambique	57	134	138	152	-11%	-17%
Poland	94	130	139	130	44%	38%
Sudan	70	166	140	141	108%	2%
Argentina	82	145	141	135	51%	22%
Madagascar	58	140	142	151	-3%	-14%
Zimbabwe	83	101	143	134	-26%	26%
Rwanda	109	175	144	120	370%	66%
Ghana	52	127	145	157	-22%	-20%
Zambia	62	122	146	144	-10%	-4%
Gabon	55	139	147	153	-8%	-14%
Bangladesh	61	149	148	145	28%	-2%
Sierra Leone	12	112	149	179	-87%	-79%
Tanzania	69	148	150	142	46%	20%
Mauritania	58	143	151	150	6%	2%
Comoros	100	153	152	126	125%	78%
Algeria	59	147	153	148	12%	7%
Mali	55	133	154	154	-14%	0%
Liberia	74	156	155	137	72%	36%
Niger	54	131	156	155	-16%	2%
Cameroon	40	157	157	163	-4%	-20%
Benin	28	125	158	171	-58%	-43%
Eritrea	175	138	159	98	189%	264%
Kazakhstan	61	164	160	146	70%	30%
Botswana	41	146	161	162	-24%	-7%
Ivory Coast (Cote d'Ivoire)	45	162	162	160	19%	3%
Paraguay	43	171	163	161	54%	2%
Angola	36	173	164	167	36%	-10%
Iraq	53	179	165	156	1026%	31%
Malawi	37	152	166	166	-19%	-6%
Burkina Faso	37	165	167	165	11%	-2%

Economy	Air connectivity/ GDP score 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Belarus	59	176	168	147	182%	63%
Democratic Republic of the Congo	29	159	169	168	-24%	-19%
Lesotho	26	161	170	173	-32%	-22%
Iran	40	170	171	164	43%	27%
Nigeria	24	167	172	174	-26%	-11%
Chad	20	158	173	177	-48%	-26%
Guinea	29	151	174	169	-36%	12%
Central African Republic	28	142	175	170	-49%	37%
Burundi	26	169	176	172	-13%	26%
Equatorial Guinea	23	155	177	176	-48%	50%
Slovakia	23	174	178	175	-6%	97%
Tuvalu	15	177	179	178	-6%	57%

