OXFORD ECONOMICS

Quantifying the Economic Impact of Aviation in Dubai

November 2014

A report for Emirates and Dubai Airports

November 2014

OXFORD ECONOMICS

Contents

Executive summary

- This report sets out the contribution of the Emirates Group, Dubai Airports and the aviation sector as a whole to the economy of Dubai in 2013. It assesses the value of the activity undertaken by businesses forming part of the aviation sector (the 'direct' impact), and that of the additional work carried out by other Dubai-based entities as a result of supply chain ('indirect') and employee spending ('induced') impacts, together with the associated employment effects. The study also analyses the benefits to the Dubai economy from aviation-driven inbound tourism.
- The report further looks at how this activity – and the consequent benefits – can be expected to grow by 2020 and 2030, taking into account both potential demand growth and existing plans to expand the industry's capacity, and calculates the potential costs of any constraints on infrastructure expansion beyond 2020.
- The overall total economic impact of the aviation sector on the Dubai economy in 2013 can be put at US$26.7 billion[1], comprising a 'core' impact of US$16.5 billion and 'tourism' benefits of US$10.2 billion (Table 0.1). This is equivalent to 26.7% of Dubai's total GDP, and was sufficient to support some 416,500 jobs or 21% of Dubai's total employment.
- The core impact comprises the sector's direct gross value added (GVA) of US$9.6 billion, an indirect impact of US$4.2 billion and an induced impact of US$2.7 billion[2], showing how for each US$100 of activity in the sector itself, a further US$72 of value added is created in other sectors of the Dubai economy as a result of supply chain linkages and employee spending.
- The total core impact on employment of 259,400 jobs compares with a direct impact alone of 120,300 jobs, meaning that for every 100 jobs created in the aviation sector an additional 116 jobs are created elsewhere in the Dubai economy as a result of the supply chain and employee spending effects.

Table 0.1: The core and catalytic contribution of Dubai aviation in 2013

Total impact of the aviation sector on the Dubai economy in 2013				
	GVA[2] (US$ billion)	***As % Dubai GDP***	**Employment (thousands)**	**As % Dubai employment**
Direct	9.6	*9.6%*	120.3	*6.1%*
Indirect	4.2	*4.2%*	76.1	*3.8%*
Induced	2.7	*2.7%*	63.0	*3.2%*
Total core impact	16.5	*16.5%*	259.4	*13.1%*
Tourism benefits[1]	10.2	*10.2%*	157.1	*7.9%*
Overall total impact	**26.7**	***26.7%***	**416.5**	***21.0%***

[1] Over and above the impact of tourism on and via the aviation sector, the value of which is already captured in the direct, indirect and induced impacts.
[2] GVA = Gross Value Added

[1] In this report we only quantify the direct, indirect, induced and tourism benefits, and do not attempt to put a value on 'connectivity benefits' as in the 2011 report *Explaining Dubai's Aviation Model*. For comparison, the direct, indirect, induced and tourism benefits in the 2011 report totalled US$19.6 billion, or 24% of GDP.

[2] Throughout this report GVA values are rounded to the nearest US$0.1 billion, employment numbers to the nearest 100 and percentages to one decimal place. The totals shown may not always appear to equal the sum of their components due to this rounding.

- The aviation industry also brings some US$10.2 billion in tourism benefits and is estimated to support a further 157,100 people in employment.
- Without an aviation sector presence in Dubai, the economy would probably suffer from a reduced degree of diversity, leaving it somewhat more vulnerable to the impact of costly economic 'shocks'. It would obviously be more dependent on the remaining non-aviation sectors in aggregate. But within the remaining group of activities, relative dependence would also change, with greater reliance on manufacturing, construction, wholesale and retail and a reduced role for varied business services (reflecting supply chain links to aviation) and hotels and catering (reflecting an associated loss of tourist expenditure).
- Taking into account projected growth in passenger numbers and existing plans to expand capacity – including development of the new Al Maktoum International at Dubai World Central terminal due for completion in the early 2020s along with efforts to accommodate the additional visitors expected to arrive for the Expo 2020 – we expect the combined direct, indirect, induced and tourism GVA impact, to rise from 26.7% of Dubai's GDP in 2013 to 37.5% in 2020 and 44.7% in 2030 (Table 0.2), provided that capacity continues to expand to meet potential demand beyond 2020. The associated employment impact would on that basis, grow from 21% of total Dubai employment in 2013, to 29.5% in 2020 and 35.1% in 2030.
- The likelihood that capacity will be sufficient to meet potential demand in 2020, and the possibility that it could also do so in 2030, despite the significant further expansion that would entail, is greatly helped by Dubai's aviation policy landscape. This includes a consensus-based partnership between the government and the aviation sector, allowing important decisions to be taken quickly and carried through effectively, as in the case of the US$32 billion expansion of Al Maktoum International at Dubai World Central.
- By contrast, the potential cost of deviating from that strategy could be significant. With no further expansion in airport capacity beyond the existing plans running to 2020, the rate of growth in aviation activity would on the basis of reasonable assumptions be significantly slower than otherwise from 2021 onwards. In that case, in 2030 the direct, indirect, induced and tourism benefits of the aviation sector would come in some 13% lower than expected on the unconstrained scenario, with an associated jobs shortfall of 159,600 – equivalent to 4.7% of projected economy-wide employment in that year.

Table 0.2: The core and catalytic contribution of Dubai aviation in 2020 and 2030

Dubai aviation sector contribution in the future			
	2013	**2020**	**2030**
GVA (US$ billion[1])			
Direct, indirect and induced impacts	16.5	31.4	48.6
Additional tourism impact	10.2	21.7	39.5
Total of above impacts	**26.7**	**53.1**	**88.1**
As % economy-wide GVA	*26.7%*	*37.5%*	*44.7%*
Potential loss if capacity constrained	-	-	11.8
Employment (thousands)			
Direct, indirect and induced impacts	259.4	449.5	664.1
Additional tourism impact	157.1	305.0	530.6
Total of above impacts	**416.5**	**754.5**	**1,194.7**
As % economy-wide employment	*21.0%*	*29.5%*	*35.1%*
Potential loss if capacity constrained	-	-	159.6

[1] At constant 2013 prices and using the average 2013 exchange rate.

1 Introduction

1.1 Purpose of report

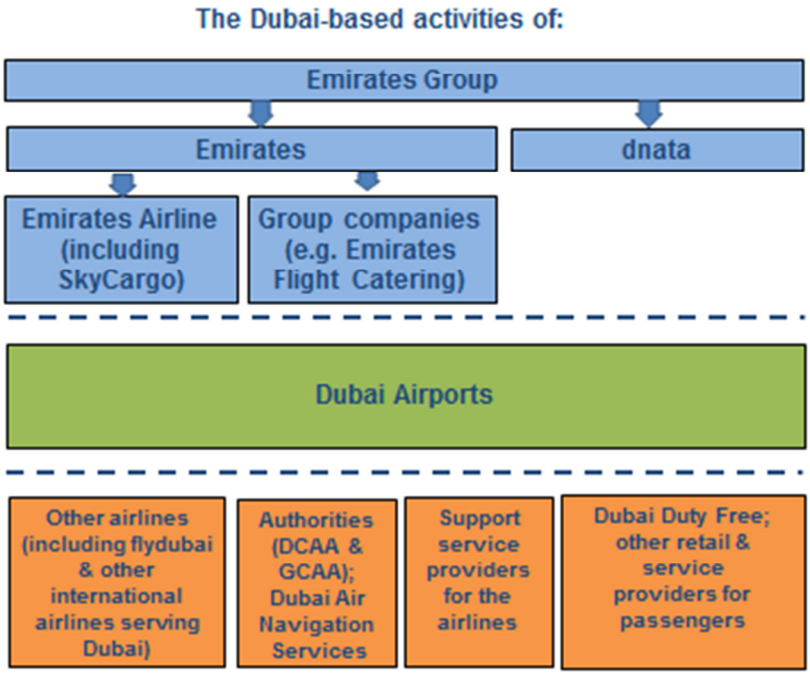
The objective of this report is to investigate the economic benefits that the aviation sector brings to the Dubai economy currently (2013) and the projected impacts in 2020 and 2030. The study quantifies the economic impact of the aviation sector in Dubai and its Dubai-based supply chain.

As well as the expenditure benefits to the local economy, the study also examines the aviation sector's contribution to the success of the Dubai economy via its role in sustaining the tourism industry, in facilitating trade through its cargo capabilities, and in providing the connectivity that delivers long run productivity gains. Finally, the study assesses the potential cost to the economy by 2030 if there were no further investment in new sector capacity beyond the existing plans through to 2020.

1.2 Sector coverage

Figure 1.1 illustrates the sector coverage of the measures in this report, which essentially covers the contribution of the aviation sector broadly defined to the economy of Dubai. More specifically, the Dubai-based aviation sector in this report is taken to be all activities taking place at Dubai International (DXB) and Dubai World Central (DWC) airports, together with the aviation entities and related activities elsewhere in Dubai.

Figure 1.1 : Sector coverage in this report



While most of the activities would be classified as ‘air transport’ and ‘support services for air transport’ in a standard industrial classification, some will be classified elsewhere, for example on-board and airport-based catering within ‘food and beverage service provision’ and duty free sales within ‘retail’.

1.3 Report structure

The report is structured as follows:

- **Chapter 2** explores the sector’s ‘core’ economic contribution to the Dubai economy, covering the impact on GDP and employment within Dubai, arising both as a result of the aviation sector’s own activities (the so-called ‘direct’ impact) and as a result of consequential expenditure impacts for other parts of the economy (‘indirect’ and ‘induced’ impacts).
- **Chapter 3** analyses further consequential benefits of the sector for the Dubai economy, in terms of tourism benefits, benefits to productivity from enhanced ‘connectivity’ and cargo benefits.
- **Chapter 4** assesses how the above processes benefit different parts of the Dubai economy (‘diversification analysis’).
- **Chapter 5** projects the economic impact of aviation on the Dubai economy at two future dates, 2020 and 2030, on the assumption that capacity continues to grow at a sufficient pace to meet demand. It also models the losses to the Dubai economy in 2030 in the event that the growth in aviation activity was constrained by insufficient investment in new capacity after 2020.

2 The core impact of aviation on the Dubai economy

This chapter highlights the scale of the aviation sector's activities in Dubai, its contribution to GDP and the number of people it employs. It investigates the impact of the sector's procurement from its domestic supply chain and the effect of its staff spending their wages.

Key points

- In 2013, the aviation sector made a direct GVA contribution to Dubai's GDP of US$9.6 billion and employed around 120,300 people.
- To provide its services, the aviation sector in Dubai spent US$6.3 billion on inputs of goods and services from Dubai-based suppliers in other sectors.
- This procurement from local suppliers supported an estimated US$4.2 billion value added contribution to Dubai's GDP and 76,100 employment posts.
- As a result of employees in the aviation sector and its suppliers spending their aviation-derived earnings, a further induced contribution to GVA of US$2.7 billion was made, sufficient to support a further 63,000 jobs in Dubai.
- Taking the direct, indirect and induced impacts together, the aviation sector made an estimated US$16.5 billion value-added contribution to Dubai's economy, equivalent to 16.5% of Dubai's economy-wide GDP.
- The total of 259,400 Dubai-based jobs supported in 2013, would have accounted for around 13.1% of Dubai's total employment.

2.1 An introduction to economic impact analysis

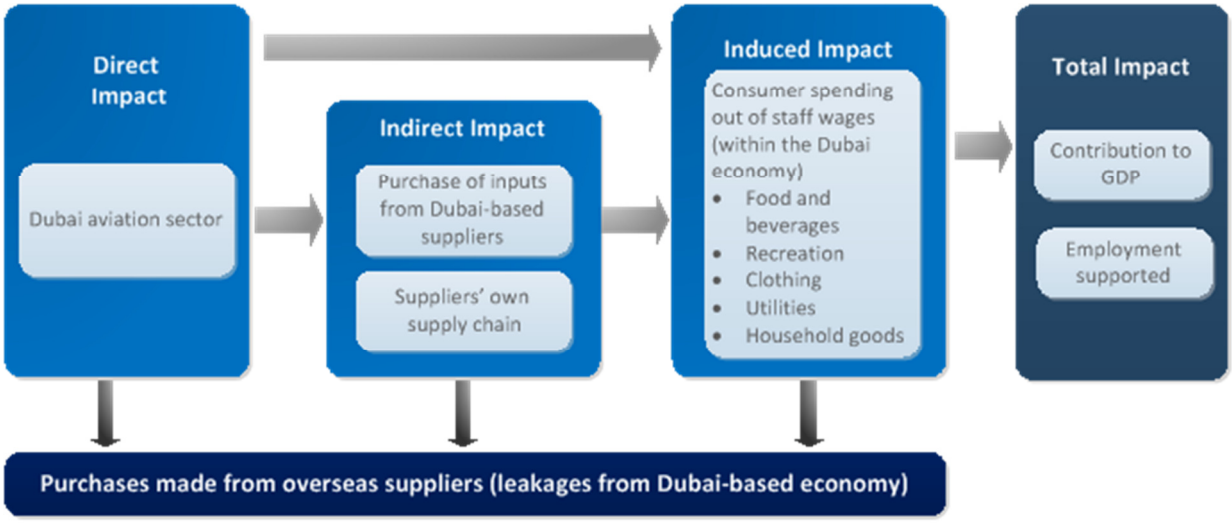
A standard economic impact assessment identifies three channels of impact that stem from an activity:

- The first channel of impact is the *direct effect*. In the case of the aviation sector in Dubai this encompasses the activity generated by its local operations.
- The second channel of impact – *indirect effect* – encapsulates the activity supported in the aviation sector's supply chain as a result of its procurement of inputs of goods and services. It should be noted that this supply chain impact, relates to current expenditures only. This channel of impact includes the supply chain behind the sector's operations in Dubai.
- The final channel captures the impact of staff employed in the aviation sector spending their wages on locally-produced goods and services, together with the spending of those working for suppliers to the aviation sector (relating to the relevant proportion of their wages). This supports activity across the spectrum of consumer goods and services, and their supply chains. This final channel of impact is known as the *induced effect*.

