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AIR NAMIBIA'S ECONOMIC IMPACT

NOVEMBER 2016

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EXECUTIVE SUMMARY

N$704 mn

GDP contribution

Supported by Air Namibia's activities in 2015/16, along with 4,550 jobs

Air Namibia makes a meaningful economic contribution to the Republic of Namibia. Its services provide vital domestic and international connectivity to the 560,000 people who flew with the airline in 2015/16. This report explores how the domestic economy benefits from its flag carrier's presence.

This report quantifies the airline's economic contribution through two main channels. The first is Air Namibia's core contribution to the economy of Namibia. This encompasses the activity sustained by the airline's operations and capital spending, and is quantified in terms of its contribution to Namibian GDP, the employment it supports and the tax revenues it generates. The second stage captures the wider 'catalytic' economic impact it generates, through the broader activity enabled and stimulated by its services.

In 2015/16 Air Namibia's operations and aviation-related capital spending made a N$704 million contribution to the Namibian economy and sustained 4,550 jobs. In addition to the airline's own operations, Air Namibia spent over N$1 billion on goods and services supplied by local companies. These purchases supported activity in businesses throughout Namibia, as did the spending of wages by those employed by Air Namibia and by firms within its supply chains. These benefits are not only retained within the aviation or tourism sectors, but rather 'ripple out' throughout the economy. Of nine broad sectors in the Namibian economy, five of them enjoy activity in excess of N$50 million as a result of Air Namibia's operations.

The activity sustained by Air Namibia generates considerable tax revenues for the Government of Namibia. By stimulating activity throughout the economy and sustaining many thousands of jobs, Air Namibia generates revenues across a range of tax streams. We estimate these revenues reached N$316 million in 2015/16; this was equivalent to 55 percent of the subsidy the airline received that year.

The airline has ambitious plans to expand its services over the next five years. Route consolidation, capacity expansion and the addition of new services to key destinations such as Gaborone, Durban, Nairobi, Lagos and Accra will see the international network evolve. Air Namibia's internal projections foresee network-wide passenger numbers increasing by nearly 50 percent by 2020/21, with passenger numbers on international routes increasing to nearly 750,000.

Air Namibia's core contribution to the country's economy is projected to grow rapidly in the coming years, as it expands its services. As a result, we forecast that by 2020/21 the core GDP contribution from its operations and aviation-related capital investment will reach nearly N$1.7 billion (measured in 2015/16 prices), supporting almost 6,300 jobs and N$463 million in government revenue (also in 2015/16 prices).

But the airline's contribution extends far beyond this core impact. By connecting Namibian citizens and businesses with the rest of the world, it facilitates a wide range of economic activity in both the local and global economy. These include enabling efficient business interactions, to facilitating foreign investment, and encouraging tourism and trade. Ultimately, these inter-

related 'catalytic' benefits act to boost the productivity of the Namibian economy, and hence GDP. These catalytic benefits for Namibia arise through its aviation links to major cities and markets throughout the world.

N$1.4 bn

productivity boost in 2015/16

From Air Namibia's connectivity; equivalent to 0.9% of Namibian GDP

Air Namibia accounts for over half of Namibia's aviation connectivity, and so is crucial contributor of the associated benefits. We estimate this connectivity boosted Namibia's productivity by some N$1.4 billion in 2015/16. This constitutes 0.9 percent of national GDP, emphasizing the importance of the airline to the Namibian economy. The evolution of the airline's network, and particularly the addition of services to the major hubs at Lagos and Nairobi, is expected to result in a considerable increase in the productivity boost associated with Air Namibia's connectivity. By 2020/21 we expect this boost to reach nearly N$1.8 billion (measured in 2015/16 prices).