Appendix D: International air connectivity

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
United States	47,707,135	1	1	1	57%	34%
China	39,757,313	4	3	2	153%	46%
United Kingdom	35,918,580	2	2	3	56%	31%
Germany	31,353,354	3	4	4	54%	24%
Spain	26,584,363	6	5	5	80%	52%
Japan	25,255,574	8	7	6	125%	56%
Italy	23,590,083	5	6	7	59%	43%
France	20,268,669	7	8	8	56%	30%
India	19,372,352	9	10	9	103%	38%
Thailand	18,053,205	12	12	10	126%	38%
United Arab Emirates	16,239,050	11	9	11	94%	13%
Hong Kong	14,909,499	10	11	12	61%	14%
South Korea	13,660,297	19	16	13	137%	49%
Taiwan	12,767,515	15	14	14	82%	29%
Singapore	12,357,179	14	13	15	68%	18%
Turkey	12,038,646	22	20	16	155%	46%
Indonesia	11,402,034	21	15	17	138%	22%
Switzerland	11,332,168	13	17	18	52%	25%
Netherlands	10,485,601	16	21	19	62%	36%
Malaysia	10,482,655	20	18	20	98%	19%
Vietnam	10,433,049	35	29	21	291%	126%
Australia	10,419,915	18	19	22	78%	19%
Philippines	9,951,109	27	25	23	165%	57%
Canada	9,407,188	17	24	24	56%	38%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Saudi Arabia	9,324,517	37	23	25	266%	30%
Russian Federation	9,173,851	24	22	26	112%	23%
Portugal	7,750,939	26	32	27	103%	75%
Greece	6,890,022	29	34	28	89%	73%
Austria	6,653,013	25	27	29	71%	36%
Qatar	6,475,471	34	26	30	138%	10%
Ireland	6,469,936	23	31	31	46%	42%
Denmark	6,158,983	28	28	32	65%	29%
Sweden	5,911,795	30	30	33	73%	30%
Poland	5,704,283	36	39	34	119%	76%
Mexico	4,997,193	38	38	35	102%	51%
Norway	4,749,321	31	33	36	54%	8%
Belgium	4,738,205	33	35	37	63%	33%
Egypt	4,416,510	32	36	38	49%	26%
Pakistan	4,320,814	47	40	39	152%	35%
Finland	4,061,288	41	42	40	71%	45%
Israel	4,047,969	44	44	41	94%	69%
Kuwait	3,953,102	46	41	42	125%	37%
Brazil	3,886,801	39	37	43	60%	15%
Oman	3,570,542	65	52	44	300%	102%
Morocco	3,545,125	45	45	45	88%	50%
Czech Republic	3,441,403	42	46	46	56%	50%
South Africa	3,379,800	40	43	47	41%	25%
Ukraine	3,184,211	54	51	48	179%	78%
Romania	2,987,647	48	50	49	80%	62%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Hungary	2,813,197	49	55	50	75%	84%
Cambodia	2,397,428	69	58	51	236%	70%
Bahrain	2,365,503	43	47	52	9%	8%
Iran	2,329,560	50	48	53	54%	15%
Lebanon	2,302,330	52	57	54	84%	52%
Sri Lanka	2,184,022	61	49	55	131%	18%
Jordan	2,115,352	55	54	56	95%	33%
Bangladesh	2,105,695	63	53	57	133%	31%
New Zealand	2,091,728	53	61	58	83%	57%
Croatia	2,058,127	66	69	59	162%	84%
Algeria	1,861,452	58	60	60	82%	37%
Colombia	1,860,633	68	67	61	154%	62%
Dominican Republic	1,854,264	56	56	62	73%	22%
Iraq	1,831,274	141	65	63	1882%	59%
Cyprus	1,799,032	51	62	64	43%	40%
Ethiopia	1,747,429	78	71	65	230%	78%
Argentina	1,681,811	60	63	66	76%	31%
Bulgaria	1,600,555	67	74	67	104%	81%
Tunisia	1,565,797	57	59	68	48%	12%
Macau	1,534,307	64	70	69	71%	48%
Myanmar	1,503,702	96	68	70	393%	34%
Serbia	1,420,526	70	73	71	116%	51%
Kenya	1,415,718	62	66	72	50%	23%
Maldives	1,282,203	84	72	73	204%	35%
Iceland	1,273,648	83	83	74	201%	83%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Nigeria	1,245,761	59	64	75	25%	6%
Peru	1,223,976	77	76	76	129%	49%
Cuba	1,204,349	79	78	77	138%	66%
Panama	1,192,491	85	75	78	201%	38%
Kazakhstan	1,188,680	81	79	79	146%	65%
Chile	1,140,509	80	81	80	126%	61%
Malta	1,123,810	76	84	81	108%	68%
Nepal	1,092,966	86	77	82	208%	38%
Latvia	1,082,286	75	80	83	98%	53%
Luxembourg	980,257	95	90	84	216%	84%
Mauritius	906,920	74	82	85	58%	28%
Azerbaijan	866,921	99	85	86	260%	35%
Uzbekistan	784,433	94	94	87	152%	75%
Georgia	766,039	119	105	88	435%	149%
Lithuania	746,473	101	97	89	230%	74%
Jamaica	727,704	82	86	90	67%	26%
Costa Rica	674,938	89	96	91	105%	57%
Tanzania	671,222	98	98	92	178%	67%
Laos	641,999	117	101	93	319%	87%
Brunei Darussalam	603,954	87	95	94	74%	37%
Afghanistan	597,300	104	87	95	182%	6%
Ecuador	578,432	92	93	96	80%	26%
Sudan	568,554	93	88	97	79%	2%
Ghana	555,587	90	92	98	69%	17%
Estonia	527,606	107	100	99	170%	51%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Belarus	486,385	116	108	100	217%	69%
El Salvador	468,971	103	102	101	119%	38%
Senegal	461,567	97	103	102	58%	37%
Bahamas	437,281	88	104	103	33%	32%
Albania	437,262	109	111	104	141%	76%
Seychelles	425,941	118	116	105	188%	103%
Uganda	425,746	108	106	106	127%	40%
Armenia	420,024	111	114	107	142%	80%
Slovenia	396,383	91	110	108	22%	48%
Moldova	390,482	121	118	109	183%	87%
Angola	355,193	110	99	110	97%	-7%
Mongolia	345,872	131	112	111	231%	46%
Reunion	329,151	105	109	112	58%	18%
Barbados	327,985	100	113	113	42%	40%
Cape Verde	299,445	153	134	114	340%	115%
Bosnia and Herzegovina	297,873	132	133	115	185%	106%
Venezuela	293,547	72	91	116	-54%	-39%
Montenegro	286,990	135	129	117	192%	83%
Curacao	286,940	102	120	118	28%	41%
Guatemala	282,259	114	119	119	74%	39%
Kyrgyzstan	267,528	160	117	120	385%	28%
Fiji	265,830	122	123	121	110%	45%
Aruba	259,146	112	121	122	57%	28%
Ivory Coast (Cote d'Ivoire)	255,028	128	131	123	117%	70%
Macedonia	249,508	145	136	124	195%	92%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Slovakia	240,944	113	141	125	46%	118%
Guadeloupe	233,865	124	125	126	91%	30%
Turkmenistan	230,353	133	107	127	124%	-23%
Zambia	221,650	125	124	128	82%	21%
Libya	217,415	73	89	129	-63%	-59%
Trinidad and Tobago	213,133	106	115	130	9%	-1%
Cameroon	211,769	120	122	131	53%	14%
Martinique	201,952	129	127	132	79%	22%
Uruguay	199,817	137	130	133	110%	30%
Bolivia	186,278	138	137	134	97%	47%
Suriname	167,621	142	149	135	84%	75%
Honduras	165,737	127	138	136	40%	32%
Rwanda	163,668	183	160	137	891%	145%
Namibia	158,889	130	145	138	42%	48%
Gibraltar	157,610	152	142	139	126%	43%
Saint Lucia	155,703	134	140	140	55%	32%
Sint Maarten	154,397	115	126	141	-3%	-9%
Bermuda	151,274	123	139	142	23%	21%
Tajikistan	148,916	162	135	143	203%	11%
Paraguay	137,291	161	153	144	159%	54%
Haiti	136,301	126	128	145	13%	-16%
Mali	133,641	136	151	146	40%	44%
Madagascar	133,477	143	144	147	50%	24%
Antigua and Barbuda	133,055	147	146	148	65%	27%
Cayman Islands	128,585	139	143	149	38%	17%