In accordance with standard economic impact assessments, the scale of the impact of the industry is measured using two key metrics:

- *Gross value added* – Gross value added (GVA) is the contribution an institution, company or industry makes to gross domestic product (GDP).[3] The sum of the GVA contributions of all Dubai organisations is – with minor adjustments for taxes – equal to Dubai GDP. GVA is most simply understood as turnover (i.e. value of sales) minus the cost of bought-in goods and services used up in the production process.
- *Employment* – Employment is generally measured in terms of headcount. Hours worked by 'contingent staff' however are translated into headcount based on full-time equivalence.

Figure 2.1: The channels of economic impact



2.2 Economic impact analysis of Dubai's aviation sector

Turning specifically to the economic contribution of Dubai's aviation sector, covering direct, indirect and induced impacts, Table 2.1 sets out the results of our analysis. The methodology underlying this is set out in Annex 1. For the aviation sector as a whole, only the 'net' indirect and induced impacts – i.e. the impacts on other sectors of the Dubai economy – are shown. For individual companies such as Emirates, we show both 'gross' and 'net' impacts – i.e. the values including and excluding, respectively, impacts due to purchases from other entities within the aviation sector.

2.3 Direct impacts

Table 2.1 shows how the direct contribution of the Emirates Group to the Dubai economy, amounted to US$5.4 billion in 2013, with Dubai Airports' contribution put at US$0.5 billion and the rest of the aviation sector at US$3.7 billion. The direct GVA contribution of the whole sector, of some US$9.6 billion, is equivalent to 9.6% of Dubai's total GDP (Chart 2.1). This is twice the value of mining, utilities and agriculture combined, almost twice the value of government services and approaching the value of finance activities undertaken in Dubai.

[3] GDP is the main 'summary indicator' of economic activity in the Dubai economy. References to the rate at which the Dubai economy is growing (or when it enters recession) are made using GDP.

In 2013, the Emirates Group directly employed some 60,800 individuals (including outsourced or contingent staff) in Dubai, with Dubai Airports employing 6,300 and the rest of the sector some 53,200. The sector's total direct employment of 120,300 accounted for around 6.1% of total employment in Dubai (Chart 2.2). This figure is a little higher than the combined employment of finance, government services, mining, utilities and agriculture, and more than half of the numbers employed in business services.

Table 2.1: The Dubai aviation sector's direct, indirect and induced contribution

Core impact of the aviation sector on the Dubai economy							
Gross value added, billions of US$, 2013							
	Direct	Indirect		Induced		Total contribution	
		Gross[1]	Net[1]	Gross[1]	Net[1]	Gross[1]	Net[1]
Emirates	4.8	1.4	1.0	1.2	1.1	7.4	6.8
dnata	0.6	0.2	0.1	0.2	0.2	1.0	1.0
Emirates Group	5.4	1.6	1.1	1.4	1.3	8.4	7.8
Dubai Airports	0.5	0.2	0.2	0.1	0.1	0.8	0.8
Other businesses	3.7	3.2	2.9	1.3	1.3	8.2	7.9
Total sector	**9.6**	**-**	**4.2**	**-**	**2.7**	**-**	**16.5**
Employment, thousands, 2013							
	Direct	Indirect		Induced		Total contribution	
		Gross	Net	Gross	Net	Gross	Net
Emirates	47.7	25.1	13.9	29.0	25.3	101.8	86.8
dnata	13.1	3.2	2.9	4.9	4.7	21.2	20.8
Emirates Group	60.8	28.3	16.8	33.9	30.0	123.0	107.6
Dubai Airports	6.3	3.3	3.3	3.1	3.1	12.7	12.7
Other businesses	53.2	62.3	56.0	31.5	29.9	147.0	139.1
Total sector	**120.3**	**-**	**76.1**	**-**	**63.0**	**-**	**259.4**

[1] The gross figures show the indirect and induced impacts of the individual companies. The net figures remove indirect and induced impacts relating to purchases by Emirates and other airlines from suppliers within the wider aviation sector, so that these elements are not 'double-counted' in the overall sector total.

Chart 2.1: The direct contribution to GVA of Dubai's aviation sector

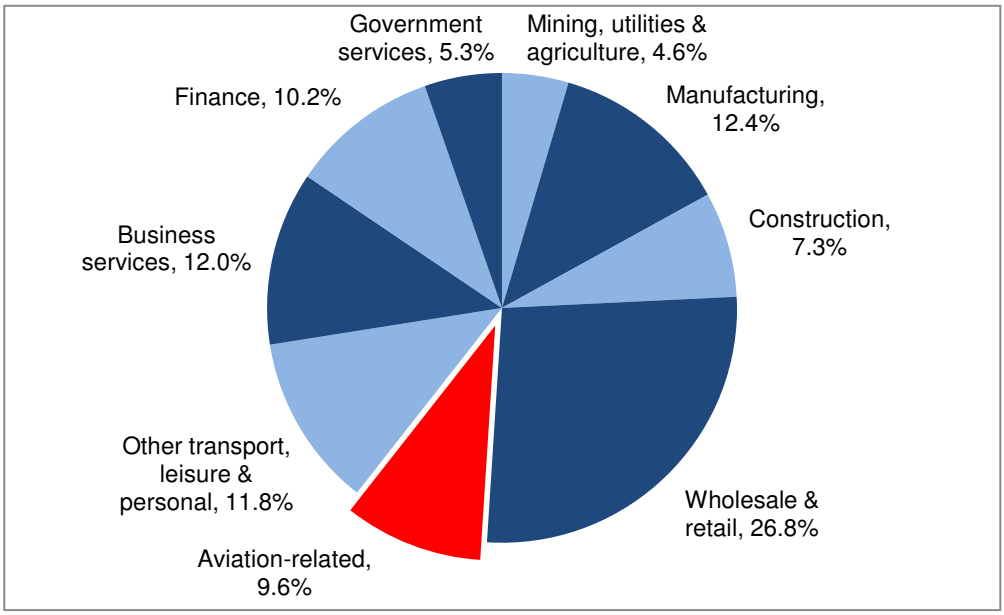
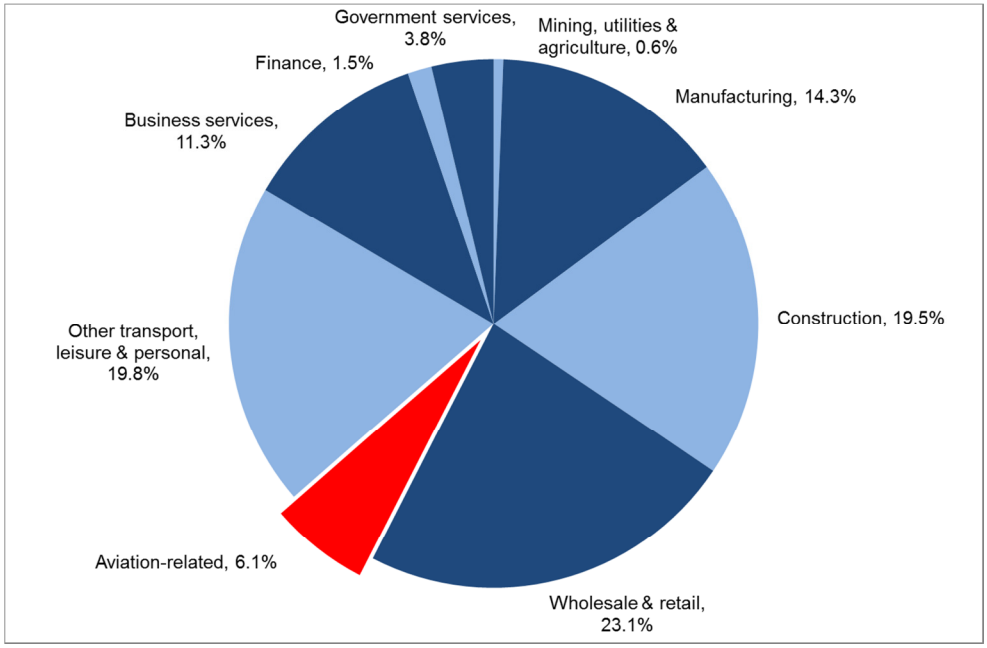


Chart 2.2: The direct contribution to employment of Dubai's aviation sector

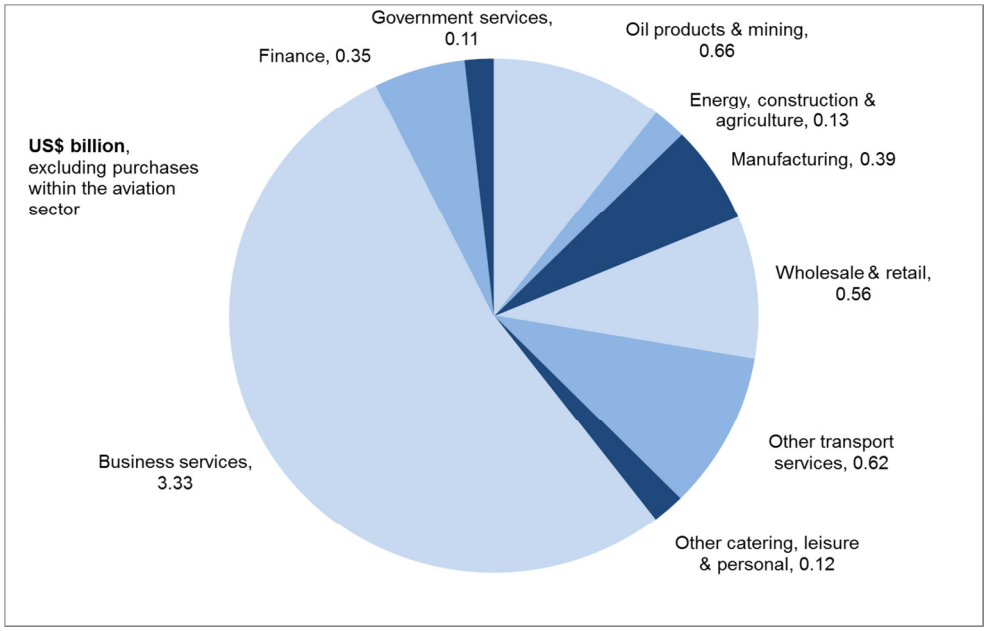


2.4 Indirect impacts

In 2013, the Emirates Group is estimated to have purchased some US$2.5 billion worth of goods and services from other Dubai-based entities, despite having to source the majority of its jet fuel from outside of Dubai.

Taking into account purchases by Dubai Airports (US$0.3 billion) and other parts of the sector (US$5 billion), and deducting the estimated purchases of Emirates Group and other airlines from other aviation sector businesses (US$0.9 billion and US$0.5 billion respectively), we calculate that the sector as a whole bought in US$6.3 billion worth of goods and services from other Dubai-based entities. These purchases were made from businesses in a range of sectors as shown in Chart 2.3.

Chart 2.3: Aviation sector purchases from other Dubai-based suppliers



The largest amount of expenditure by sector was on business services, at US$3.3 billion. This reflects a wide variety of spending by the airlines and other businesses, including office accommodation, corporate overheads such as accountancy and consultancy costs, sales and marketing and information technology services. (It should be noted here that transactions within the aviation sector as defined for the purposes of this report, such as purchases by the airlines of in-flight catering services, are excluded from the analysis.)

Of this US$6.3 billion of purchases from Dubai-based suppliers, we estimate that a further US$2 billion would have 'leaked out' of the Dubai economy due to content imported further along the supply chain, with the remainder supporting an indirect GVA contribution of US$4.2 billion. This is believed to have been sufficient to support a further 76,100 Dubai-based jobs.