The spending of international visitors carried to Namibia on Air Namibia flights in also leaves a considerable economic footprint. We estimate some 140,000 visitors to Namibia used the airline's services to reach the country in 2015/16. These visitors' spending is estimated to have contributed N$971 million in GDP, supporting some 4,400 jobs and generating N$245 million in tax revenues. By 2020/21, the number of visitors transported to the country by Air Namibia is projected to exceed 230,000. As a result, the GDP contribution from visitor spending is expected to grow to nearly N$1.7 billion, sustaining 7,700 jobs in the Namibian economy and raising over N$440 million in tax revenues (again measured in 2015/16 prices).

These connectivity and tourism benefits would be vastly reduced if Air Namibia's services were not provided. Through an analysis of ten key routes, we demonstrate that had these routes not been flown by Air Namibia in 2015/16, there would have been over 226,000 fewer trips to and from Namibia in that year. While some capacity exists on alternative services between these destinations in the wider aviation network, increased costs and inconvenience to passengers would discourage many from making their journeys; we estimate that some 79,000 fewer visitors would have travelled to Namibia that year. This would have forgone many of the economic benefits, sacrificing N$452 million in tourism GDP, around 2,050 fewer tourism jobs and N$114 million in taxes—equivalent to a fifth of the subsidy received by the airline that year.

Moreover, the connectivity benefit would have been lost, almost in its entirety. The ten routes examined represent over 99.9 percent of Air Namibia's connectivity contribution, and if they had not been provided in 2015/16, the impaired productivity of the Namibian economy would have seen national output around N$1.4 billion lower.

Air Namibia's contribution to Namibia is both broad and substantial. The airline's operations generate wealth and employment throughout the economy, and the tax revenues it sustains–through both its core and tourism impacts–equate to the Government subsidy it receives. It also provides vital domestic and international connections, delivering social and economic benefits. Our analysis suggests much of this economic benefit would not have arisen in the absence of its services. This places into context the importance of the output and productivity that Air Namibia supports, and the thousands of jobs sustained by visitors flying with the airline to and from Namibia each year.

1. INTRODUCTION

560,000

passengers carried by Air Namibia in 2015/16

Encompassing services across Namibia, Southern Africa and beyond.

Air Namibia makes a substantial contribution to the Namibian economy. As the national carrier its flights and activities offer Namibians vital connections across Southern African and beyond. In 2015/16, the airline carried over 560,000 passengers between sixteen domestic and international airports, providing direct links not only between Namibia and its neighbours, but also to Germany and a wide range of subsequent international connection possibilities.

Air Namibia sustains jobs and economic activity in Namibia. Its operations and capital expenditures stimulate supply chains across a broad spectrum of industries throughout the country, generating an economic footprint far larger than the airline itself. Indeed, like all other airlines, Air Namibia contributes to aviation's global impact. Oxford Economics, in association with the Air Transport Action Group (ATAG), has calculated that aviation supported almost 63 million jobs worldwide and contributed US $2.7 trillion to the world economy in 2014.[1]

But perhaps even more important than this impact is the role Air Namibia plays in linking the country and its people to the global economy. By doing so, the airline enhances Namibia's 'connectivity' and acts as a catalyst for economic growth. Greater connectivity stimulates the exchange of ideas and technology, fosters global competition, underpins international business cooperation, sustains foreign investment and facilitates tourism. All of these are essential contributors to long-term economic growth. Air Namibia's services play a crucial part in raising Namibia's connectivity, thereby contributing to the country's growth both at present and in future.