Economy	International Connectivity 2019	Global Ranking 2009	Global Ranking 2014	Global Ranking 2019	Growth 2009-2019	Growth 2014-2019
Turks and Caicos Islands	117,910	157	154	150	92%	38%
Djibouti	113,259	155	150	151	69%	20%
Somalia	111,685	194	181	152	1512%	369%
Gabon	111,018	146	147	153	37%	8%
Democratic Republic of the Congo	107,707	150	152	154	42%	17%
Papua New Guinea	107,127	163	157	155	123%	43%
Zimbabwe	105,189	144	158	156	21%	51%
Bonaire, Saint Eustatius & Saba	103,452	154	162	157	53%	59%
Eritrea	98,252	181	187	158	442%	473%
French Polynesia	89,740	151	155	159	28%	18%
Congo	88,258	149	132	160	13%	-41%
Mozambique	88,137	166	159	161	98%	32%
Nicaragua	86,352	140	148	162	-7%	-11%
Burkina Faso	82,168	171	166	163	114%	51%
Niger	71,871	164	168	164	52%	45%
Belize	70,567	159	167	165	19%	38%
New Caledonia	66,578	158	164	166	11%	15%
Gambia	66,480	185	175	167	327%	121%
Guyana	60,122	177	173	168	179%	52%
Mauritania	59,049	172	170	169	59%	37%
Togo	56,436	169	161	170	42%	-14%
Botswana	55,142	168	171	171	29%	30%
Guinea	53,132	167	177	172	20%	91%