Within that, net indirect GVA impacts of US$1.1 billion and US$0.2 billion were contributed by Emirates Group and Dubai Airports respectively, sufficient to support 16,800 and 3,300 indirect jobs. The 'gross' indirect GVA contribution of the Emirates Group – i.e. the value including the benefits for other parts of the aviation sector – is estimated to have been around US$1.6 billion, sufficient to support 28,300 jobs.

2.5 Induced impacts

Total employee earnings paid by the Dubai aviation sector in 2013 is estimated to have been US$4.6 billion.

As a result of employees in the sector – and those of its Dubai-based suppliers – spending their aviation-derived earnings, we estimate the sector's induced impact to have been US$2.7 billion in 2013, sufficient to support 63,000 jobs. These calculations allow for savings, imports and imported content further along the Dubai-based supply chain.

Within that the contribution of Emirates Group companies and Dubai Airports amounted to US$1.3 billion and US$0.1 billion respectively, sufficient to support 30,000 and 3,100 additional jobs. The gross induced contribution of the Emirates Group companies can be put at US$1.4 billion, supporting 33,900 induced jobs in total.

2.6 Total core economic impacts

Taking the direct, indirect and induced impacts together, and excluding impacts due to purchases within the aviation sector, the total core impact of the Emirates Group for the Dubai economy amounted to US$7.8 billion in 2013, with Dubai Airports' contribution put at US$0.8 billion and the rest of the aviation sector at US$7.9 billion. The total core contribution of the aviation sector as a whole was therefore US$16.5 billion, equivalent to 16.5% of Dubai's economy-wide GDP.

A comparison of the total impact with the direct impact reveals how, for every US$100 of value added output created within the aviation sector itself, a further US$72 of value added is created in other sectors of the Dubai economy as a result of supply chain and employee expenditure impacts.

In terms of employment, and again excluding impacts within the aviation sector, the Emirates Group supported some 107,600 jobs through the direct, indirect and induced channels, Dubai Airports 12,700 jobs and other aviation-related businesses 139,100 jobs. The overall impact of the sector on Dubai-based employment can therefore be put at around 259,400 – sufficient to account for 13.1% of employment across Dubai. This means that for every 100 jobs supported

within the aviation sector, a further 116 are supported elsewhere in Dubai due to supply chain and employee knock-on effects.

The 'catalytic' benefits discussed in the next chapter are additional to direct, indirect and induced impacts covered by this chapter.

Figure 2.2: The total core economic impact of Dubai's aviation sector in 2013

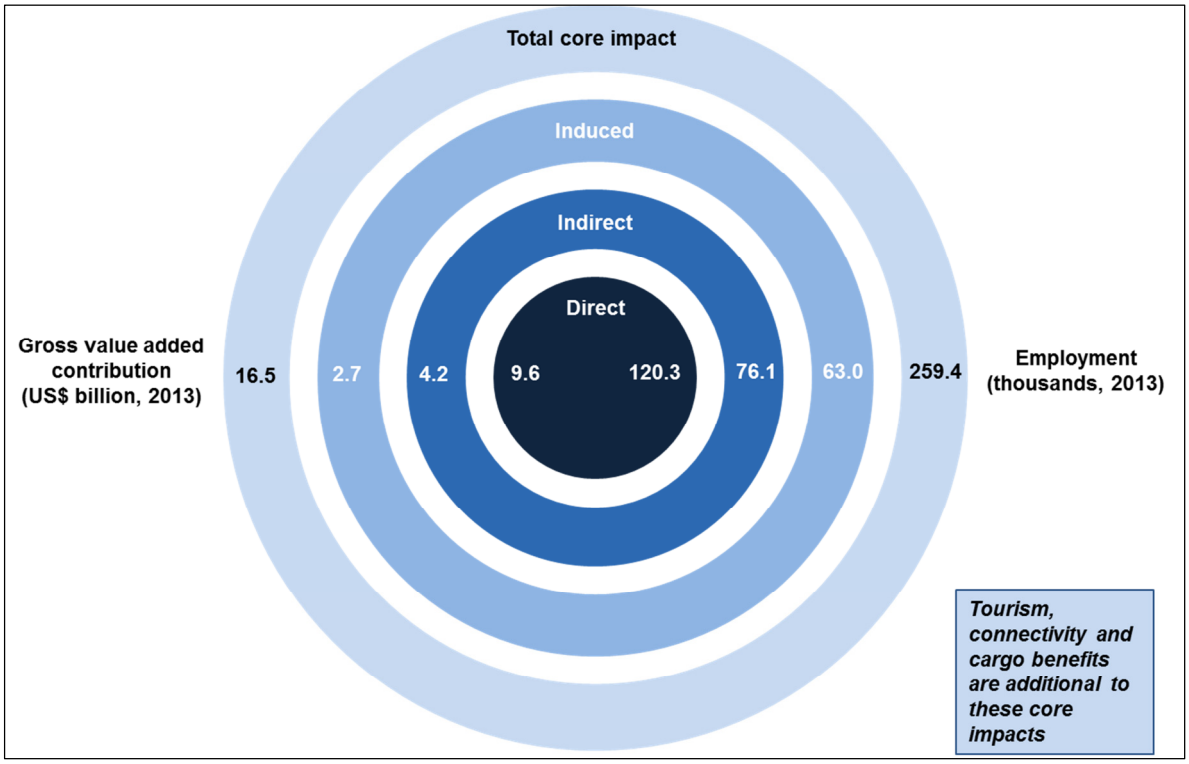
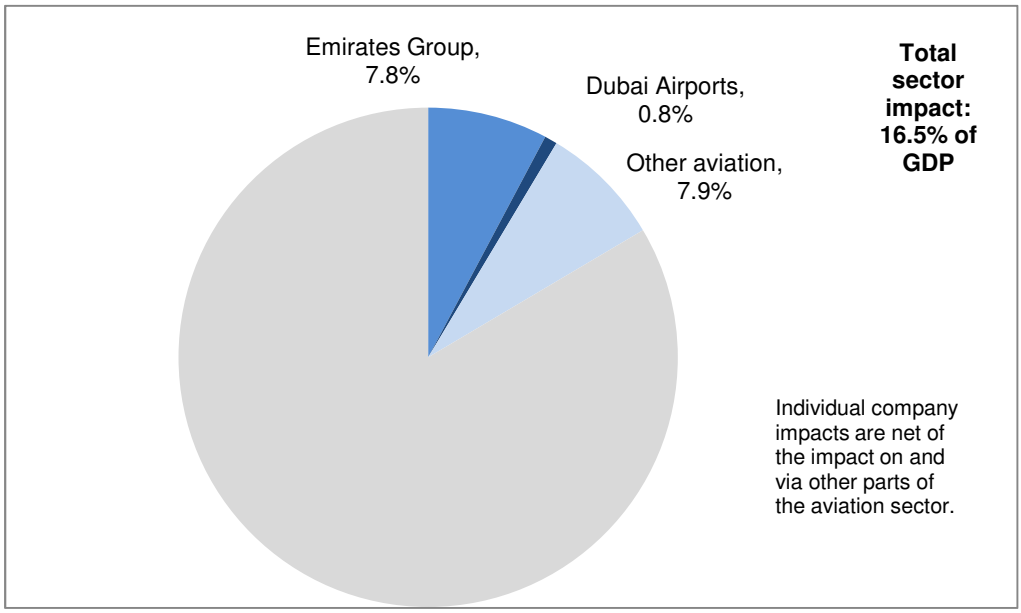


Chart 2.4: Aviation sector total GVA contribution as a share of GDP in 2013



3 'Catalytic' benefits of the aviation sector

Key points

- This chapter assesses three additional benefits of Dubai's aviation sector, namely benefits from spending in Dubai by incoming tourists, long run productivity benefits from 'connectivity', and benefits from the ability to trade goods using air cargo options.
- The contribution of aviation-related tourism to Dubai's economy was an estimated US$10.2 billion contribution to Dubai's GVA in 2013, supporting 157,100 jobs. These values are over and above the impact of tourism on and via the aviation sector, and therefore additional to the direct, indirect and induced aviation contributions set out in the previous sector.
- In 2013, Dubai had direct flight connections to 149 cities with over 1 million inhabitants. This is a potential export market of 916 million people, 13% of the world's population.
- In addition, there will be modest but positive benefits from the ability to trade internationally using air cargo options, although these cannot be quantified in this case.

3.1 Tourism impacts

Through their own operations, airlines and airports make substantial economic contributions to economic activity and employment in Dubai. However, the aviation sector's total economic impact reaches far wider. By bringing tourists and business travellers to Dubai, the aviation sector stimulates a broad array of economic activities.

Travellers arriving in the city will spend money on food, accommodation, travel, and a variety of cultural and recreational activities. The people and firms providing those services make purchases from their suppliers, supporting further economic activity. The government invests in the promotion of the tourism sector, while both public and private entities make investments to capitalise on growth in the sector. This section explores and quantifies the direct, indirect and induced impacts of travel and tourism in Dubai, as well as the wider impacts that the travel and tourism sector enable.

Twenty years ago, about 1.1 billion people worldwide travelled to a foreign country for tourism or business purposes. By 2013, that number had grown to 2.3 billion. These visitors generate substantial impacts on the economies they visit. Counting hotels, airlines, airports, travel agencies, leisure outlets and other tourism-dependent sectors, spending by foreign visitors worldwide totalled US$1.1 trillion in 2013. That is equivalent to 1.5% of the world's GDP, and the figure is expected to grow to US$1.6 trillion by 2020.

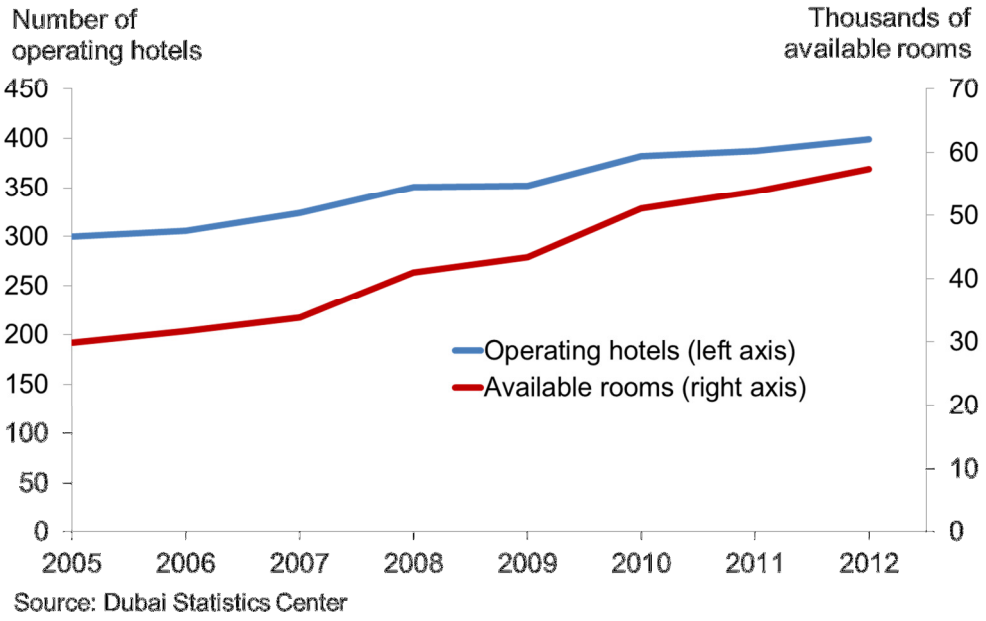
This has substantial direct economic benefits, and the wider impacts are larger still. Including domestic tourism spending, investment spending, government spending to promote and facilitate tourism, and the tourism and travel sector's supply chain impacts, domestic and international travel and tourism is estimated to have contributed US$6.9 trillion to world GDP in 2013 (9.5% of the total). This economic activity is estimated to have supported 266 million people in employment (8.9% of the global total).

Dubai is a popular destination for foreign visitors. In 2013, the city welcomed nearly 10 million non-United Arab Emirates (UAE) visitors[4]. That is 0.4% of all international visitor arrivals worldwide[5] – compared with Dubai's 0.03% share of the global resident population – and an increase of more than 230% since 2000.

Dubai attracts the majority of visitors to the UAE. According to the UN World Tourism Organization (UNWTO), 16.4 million foreign visitors arrived in the UAE in 2013, and 61% of those travelled either solely to Dubai or travelled to Dubai as part of their trip to the UAE. Another one million visitors travelled to Dubai from elsewhere in the UAE[6].

Dubai's success as a destination for foreign visitors may be due, in part, to the city's public and private efforts to invest in its aviation and tourism infrastructure. Between 2005 and 2012, the number of operating hotels in Dubai increased by a third, from 300 to nearly 400 (Chart 3.1). The number of rooms available to hire rose by 92% over the same period, to more than 57,000. Hoteliers have been rewarded with a doubling of revenues: in 2012, hotels and hotel apartment operators reported US$4.4 billion in revenues, up from US$2.2 billion in 2005.

Chart 3.1: Number of operating hotels and available rooms in Dubai, 2005-2012



These and other efforts may have encouraged the World Economic Forum to recently rank the UAE 28th out of 140 countries in a report on travel and tourism competitiveness[7]. That places the UAE below countries such as France, Iceland, and Singapore, but above popular destinations such as Thailand and Mexico as well as its neighbours Bahrain, Oman and Qatar.

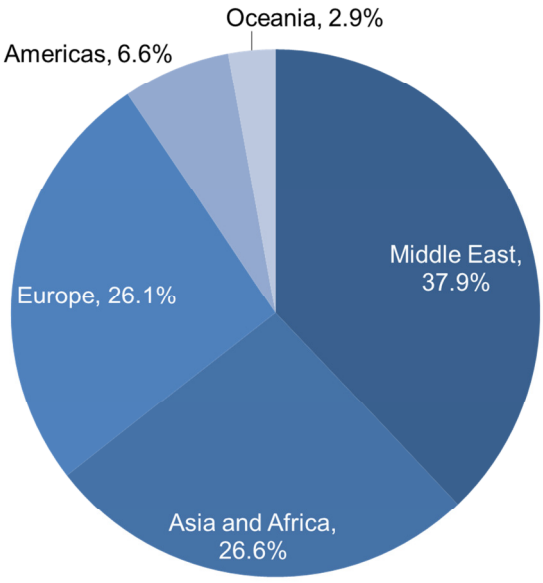
[4] Dubai Department of Tourism & Commerce Marketing via Dubai Statistics Center.

[5] Based on total world arrivals of overseas visitors as recorded in Oxford Economics' Tourism Decision Metrics database, derived in turn from UN World Tourism Organization and national data.

[6] Dubai Department of Tourism & Commerce Marketing, via Dubai Statistics Center.

[7] World Economic Forum, (2013), 'The Travel and Tourism Competitiveness Report 2013: Reducing Barriers to Economic Growth and Job Creation'.

Chart 3.2: Foreign visitors to Dubai by origin in 2013



Source: Dubai Statistics Center

Travellers from around the world have taken note of Dubai's attractiveness. Dubai's tourist and business travellers are a diverse group. Some 9% of Dubai's 2013 visitors came from elsewhere in the UAE, and a further 29% from other Middle Eastern countries. Visitors from Europe accounted for 26% of the total, visitors from Asia and Africa for 27%, and those from the Americas and Oceania for 10%.

The high volume of visitors to Dubai has made Dubai International one of the ten busiest airports in the world (Chart 3.3). Over 66 million people got on or off a plane at Dubai International in 2013. That is more than for France's Paris Charles de Gaulle (62 million), the United States' Dallas/Fort Worth International Airport (60 million), and Indonesia's Jakarta Soekarno–Hatta International (60 million)[8].

In 2013, nearly 10 million visitors travelled to Dubai from outside of the UAE, including those travelling for leisure as well as for business purposes. A further one million citizens and residents of the UAE travelled to Dubai. Each visitor stayed for an average of 3.8 nights[9]. That is substantially higher than the UAE average of 3.1 nights per visitor[10].

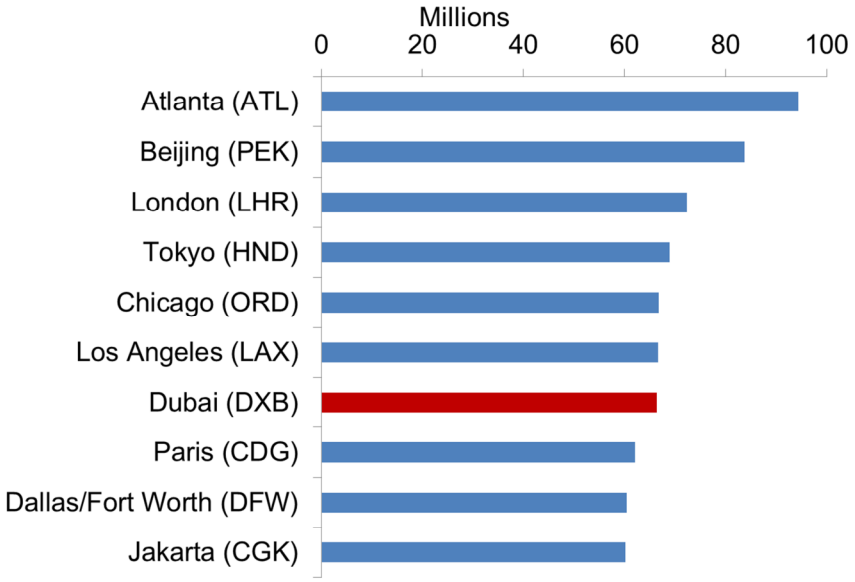
Non-UAE visitors spent an estimated US$13 billion in Dubai's economy in 2013. That is 1% of foreign visitor spend globally during the year.

[8] Airports Council International.

[9] Dubai Department of Tourism & Commerce Marketing via Dubai Statistics Center.

[10] UNWTO (2014).

Chart 3.3: Ten busiest airports in the World in 2013

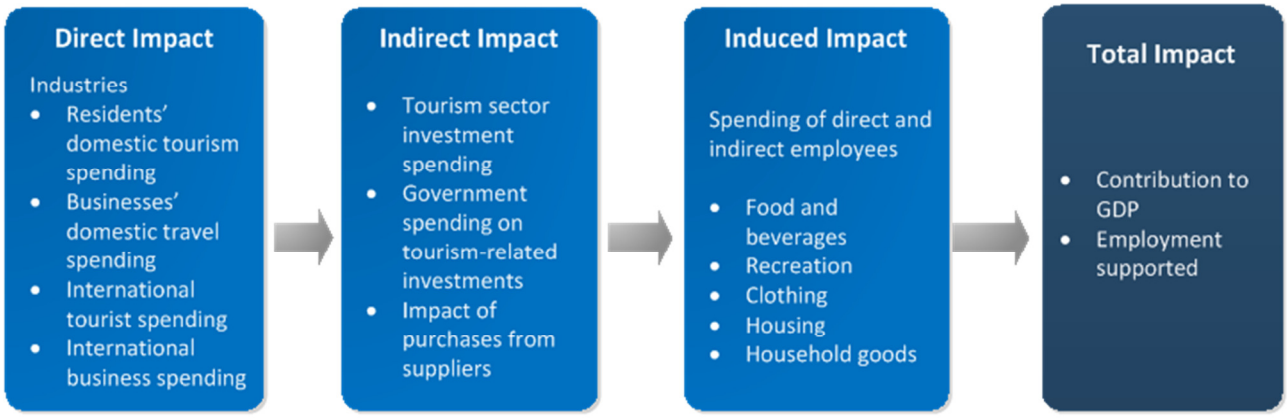


Source: Airports Council International (2014)

By spending money in the local economy, foreign and domestic visitors will drive business at restaurants, hotels, travel agencies, travel providers, and a variety of leisure outlets. This spending generates revenues, value added contributions to GDP and employment in businesses that cater to these visitors (Figure 3.1).

In 2013, the direct GVA impact of spending by visitors, both domestic and foreign is estimated to be US$4.5 billion, excluding the GVA created as a result of purchases from the aviation sector (and so already captured in the direct, indirect and induced benefits of that sector as set out in chapter 2). In order to deliver these goods and services, the firms directly catering to these visitors employed 99,400 people.

Figure 3.1: Channels of tourism's economic impact



The people and firms that cater to visitors purchase inputs of goods and services from their suppliers. They also pay their staff wages (as do those in the sector's supply chain). The impact of spending with suppliers and the impact of staff spending their wages in Dubai's economy make up the indirect and induced impacts (Figure 3.1). In 2013, Oxford Economics estimated

that US$5.7 billion in GVA was supported through these two channels. At the same time, these two channels supported an estimated 57,700 people in employment.

Therefore, through its direct, indirect and induced impacts, tourism generated an estimated US$10.2 billion contribution to Dubai's GVA in 2013, over and above the impact on the aviation sector, sufficient to support some 157,100 jobs.

Table 3.1: Aviation-related tourism benefits in 2013

Tourism benefits in 2013				
	GVA (US$ billion)[1]	***As % of Dubai GDP***	**Employment (thousands)[1]**	***As % of Dubai employment***
Direct tourism impact	4.5	*4.5%*	99.4	*5.0%*
Indirect and induced tourism impacts	5.7	*5.7%*	57.7	*2.9%*
Total tourism impact	**10.2**	***10.2%***	**157.1**	***7.9%***

[1] Excluding the impact of tourism on and via the aviation sector (e.g. due to payment of air fares), as these amounts are already captured in the direct, indirect and induced impact of the aviation sector set out in chapter 2.

3.2 Productivity enhancement due to global connectivity

Improvements in connectivity that direct flights provide, contribute to the economic performance of the wider economy through enhancing its overall level of productivity. This comes through two main channels: through the effects on domestic firms of increased access to foreign markets and increased foreign competition in the home market, and through the less restricted movement of investment capital and workers between countries.

Improved connectivity gives Dubai-based businesses greater access to foreign markets, encouraging exports, and at the same time increases competition and choice in the home market from foreign-based producers. In this way, improved connectivity encourages firms to specialise in areas where they possess a comparative advantage. Where firms enjoy a comparative advantage, international trade provides the opportunity to better exploit economies of scale, driving down their costs and prices and thereby benefiting domestic consumers in the process. Opening domestic markets to foreign competitors can also be an important driver behind reducing unit production costs, either by forcing domestic firms to adopt best international practices in production and management methods or by encouraging innovation. Competition can also benefit domestic customers by reducing the mark-up over cost that firms charge their customers, especially where domestic firms have enjoyed some shelter from competition.

Improved connectivity can also enhance an economy's performance by making it easier for firms to invest outside their home country, which is known as foreign direct investment (FDI). Most obviously, the link between connectivity and FDI may come about because foreign investment necessarily entails some movement of staff. Increased connectivity also allows firms to exploit the speed and reliability of air transport to ship components between plants in distant locations, without the need to hold expensive stocks of inventory as a buffer. Less tangible, but possibly just as important, improved connectivity may favour inward investment as increased passenger traffic and trade that accompanies improved connectivity can lead to a more favourable environment for foreign firms to operate in.

One way of analysing Dubai's air connectivity, is to look at the number of direct flight connections it has specifically with major cities. This may be more indicative than the total number of flight connections to all locations, as large cities will have greater numbers of both potential customers and potential skilled migrant labour. They will also be the location of key individuals making decisions about foreign direct investment. By contrast, flights to some holiday destinations may offer fewer opportunities to develop the longer run productive potential of the economy.

Dubai has its greatest connectivity with the world's largest cities. In 2013, there were direct passenger flights to 25 or 81% of total cities with over 10 million people (Table 3.2). These were inhabited by 0.5 billion people, or 7% of the world's total population. There were also direct connections to 25 cities or 57% of cities with over 5 million but less than 10 million residents. This offered exporters in Dubai access to a further 175 million potential customers. The share of cities with which Dubai has direct flight connections to is positively related to a city's size.

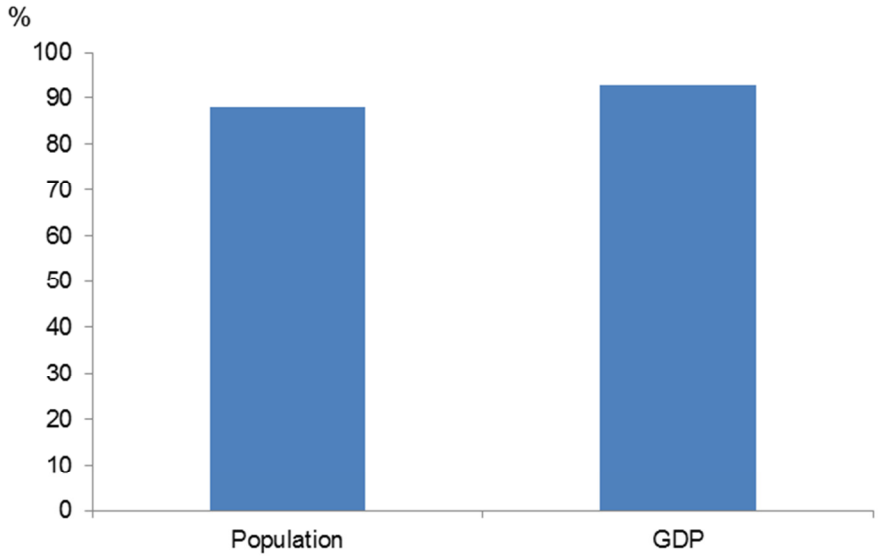
In 2013, Dubai had direct passenger flight connections to 149 cities with over 1 million inhabitants. This is a potential export market of 916 million people, 13% of the world's population.