Bhutan	52,457	203	190	173	1563%	281%
French Guiana	50,240	173	169	174	39%	14%
Palau	49,559	176	156	175	125%	-34%
South Sudan	46,478	187	163	176	269%	-26%
Benin	46,005	156	165	177	-28%	-16%
Grenada and South Grenadines	45,309	182	178	178	151%	64%
Malawi	35,075	175	179	179	38%	28%
Western Sahara	35,036	197	192	180	574%	229%
Chad	33,819	165	172	181	-28%	-19%
Cook Islands	31,970	184	182	182	96%	42%
Syria	31,689	71	211	183	-95%	2336%
Western Samoa	30,927	178	185	184	45%	52%
Saint Kitts and Nevis	29,602	174	180	185	15%	18%
Equatorial Guinea	29,198	148	176	186	-64%	4%
Greenland	27,992	180	183	187	42%	31%
Liberia	27,422	190	188	188	145%	64%
Mayotte	27,309	201	201	189	580%	798%
East Timor	25,657	188	184	190	120%	21%
Vanuatu	23,784	179	186	191	20%	21%
North Korea	18,493	204	189	192	498%	14%
Guinea Bissau	17,083	199	203	193	302%	549%
Tonga	16,730	189	191	194	49%	35%
Saint Vincent and Grenadines	12,792	200	199	195	216%	289%
Burundi	11,048	191	193	196	39%	30%
Sierra Leone	8,053	170	174	197	-80%	-78%
Comoros	6,909	206	202	198	196%	142%
Sao Tome and Principe	6,332	198	197	199	46%	56%
Norfolk Island	6,011	196	195	200	7%	6%

Solomon Islands	5,841	202	198	201	50%	63%
Central African Republic	5,680	186	204	202	-55%	121%
Swaziland	5,541	192	194	203	-24%	-3%
Lesotho	5,534	195	196	204	-4%	2%
British Virgin Islands	3,534	193	206	205	-52%	69%
Micronesia	2,217	207	209	206	-1%	40%
Niue	2,200	210	208	207	175%	38%
Dominica	2,076	205	200	208	-19%	-32%
Marshall Islands	2,010	208	210	209	56%	39%
Saint Pierre and Miquelon	1,725	216	213	210	1784%	237%
Nauru	1,436	217	207	211	4562%	-20%
Kiribati	1,015	214	212	212	268%	16%
Christmas Island	586	211	205	213	-22%	-75%
Anguilla	455	209	214	214	-63%	14%
Cocos (Keeling) Islands	447	215	217	215	193%	3227%
Wallis and Futuna Islands	310	213	215	216	-21%	-14%
Falkland Islands	310	218	219	217	15403%	27451%
Montserrat	140	212	216	218	-72%	11%
Tuvalu	7	219	218	219	336%	46%

Appendix G: Definition of statistical regions

List of countries and territories classified by region of geographical location (based on ICAO statistical regions)

Africa

Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Djibouti
Egypt
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Libya
Madagascar
Malawi
Mali
Mauritania
Mauritius
Morocco
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
South Sudan
Sudan
Swaziland
Togo
Tunisia
Uganda
United Republic of Tanzania
Western Sahara
Zambia
Zimbabwe