Table 3.2: Dubai's air connections to large cities around the world in 2013

Dubai's air connections					
City size (by number of inhabitants)	**Number of direct connections to Dubai**	**% of total cities of that size**	**Number of people with a direct connection (millions)**	**Passenger flights (millions)**	**Share of total passenger flights**
Cities over 10 million inhabitants	25	80.6%	502.0	19.5	29.3%
Cities between 5 to 9.9 million	25	56.8%	174.6	10.9	16.4%
Cities between 2.5 to 4.9 million	42	35.0%	149.5	12.8	19.2%
Cities between 1 to 2.4 million	57	16.9%	89.7	12.8	19.3%
All cities over 1 million inhabitants	149	28.0%	915.8	56.0	84.2%
Source: Dubai Airports, Oxford Economics					

If the analysis is undertaken at the country level, 66.5 million passengers travelled to or from Dubai by air on direct flights to or from 98 countries in 2013. The countries with which Dubai had direct air connections had 88% of the world's population and produced 93% of world output in 2013 (Chart 3.4).

Chart 3.4: Share of world population and GDP accounted for by the countries which had direct passenger flight connections with Dubai in 2013



Dubai has greater air connectivity with countries that produce the most output and have the highest populations. Chart 3.5 and 3.6 show the share of countries with which Dubai has a direct flight connection when the countries are ranked (in tens) by size of GDP and population in 2013, respectively. Broadly speaking the percentage of countries with direct flight connections is highest for the largest countries (on the right hand side of both charts) and declines as the scale falls.

Chart 3.5: Share of countries ranked by GDP which had direct passenger flight connections with Dubai in 2013

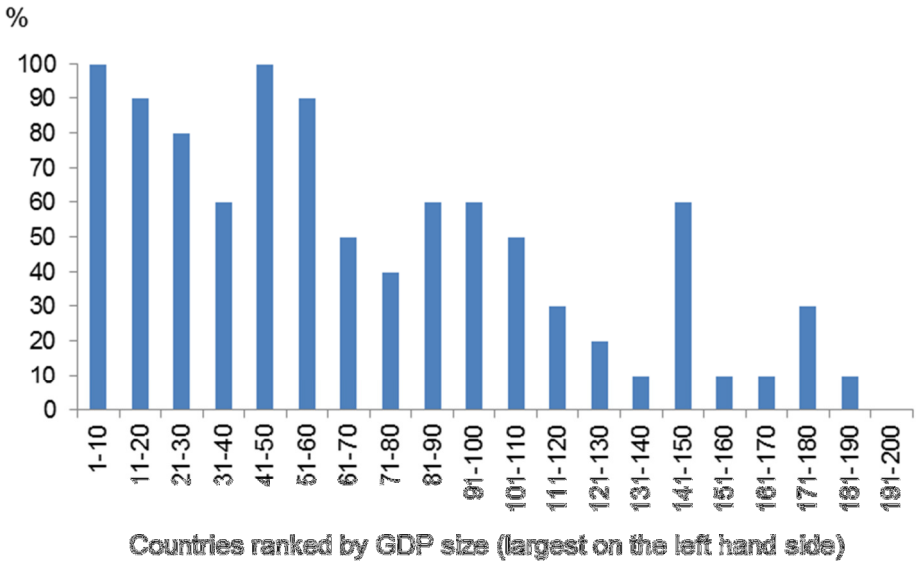
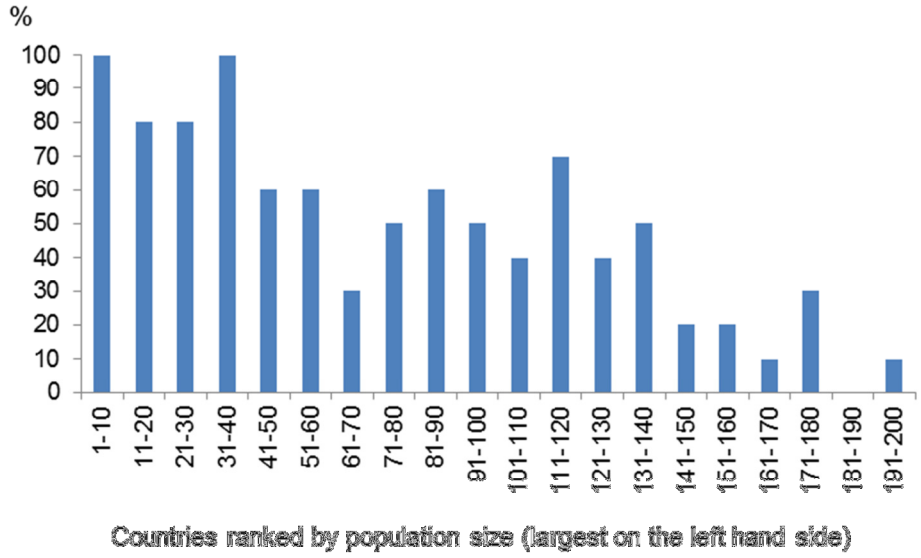


Chart 3.6: Share of countries ranked by population size which had direct passenger flight connections with Dubai in 2013



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

The precise nature of the relationship between connectivity and economic benefits may also be complex. It is not known whether the relationship is:

- Linear – as connectivity increases the level of economic benefit delivered increases proportionately;
- Diminishing Returns – initial small increases in connectivity result in large increases in economic benefit but as the absolute level of connectivity grows, the increase in economic benefit associated with a unit increase in connectivity falls;
- Tipping Point – again this could be either positive or negative. Is there a point before which the level of connectivity is irrelevant - little or no benefit is delivered but beyond which there are significant benefits?

Given all these complexities, it is perhaps unsurprising the studies that investigate it, come up with a wide range of estimates. For example, one finds that a 10% increase in connectivity (relative to GDP), will raise the level of productivity in the economy by a little under 0.5% in the long run, with there being a fair degree of uncertainty around this average estimate.[11] A much wider 2006 study, based on a cross-country statistical analysis of connectivity and productivity,

[11] Oxford Economics, (2013), 'Impacts on the UK economy through the provision of international connectivity'.

derived a lower estimate of 0.07% for the elasticity between connectivity and long-run productivity.[12]

It should also be noted that most of the existing studies tend to focus on Europe and North America.

3.3 Cargo benefits

Air transport facilitates trade in certain types of products that would otherwise not be traded, thereby generating additional value added for some sectors of an economy, to their suppliers and to suppliers of goods and services to their employees. These benefits are difficult to quantify, given the available cargo data (which mainly relate to tonnage and tonnage-miles rather than values), and will be modest in comparison to the tourism and connectivity benefits discussed above. But they are undoubtedly positive so we give a brief overview here.

In 2013, a total of 2.65 million tonnes of cargo was handled at Dubai's two airports. That compares with a global total of tonnage transported by air (as cited by Boeing[13]) of some 42 million – meaning that Dubai-based airlines account for approaching 6.3% of the global total. Data from Dubai Airports also show a growth rate for tonnage handled of 10.3% per annum over the past four years, which compares to growth in the global volume of all international trade (i.e. the inflation-adjusted total value) of 6.4% per annum. Over the whole period 1990-2013, air cargo tonnage handled in Dubai has grown by an average of 13.5% per annum, compared with the growth rate for total global trade volumes of 5.6% per year.

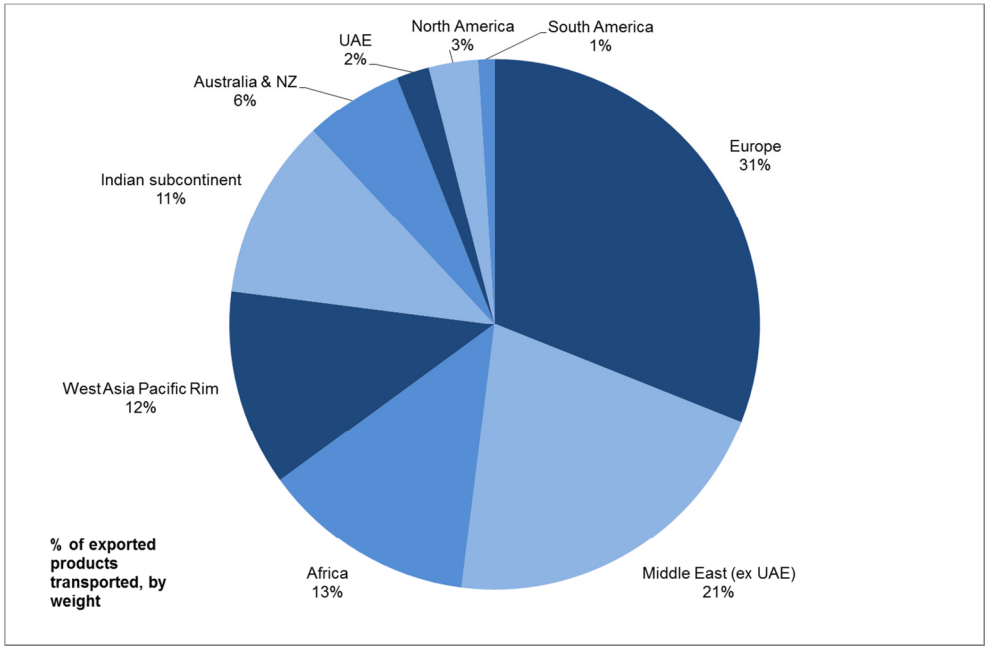
Looking at Emirates SkyCargo in particular, in relation to cargo handling in Dubai only:

- The total movement comprised 1.13 million tonnes of discharged products and 1 million tonnes of uplifted products.
- Products were exported across the globe, with 77% by weight going to destinations outside of the Middle East (Chart 3.7).
- Imported products were similarly varied in terms of their region of origin.
- The value of exports handled increased from US$96 million in 2011 to US$218 million in 2012 and US$243 million in 2013 – an average annual growth rate of 11.5% in money terms. The corresponding value of imports grew by 7.5% per year to reach US$404 million.

[12] IATA (2007), 'Measuring the economic rate of return on investment in the aviation industry', IATA Economics Briefing No. 8, July.

[13] Boeing, *World Air Cargo Forecast 2014-15*.

Chart 3.7: Destination of exported products transported by SkyCargo



Looking at dnata's cargo operations meanwhile, also relating to Dubai-based activity only:

- Imports accounted for 51% of tonnage handled, exports for 34% and goods in transit for 15%.
- The top destination country by tonnage was Afghanistan, followed by China, Egypt, Netherlands, UK, Germany, Ethiopia, Saudi Arabia, Iraq, India and Iran.
- Some 24% of total tonnage handled was perishable – i.e. of the kind that it would be much more difficult to trade (other than with neighbouring countries) in the absence of the air cargo option.

4 Diversification analysis

Key points

- Economies can benefit from having a diverse industrial structure, rather than being dependent on only a few key commodities and/or industries, as it makes them less vulnerable to costly economic 'shocks'.
- The presence of an aviation sector has bolstered the degree of diversification in the Dubai economy, both through the direct creation of varied employment roles within the broadly-defined sector, and by creating demand in the varied supply chain.
- In the absence of an aviation presence, the economy would obviously be more dependent on the remaining non-aviation sectors in aggregate. But within that, relative dependence would also be different, reflecting aviation's supply chain linkages. In the absence of aviation, there would be a greater relative reliance on manufacturing, construction, wholesale and retail and a reduced role for varied business services.
- In addition, reflecting the associated loss of tourist expenditure, the contribution of the hotels and catering sector to the economy would be diminished.

The economy of a country dependent on only a few industries to provide most of its GDP and employment, is exposed to somewhat greater risks and volatility than one which is well diversified. This is because most industries are subject to shocks which only affect that industry (for example, a technological change which renders existing production processes obsolete). These may occur on the demand or supply side and be positive and negative. But when a shock occurs, it is liable to affect turnover, output and employment in that industry. If the economy is heavily dependent on a single sector, the shock will feed through to national GDP and employment.[14]

An economy which is well diversified across the industrial spectrum will, by contrast, be less volatile and faces a lower downside risk. This is because shocks which hit individual industries are likely to be uncorrelated with each other. So while one industry sector may be hit by an adverse shock, another may be hit by a positive one. Alternatively, the other industries will continue to grow or decline at trend, muting the impact on economy-wide GDP or employment.

When an economy enters a recession or overheats, this has economic and social costs. In the case of a recession, these are reduced output, unemployment and lower income growth. In the case of overheating, these are inflation, shortages and balance of payments problems. As a more diversified economy has lower exposure to both sets of costs than a highly concentrated one, greater diversification is generally perceived to be beneficial.

The desirability of diversification increases if the costs of production do not vary with specialisation. This may occur if there are economies of scale or firms in the same industry benefit from 'clustering' together.

In this chapter, we therefore highlight how the aviation sector has benefitted – and will continue to benefit – Dubai by enhancing the degree of diversification in the economy.

[14] Diversity will also mitigate any marked seasonality in output and employment, if the industry in which an area or country is specialised in is seasonal.

Chapter 3 highlighted the direct contribution of the sector to GDP and jobs (Charts 2.1 and 2.2), as well as the way in which the sector purchases goods and services from a wide range of other businesses in Dubai (Chart 2.3). Combining these two influences and focusing on employment, Chart 4.1 shows the number of jobs dependent either directly or indirectly on the sector's presence in Dubai[15].

Within the aviation sector (as defined for the purposes of this report), core airline operations provide the bulk of direct jobs, but significant numbers are also employed both in support services of the kind usually also classified to the 'transport services' sector and in other activities including on-board catering and airport retail. At the same time, a significant number of jobs are also supported in the Dubai-based supply chain including:

- 47,900 in business services, of diverse kinds including legal, accountancy and consultancy-type work, provision of office accommodation and leasing of equipment, and information technology services.
- 10,500 in wholesale and retail (excluding airport retailing), 5,900 in non-aviation transport services, 3,400 in manufacturing and 2,000 in construction.

Chart 4.1: Dubai jobs in the aviation sector and its supply chain

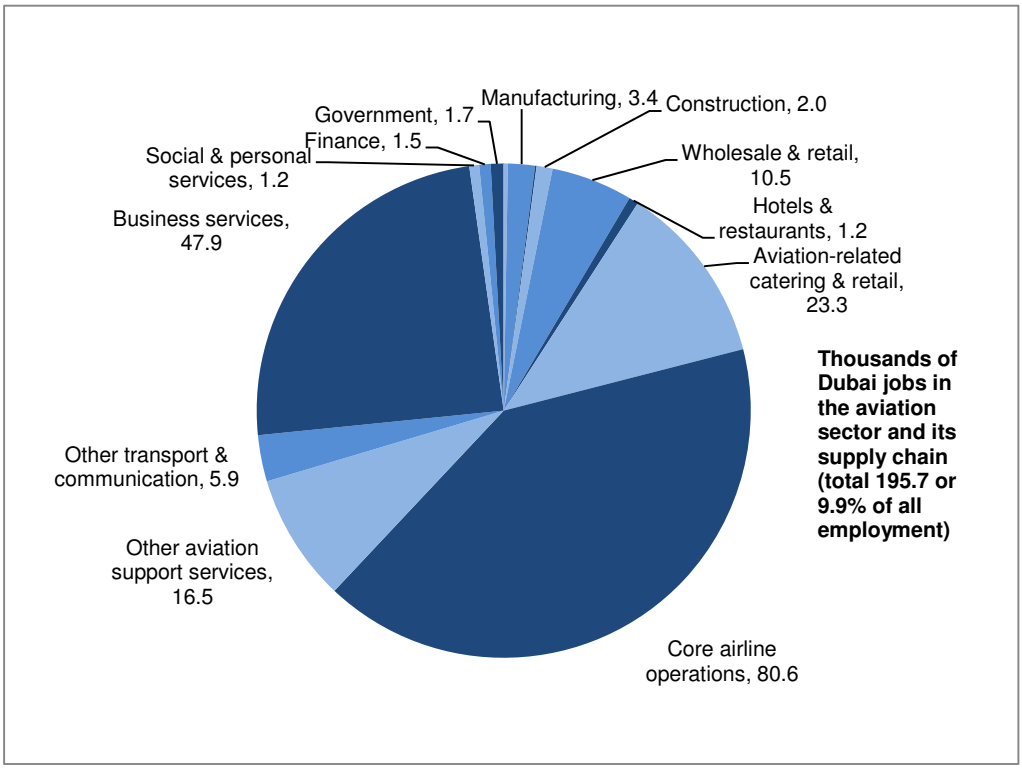


Table 4.1 meanwhile shows the composition of the Dubai-based workforce including and excluding these aviation-related jobs.

[15] These numbers cover direct and indirect employment only, excluding induced impacts and excluding catalytic impacts such as tourism benefits.

In the absence of any aviation sector presence, dependence of the economy on the remaining sectors – as measured by the proportion of total employment – would obviously increase. But the composition of employment would change over and above those effects, as a result of aviation's reach into key supplier sectors. Consequently, dependence on business services – a sector where productivity is above the national average – would also be lower in the absence of an aviation presence. Dependence on construction, wholesale and retail and manufacturing in particular would by contrast be noticeably higher.

Table 4.1: Jobs composition with and without an aviation presence

The composition of Dubai-based jobs with and without an aviation presence			
% of workforce	**Actual**	**No aviation**	**Difference**
Agriculture	0.1%	0.1%	0.0%
Mining	0.1%	0.1%	0.0%
Manufacturing	14.3%	15.7%	1.4%
Energy supply & water	0.4%	0.4%	0.0%
Construction	19.5%	21.6%	2.1%
Wholesale & retail	22.8%	24.7%	1.9%
Hotels & restaurants	4.2%	4.6%	0.4%
Aviation-related catering & retail	1.2%	0.0%	-1.2%
Core airline operations	4.1%	0.0%	-4.1%
Other aviation support services	0.8%	0.0%	-0.8%
Other transport & communication	8.4%	9.0%	0.6%
Business services	11.3%	9.9%	-1.4%
Social & personal services	2.9%	3.2%	0.3%
Finance	1.5%	1.5%	0.0%
Government	3.8%	4.1%	0.3%
Domestic service	4.6%	5.1%	0.5%

If anything, this analysis will understate the importance of aviation by excluding the impact of aviation-related tourist expenditure. This will obviously benefit employment in the hotels and restaurants sector disproportionately, and in the absence of aviation the share of whole economy employment supported by these activities would be reduced too, resulting in an even higher reliance on wholesale and retail, manufacturing and construction.

5 The potential impact of aviation in 2020 and 2030

In this chapter, we set out our estimates of the sector's expected contribution to the Dubai economy in 2020 and 2030, taking into account both potential demand growth and existing plans to expand capacity in order to meet growing demand.

Key points

- Between now and 2020 the contribution of the aviation sector to Dubai's economy is expected to grow at a faster rate than the economy as a whole, on the back of strong growth in international air passenger traffic and cargo, taking into account the ongoing expansion in airport and airline capacity.
- In 2020, the direct contribution of the sector is expected to be US$18.2 billion, equivalent to 12.9% of economy-wide GDP, with the total core contribution reaching US$31.4 billion, or 22.2% of the total. This is expected to support 208,500 jobs directly and 449,500 jobs in total – some 17.6% of all projected employment in Dubai.
- Beyond 2020, the demand for aviation services in the region is expected to continue to grow at a robust pace. On the assumption that the Dubai aviation sector's capacity continues to expand in order to accommodate demand, we would expect its direct contribution to reach US$28.2 billion in 2030, or 14.3% of Dubai's GDP, with the total core contribution put at US$48.6 billion, or 24.7% of the total. This would support 308,000 jobs directly and 664,100 jobs in total – some 19.5% of all projected employment in Dubai.
- Additional tourism benefits to Dubai are expected to rise to US$21.7 billion by 2020 and to US$39.5 billion by 2030 (at 2013 prices), with associated employment of 305,000 and eventually 530,600.
- However, with no further expansion in airport capacity beyond the existing plans (which run to 2020), the rate of growth would, on the basis of reasonable assumptions, be significantly lower than otherwise from 2021 onwards. In that event, in 2030 the combined value of the direct, indirect, induced and tourism benefits of the aviation sector would come in some 13% lower than expected on the unconstrained scenario, with an associated jobs shortfall of 159,600 – equivalent to 4.7% of projected economy-wide employment in that year.

5.1 The present expansion in airport and airline capacity

In recent years, Dubai's aviation sector has expanded at a very robust rate, with for example total air passenger flows at Dubai International growing by 12.2% between 2008 and 2013. This has only been possible as a result of a significant expansion in airport and airline capacity to meet the growth in demand, and Dubai Airports' strategic plan,[16] highlights actions by the airport and airlines to accommodate further significant growth between now and 2020.

At the time of its publication in 2010, the plan highlighted that:

- Emirates then had 200 aircraft on order and flydubai 34 aircraft.

[16] Dubai Airports, *Connecting the world today & tomorrow, Strategic Plan 2020*.

- The 2010 opening of Al Maktoum International at Dubai World Central (DWC) and its subsequent and ongoing expansion would add significantly to cargo handling capacity.
- The planned expansion of airspace, airfield, stands and terminal area at Dubai International allowed for a 60% increase in the number of aircraft stands by 2015, the creation of 675,000 square metres of additional passenger facility floor space, planned capacity for 90 million passengers per year by 2018, and planned additional cargo processing capacity of some 30,000 square metres.
- Dubai International was then expecting, and preparing to receive, 98.5 million passengers in 2020 – up from 47.2 million in 2010.

Since then Dubai has secured the right to host the 2020 universal exposition – Expo 2020, 'Connecting Minds, Creating the Future' – and has announced a US$32 billion expansion project for DWC currently projected to be delivered in the early part of the next decade. Taking these and other developments into account, Dubai Airports now expects passenger movements to grow to 126.5 million in 2020 and 195.8 million in 2030.

5.2 Projected core economic impact with ongoing capacity expansion

Table 5.1 shows Oxford Economics projections for the sector's core economic contribution in 2020 and 2030, based on the assumption that the above passenger growth projections are met and that the overall GVA contribution of the aviation sector grows in tandem with that. The justification for accepting these projections as reasonable is set out in Annex 2. However, the ability to achieve these targets will depend on continued expansion in capacity beyond 2020, and in Section 5.4 further below, we examine an alternative scenario in which capacity ceases to expand at that point.

Table 5.1: Direct, indirect and induced impacts in the future with capacity expansion

Dubai aviation sector core contribution in the future			
	2013	**2020**	**2030**
Direct impact			
GVA (US$ billion at 2013 prices[1])	9.6	18.2	28.2
As % economy-wide GDP	*9.6*	*12.9*	*14.3*
Employment (thousands)	120.3	208.5	308.0
As % economy-wide employment	*6.1*	*8.2*	*9.1*
Total direct, indirect and induced impact			
GVA (US$ billion at 2013 prices)	16.5	31.4	48.6
As % economy-wide GDP	*16.5*	*22.2*	*24.7*
Employment (thousands)	259.4	449.5	664.1
As % economy-wide employment	*13.1*	*17.6*	*19.5*

[1] At constant 2013 prices and using the average 2013 exchange rate.

By 2020, the direct GVA contribution is expected to reach US$18.2 billion, equivalent to 12.9% of Dubai's projected GDP in that year. This would be sufficient to support approximately 208,500 jobs, or 8.2% of Dubai's total employment.

With the indirect and induced impacts also increasing over the seven-year period, the total core GVA impact is expected to reach US$31.4 billion in 2020, equivalent to 22.2% of projected total GDP in Dubai. That is expected to be sufficient to support 449,500 jobs, or 17.6% of Dubai employment.

Looking further ahead, by 2030 the direct GVA contribution would reach US$28.2 billion, worth some 14.3% of forecast economy-wide GDP, subject to capacity being sufficient to

accommodate demand growth. This would support around 308,000 jobs, or 9.1% of total employment in Dubai.