Asia/Pacific

Afghanistan
Australia
Bangladesh
Bhutan
Brunei Darussalam
Cambodia
China
Cook Islands
Democratic People's Republic of Korea
Fiji
India
Indonesia
Japan
Japan
Kazakhstan
Kiribati
Kyrgyzstan
Lao People's Democratic Republic
Malaysia
Maldives
Marshall Islands
Micronesia (Federated States of)
Mongolia
Myanmar
Nauru
Nepal
New Zealand
Pakistan
Palau
Papua New Guinea
Philippines
Republic of Korea
Samoa
Singapore
Solomon Islands
Sri Lanka
Tajikistan
Thailand
Timor-Leste
Tonga
Turkmenistan
Tuvalu
Uzbekistan
Vanuatu
Vietnam

Europe

Albania
Andorra
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Holy See (The)
Hungary
Iceland
Ireland
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
The former Yugoslav Republic of Macedonia
Turkey
Ukraine

Latin America and Caribbean

Antigua and Barbuda
Argentina
Bahamas
Barbados
Belize
Bolivia (Plurinational State of)
Brazil
Chile
Colombia

Costa Rica
Cuba
Dominica
Dominican Republic
Ecuador
El Salvador
Grenada
Guatemala
Guyana
Haiti
Honduras
Trinidad and Tobago
Jamaica
Uruguay
Mexico
Nicaragua
Panama
Paraguay
Peru
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Suriname
Venezuela (Bolivarian Republic of)

Middle East

Bahrain
Iran (Islamic Republic of)
Iraq
Israel
State of Palestine
Syrian Arab Republic
United Arab Emirates
Yemen
Jordan
Kuwait
Lebanon
Oman
Qatar
Saudi Arabia

North America

Canada
United States

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[11] Regional country groupings were derived using SRS Analyser classification. Asia includes countries in Asia Pacific, Australasia, Central Asia and the Caucasus region. Latin America includes countries in South America, Central America and the Caribbean. North America includes Canada, Mexico and the United States. A complete country list for each region is included in Appendix G.
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In addition to reporting air connectivity scores, the World Bank analysed the relationship between the policy environment and air connectivity scores for different countries. The study established that countries with more liberal air transport policies tend to have better connectivity scores, as a result of reducing the cost of moving from one country to another. Countries seeking to improve connectivity would benefit from improved air transport market access, in addition to considering measures such as lower landing or airport fees. The World Bank also found a positive although statistically insignificant association between air connectivity and trade openness. The lack of statistical significance could be explained by the fact that some goods (with low value of weight ratio) tend to be transported by sea and air transport is not an important transport mode for those sectors. There is a strong and positive correlation between air connectivity and the degree of a country's integration into international production networks.
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[29] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[30] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[31] ATAG, “Aviation Benefits Beyond Borders”, 2018
[32] CAPA, “Wizz Air adds competition for Aegean Airlines in Greece”, 2018
[33] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[34] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[35] The Economist Intelligence Unit, “Middle East and Africa economy: Turbulent times ahead for Gulf aviation sector”, 2019
[36] The Economist Intelligence Unit, “Middle East and Africa economy: Turbulent times ahead for Gulf aviation sector”, 2019
[37] ATAG, “Aviation Benefits Beyond Borders”, 2018
[38] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[39] It is important to note that all the city scores shown in this report are calculated as a sum of the air connectivity scores of the airports of that city.
[40] The IATA Air Transport Regulatory Competitiveness Indicators (ATRCI) uses both quantitative and qualitative data that are normalized to 0-to-10 scale (10 best, 0 worst performance). Qualitative data were collated based on the subject matter expert’s opinion against an objective framework. Respectively, quantitative data are primarily used from respected international organization (namely the World Economic Forum, World Bank) or external partner organization (Verisk Maplecroft).