Chart 5.1: Potential core contribution to Dubai's GVA in 2020 and 2030

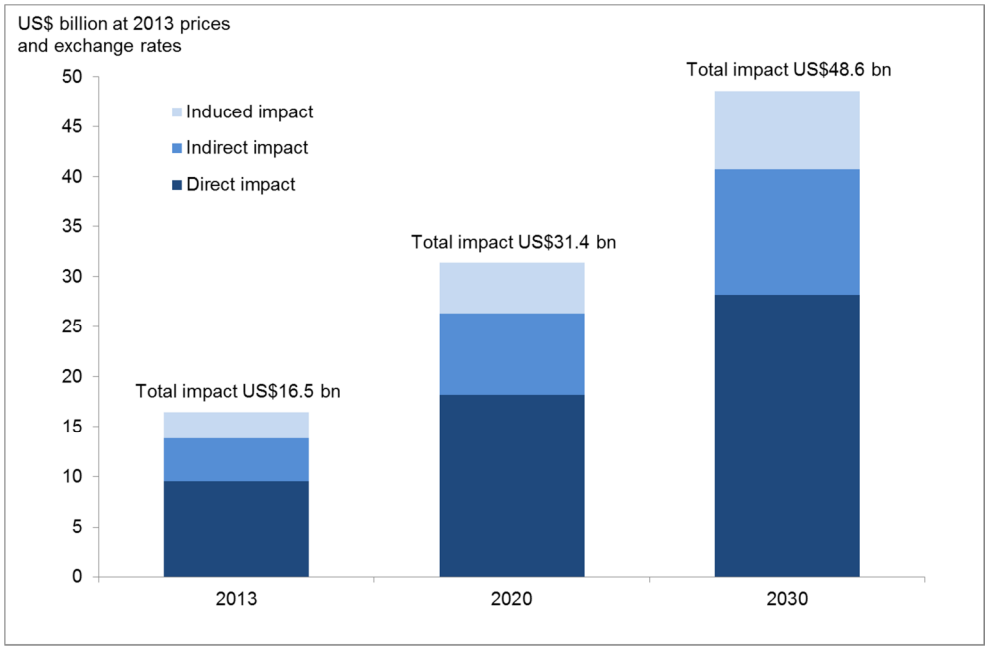
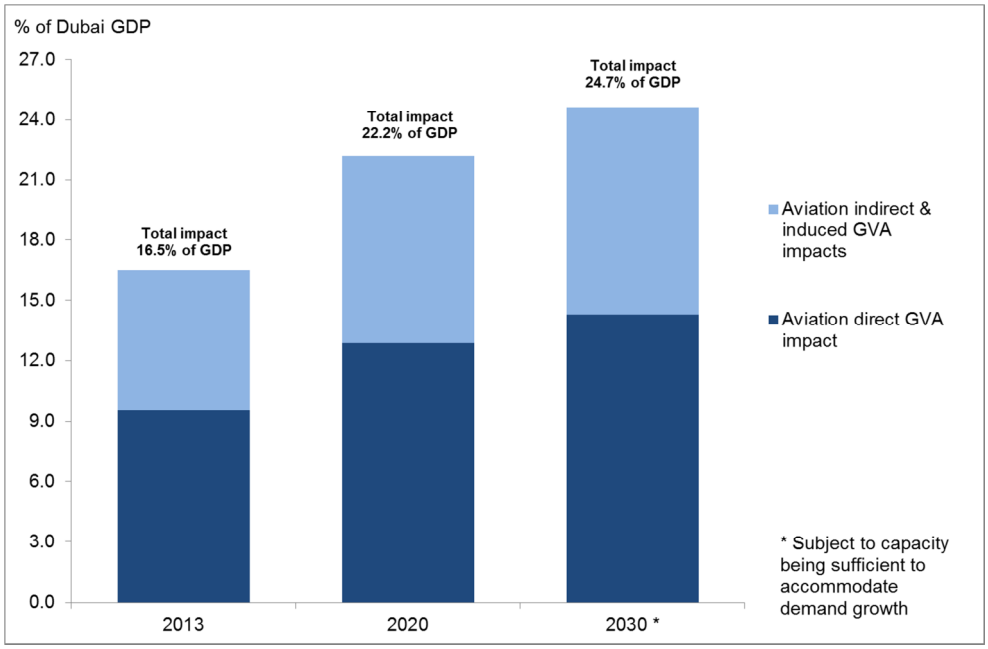


Chart 5.2: Potential core economic contribution relative to projected GDP

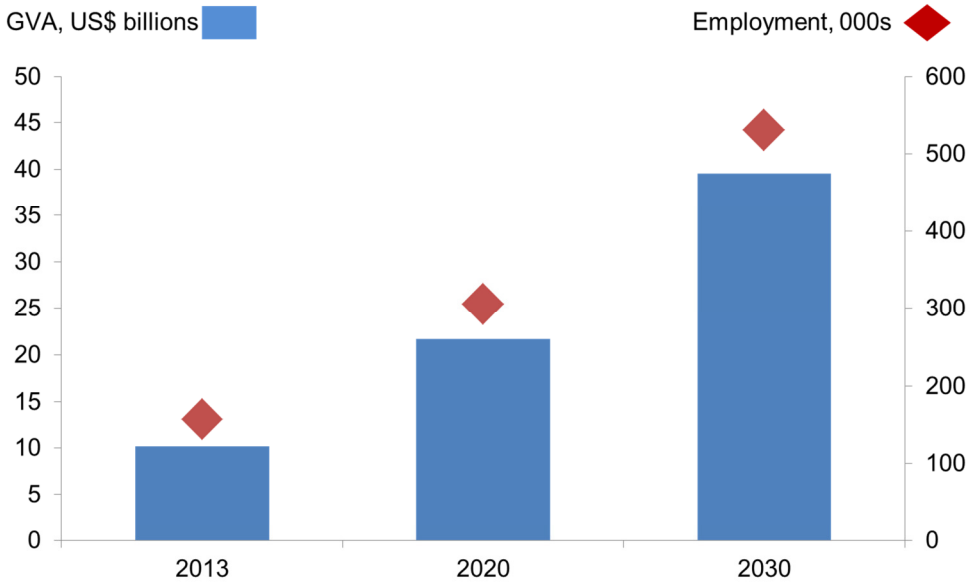


Taking growth in the indirect and induced impacts into account as well, the aviation sector's total core contribution to Dubai GDP in 2030 is expected to be US$48.6 billion, or some 24.7% of the projected total, in our unconstrained forecast. That would support 664,100 jobs, or 19.5% of the economy-wide employment.

5.3 Potential tourism benefits in 2020 and 2030 with capacity expansion

The UAE has seen strong growth in tourist and business travellers in recent years. Dubai has captured a significant proportion of that. If these trends continue, the contribution to Dubai's economy from travel and tourism will increase substantially from the estimated US$10.2 billion in GVA and 157,100 jobs supported in 2013 (over and above the impact of tourism on and via the aviation sector).

Chart 5.3: GVA and employment supported by Dubai's travel and tourism sector 2013-2030



Source: Oxford Economics

Taking into account Oxford Economics' assumption that Dubai Airports' passenger growth forecasts through to 2030 are met, and that real spending per visitor will grow by 1.6% per year (reflecting rising incomes spending power of visitors over time), Chart 5.3 shows how tourism impacts could increase in future in the absence of capacity constraints.

The total tourism benefit to Dubai is expected to rise to US$21.7 billion by 2020 and US$39.5 billion by 2030 (at 2013 prices). At the same time, the amount of employment supported is expected to rise to 305,000 by 2020 and 530,600 by 2030. These employment estimates take into account the fact that people employed in Dubai's tourism sector, as well as those employed by their suppliers, will become more productive over time.

Taking all of the direct, indirect, induced and tourism benefits together, the total contribution of aviation to the economy of Dubai – excluding connectivity and cargo benefits – is expected to rise from US$26.7 billion of GVA in 2013, to US$53.1 billion in 2020 and US$88.1 billion in 2030, in the absence of air capacity constraints (Table 5.2). The associated employment would grow from 416,500 in 2013 to 754,500 in 2020 and 1,194,700 in 2030.

Table 5.2: Aviation sector core and catalytic contributions in 2020 and 2030

Dubai aviation sector contribution in the future			
	2013	**2020**	**2030**
GVA (US$ billion[1])			
Direct, indirect and induced impacts	16.5	31.4	48.6
Additional tourism impact	10.2	21.7	39.5
Total of above impacts	**26.7**	**53.1**	**88.1**
As % economy-wide GVA	*26.7%*	*37.5%*	*44.7%*
Potential loss if capacity constrained	-	-	11.8
Employment (thousands)			
Direct, indirect and induced impacts	259.4	449.5	664.1
Additional tourism impact	157.1	305.0	530.6
Total of above impacts	**416.5**	**754.5**	**1,194.7**
As % economy-wide employment	*21.0%*	*29.5%*	*35.1%*
Potential loss if capacity constrained	-	-	159.6

[1] At constant 2013 prices and using the average 2013 exchange rate.

5.4 Implied losses in 2030 in the event of insufficient capacity expansion

In this final section, we look at the potential cost of constraints on passenger numbers, as a result of a failure to expand aviation capacity beyond 2020.

Previous work undertaken by Oxford Economics relating to aviation has involved:

- Identification of a 'constrained threshold' – the point at which annual passenger growth starts to slow due to capacity constraints.
- An absolute 'capacity limit' – the point at which no further passenger growth is possible.

Once the first of these points is reached, some passengers who would have used the airport can no longer do so. Others substitute to another time, day or route, but this becomes increasingly costly for passengers as capacity utilisation rises further above the threshold, ensuring that ever-greater numbers of potential visitors are put off.

The constrained threshold and absolute capacity limits for an airport will be the lower of terminal and runway capacity in each case, expressed in terms of passengers per annum. For the purposes of this report, we take the capacity limit – in the absence of any further investment beyond 2020 – to be 126.5 million passengers, in line with the actual forecast for passenger movements in that year, when Dubai will be hosting Expo 2020.

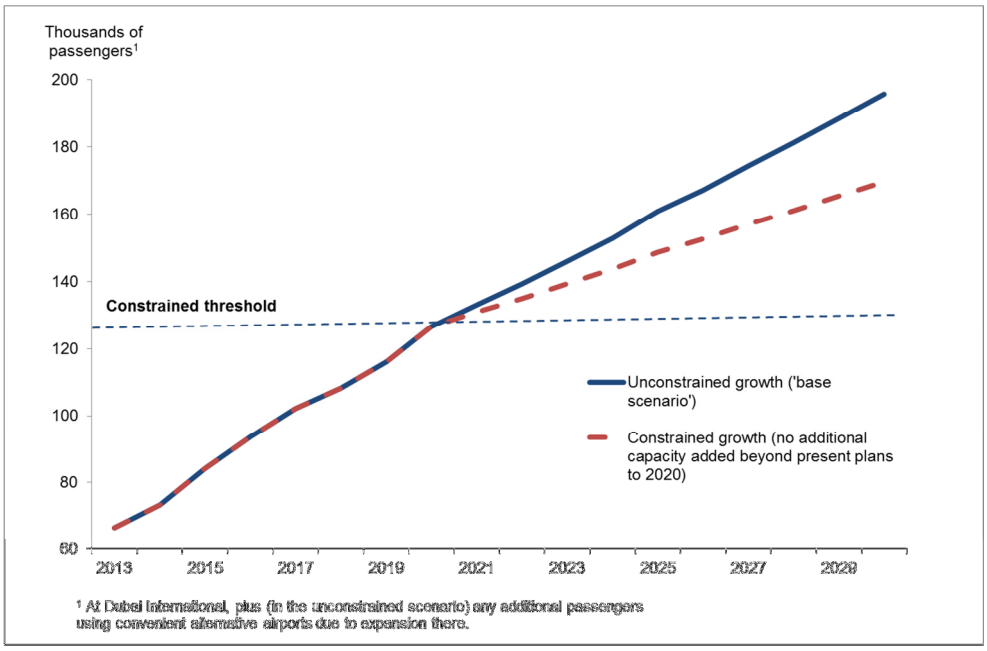
We further assume, in line with previous Oxford Economics work and consistent with the views of IATA and other experts (in relation to terminal capacity), that:

- Once the constrained threshold is reached, the rate of passenger growth is slowed by 33%.
- The absolute capacity limit is 150% of the constrained threshold, i.e. 253,000 passenger movements per annum in this case.

The results of this exercise are illustrated in Chart 5.4 and Table 5.2. It can be seen how, from 2021 onwards, growth in passenger numbers would be slower than otherwise in the absence of the development of new capacity either at Dubai International or at an alternative location that potential visitors regarded as a convenient alternative (possibly DWC). By 2030, passenger numbers would be constrained to 169,600 rather than the 195,800 projected on the

unconstrained scenario – a shortfall of 13%. The absolute capacity limit, however, would not come into play until several years beyond that.

Chart 5.4: Passenger numbers in a constrained scenario



In terms of economic impacts, the most straightforward assumption is that the economic benefits derived from aviation would also fall short by 13%, compared with the unconstrained expectation. In that case the GVA benefits derived from aviation sector activity would amount to US$42.1 billion rather than US$48.6 billion, with the additional benefits from aviation-related tourism coming in at US$34.3 billion rather than US$39.5 billion. The corresponding shortfall in employment would amount to a combined 159,600, equivalent to 4.7% of all Dubai-based employment projected for that year.

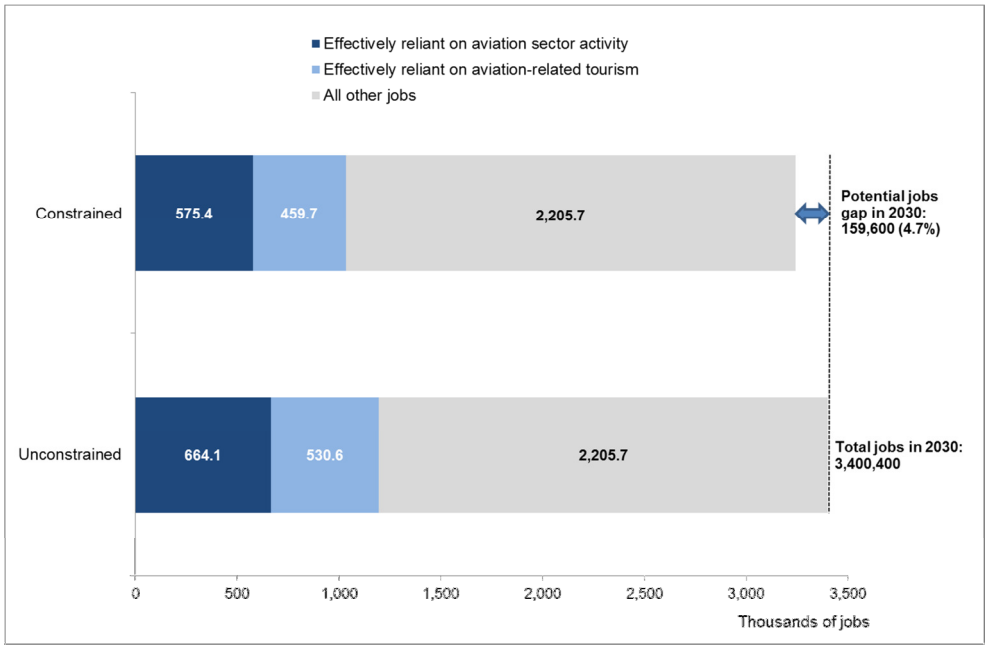
Chart 5.5 illustrates this potential 'jobs gap' in 2030, in the event that aviation activity is constrained in the way described.

Of course, in practice, the actual jobs shortfall would depend on the alternative development of the Dubai economy. It is certainly quite possible to envisage most or all of these 'lost' jobs being made up for by employment creation in other parts of the Dubai economy, through market forces, alternative government planning or a mixture of the two. But the nature of any such 'replacement' jobs is unclear and it is quite possible that they would be less productive, and correspondingly less profitable and less well paid, than those likely to be secured as a result of continued expansion in the aviation sector.

Table 5.2: Economic impacts in 2030 with capacity constraints

Potential economic impact of failure to expand aviation capacity beyond 2020	2013	2020	2030
Passenger numbers (thousands)			
- Unconstrained	66.5	126.5	195.8
- Constrained			169.6
Constrained as % unconstrained			*87%*
Aviation sector direct, indirect and induced GVA impacts (US$ billion)			
- Unconstrained	16.5	31.4	48.6
- Constrained			42.1
Potential loss (US$ billion)			*6.5*
Additional tourism GVA impacts (US$ billion)			
- Unconstrained	10.2	21.7	39.5
- Constrained			34.3
Potential loss (US$ billion)			*5.2*
Aviation sector direct, indirect and induced employment impacts (thousands)			
- Unconstrained	259.4	449.5	664.1
- Constrained			575.4
Potential loss (thousands of jobs)			*88.7*
Additional tourism employment impacts (thousands)			
- Unconstrained	157.1	305.0	530.6
- Constrained			459.7
Potential loss (thousands of jobs)			*70.9*

Chart 5.5: Dubai employment in 2030 in the unconstrained and constrained scenarios



Annex 1: Calculating the core economic impacts

- Emirates Group provided data on their revenues, staff costs and non-staff costs (broken down into several categories), split between Dubai-based and rest-of-the-world operations, together with worldwide gross profits figures. They also provided data on staff numbers split between Dubai-based operations and rest of the world, with Dubai-based employees further broken down between those working at the airports and those working elsewhere. Dubai Airports provided data on their own employee numbers and associated staff costs, together with information on the total number of employees of all businesses working at the airports.
- The GVA values were worked out in local currency (dirham) terms, and converted to dollar terms using the average 2013 exchange rate of US$1 = AED 3.6725.
- For the Emirates Group, direct GVA was calculated as the sum of staff costs and profits attributable to Dubai. For these purposes Emirates' profits were allocated between Dubai and the rest of the world in proportion to employee compensation.
- Indirect (or supply chain) GVA for the Emirates Group was calculated by taking the non-staff costs of Dubai-based operations, allocating these to different national accounts product groups, excluding a portion assumed to be imported from outside of Dubai, and combining the result with an input-output table showing transactions between Dubai industries. The input-output table used was estimated by Oxford Economics, using available official data and a standard statistical technique. More specifically, it was assumed that all spending by Dubai-based operations benefitted Dubai-based suppliers, with the exception of the cost of goods sold (60% sourced locally), jet fuel (12%) and overflying charges (nil) – these assumptions being consistent with the model used in the 2011 report for Emirates and Dubai Airports, and with the assumptions underlying the derivation of the input-output table. The final figure for indirect GVA is reduced further, relative to initial spending, by import content further down the supply chain.
- A second calculation of Emirates' indirect GVA was then made – the 'net' indirect impact – excluding the impact arising as a result of purchases from other parts of the aviation sector. (This was taken to be spending on handling, in-flight catering, aircraft maintenance, landing and parking and – for dnata – costs under the heading of 'airport operations and cargo' except for an assumed proportion relating to jet fuel.) This allows us to avoid the 'double counting' of certain activity in the results for the sector as a whole.
- For Dubai Airports, direct GVA was estimated on the basis of staff costs using the GVA-to-employee-compensation ratio for the Dubai business services sector, as found in the input-output table. Turnover was then estimated using the associated output-to-GVA ratio and non-staff costs taken to be the difference between turnover and GVA. Although airport operators are technically classified to the 'transport' sector, we assume that their pattern of spending is more akin to that of the 'business services' sector, with e.g. fuel accounting for a smaller proportion of total costs and staff for a greater proportion when compared with the 'transport' sector average.
- The Dubai Airports indirect GVA impact was then worked out by assuming that 40% of total non-staff spending was on imports (in line with the ratio implicit for total non-fuel demand in the input-output table), with the remaining spending split by product category in proportion to business services' domestic procurement in the table. Purchases from other parts of the aviation sector are assumed to be a negligible share of the total and so the 'net' impact here is assumed to equal the 'gross' impact.
- For other airlines within the 'other businesses' category, we assumed that employment and total procurement bore the same relationship to Emirates' values for passenger movements at

Dubai International (i.e. Emirates 65%, others 35%). Their direct GVA was then worked out on the basis that productivity was the same as for Emirates. Values for non-airline businesses within this category were taken as residuals, with GVA arrived at by using the GVA-to-jobs ratio for Dubai's non-financial services sector as a whole. Turnover, procurement, employee compensation and profits were then estimated for the whole group on the basis of ratios for Dubai's transport sector.

- Indirect (or supply chain) GVA for this group was then derived on the assumption that non-staff expenditure was broken down between imports and domestic spending and between product type within domestic spending. This was done in the same proportion for the other airlines as was done for Emirates and in the same proportion as for the Dubai 'business services'. The net indirect GVA impact was then arrived at on the basis that the airlines' purchases from the aviation sector were proportionate to those of Emirates, while those of the support service providers were negligible.
- Induced (or wage consumption impact) GVA was worked out in tandem with indirect GVA, for each company or group, by combining the detailed procurement data with factors derived from an extended input-output transactions matrix taking into account the pattern of employee compensation and household spending in Dubai. This gave us the induced GVA associated with the supply chain, to which we added an estimate of the induced GVA caused by the spending of the firm's own employees, taking likely savings and imports into account. Net induced impacts were again worked out for the Emirates Group and 'other' groups, to avoid 'double counting' of activity at the total sector level.
- For the purposes of this study, the direct employment numbers have been taken to include temporary, outsourced and contingent staff as well as permanent employees, with the associated cost included in direct GVA. Emirates Group and Dubai Airports numbers were provided directly, while employment in the remainder of the aviation sector was taken to be the residual between the known total of employees working at the airports and the number of airport-based staff of the Emirates Group and Dubai Airports. As a result any 'other aviation' staff not based at the airports – and their associated GVA – will not have been captured in our analysis, making a modest underestimate possible.
- Indirect and induced employment were derived from the indirect and induced GVA figures respectively, using employment-to-GVA ratios across the various industrial sectors.

Annex 2: The basis for the 2020 and 2030 projections

Table A2.1 sets out a range of plans and forecasts for the key drivers of aviation activity in Dubai, and Oxford Economics' projections for the Dubai economy more widely.

Table A2.1: Key drivers of aviation activity and Dubai economy forecasts

Indicators of potential aviation activity in future			
	2013	**2020**	**2030**
Passenger flows at Dubai International, millions			
Dubai Airports' forecast for its own airports	66.5	126.5	195.8
Average annual % growth, 2013-20 and 2020-30			
Above forecast for Dubai passengers		9.6	4.5
IATA passenger number forecasts, UAE aggregate		6.0	5.9
Airbus passenger traffic, Middle East (2013-33 average)		7.1	7.1
Boeing passenger traffic, Middle East (2013-33 average)		6.4	6.4
Boeing cargo forecast, Middle East (2013-33 average)		5.9	5.9
Average annual % growth assumed in this analysis[1]			
Direct GVA of Dubai aviation sector, real terms		9.6	4.5
Oxford Economics World and Dubai economy forecasts[2]			
World GDP		5.2	3.4
Dubai GDP		5.1	3.4
Dubai employment		3.7	2.9

[1] Forecast to 2020 based on Oxford Economics' expectation that capacity is on course to expand sufficiently to accommodate this rate of growth. Forecast for 2020-2030 dependent on the assumption that capacity continues to grow at a sufficient pace to accommodate this growth.
[2] Oxford Economics produces forecasts for the emirate of Dubai through to 2025 and for the municipality of Dubai through to 2030. The growth rates for the emirate shown here assume that it grows in line with the municipality over the period 2025-30.

Passenger number and traffic forecasts relating to the UAE in aggregate and Middle East more widely, produced by the International Air Transport Association (IATA) and global aircraft manufacturers, Airbus and Boeing, point to future growth broadly in the 6-7% per annum range. Boeing's forecasts for Middle East cargo volumes are also close to 6% per year. These projections can be thought of as indicating the potential demand growth to be faced by Dubai's aviation sector.

For the purposes of this report, we have accepted that the Dubai Airports passenger growth forecasts – on average some 9.6% per annum between 2013 and 2020 and 4.5% per annum beyond that – will be achieved. Over the whole period the average growth rate amounts to 6.6% per annum – within the range of forecasts for Middle East demand growth. The profile of faster growth early on and slower growth later fits with the substantial expansion of capacity already underway and the hosting of the Expo 2020, and with forecasts for wider GDP growth at the global level.

We further assume that the direct GVA contribution of the aviation sector as a whole – covering the real-terms value of passenger air services as well as that of cargo operations, catering and other on-board passenger services, terminal-based services for airlines and passengers, and the work of the aviation authorities and air traffic controllers – grows in line with these passenger numbers.

Values are worked out and illustrated on the basis of constant 2013 prices and exchange rates.

We then work out indirect and induced GVA contributions, and metrics concerning employment, on the basis of these simple assumptions:

- Indirect and induced GVA are assumed to grow in tandem with direct GVA, the implicit assumption being that the pattern of inputs and spending is essentially unchanged over time – including the ratio of non-staff costs to staff costs, the ratio of imports to domestically-produced content and the ratio of employee expenditure to income.
- Employment in each case is forecast to grow in line with GVA, adjusted for growth in average productivity across Dubai, as based on the GDP and employment forecasts for Dubai carried out as part of Oxford Economics' Cities and Regions forecasting work.

The results of this exercise are shown in Table A2.2.

Table A2.2: Direct, indirect and induced impacts in 2020 and 2030 with capacity expansion

Dubai aviation sector core contribution in the future			
	2013	**2020**	**2030**
Direct impact			
GVA (US$ billion at 2013 prices[1])	9.6	18.2	28.2
As % economy-wide GDP	*9.6*	*12.9*	*14.3*
Employment (thousands)	120.3	208.5	308.0
As % economy-wide employment	*6.1*	*8.2*	*9.1*
Indirect impact			
GVA (US$ billion at 2013 prices)	4.2	8.1	12.5
Employment (thousands)	76.1	131.9	194.8
Induced impact			
GVA (US$ billion at 2013 prices)	2.7	5.1	7.9
Employment (thousands)	63.0	109.1	161.3
Total core impact			
GVA (US$ billion at 2013 prices)	16.5	31.4	48.6
As % economy-wide GDP	*16.5*	*22.2*	*24.7*
Employment (thousands)	259.4	449.5	664.1
As % economy-wide employment	*13.1*	*17.6*	*19.5*

[1] At constant 2013 prices and using the average 2013 exchange rate.

OXFORD
Abbey House, 121 St Aldates
Oxford, OX1 1hb, UK
Tel: +44 1865 268900

LONDON
Broadwall House, 21 Broadwall
London, SE1 9PL, UK
Tel: +44 207 803 1400

BELFAST
Lagan House, Sackville Street
Lisburn, BT27 4AB, UK
Tel: +44 28 9266 0669

NEW YORK
817 Broadway, 10th Floor
New York, NY 10003, USA
Tel: +1 646 786 1863

PHILADELPHIA
303 Lancaster Avenue, Suite 1b
Wayne PA 19087, USA
Tel: +1 610 995 9600

SINGAPORE
No.1 North Bridge Road
High Street Centre #22-07
Singapore 179094
Tel: +65 6338 1235

PARIS
9 rue Huysmans
75006 Paris, France
Tel: + 33 6 79 900 846

email: mailbox@oxfordeconomics.com

www.oxfordeconomics.com

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