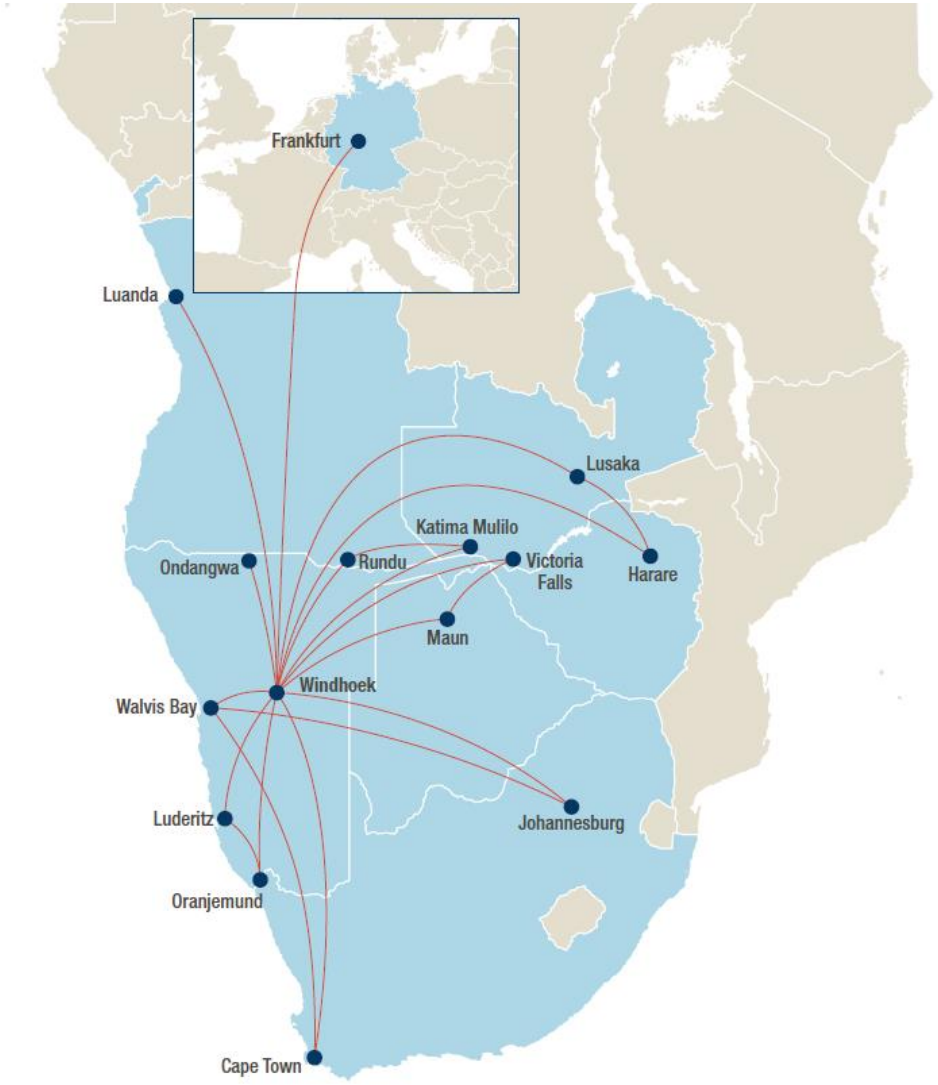
This report presents a comprehensive analysis of the airline's impact in Namibia. It does so by exploring and quantifying this contribution along a number of different channels.

- The report first considers the economic footprint of Air Namibia's activities in the last year (the 2015/16 fiscal year), and through to 2020/21, to explore how the airline's impact changes as its services evolve.
- It then considers the overarching catalytic impact of the airline, quantified through the productivity boost experienced by Namibia's economy as a result of the connectivity provided by Air Namibia's network.
- One of the channels of impact captured by the catalytic benefit is the role Air Namibia plays in stimulating tourism in Namibia by bringing visitors to the country. The report explores the economic footprint of tourism spending enabled by the airline, due to international visitors travelling to Namibia on Air Namibia flights.

[1] ATAG, "Aviation: Benefits Beyond Borders", in *http://aviationbenefits.org/* <http://aviationbenefits.org/media/149649/ABBB2016_WEB.pdf> [accessed 11 May 2016]

The analysis presented in the majority of the report examines Air Namibia's gross impact. However, when considering an airline's economic contribution, it can also be informative to consider whether and to what extent any benefits may have arisen if its services did not exist. To explore this, the report finishes by exploring a counterfactual scenario where Air Namibia ceases to operate ten of its routes, assessing how demand for travel and supply of services would change, and the economic impact that would result.

Fig. 1: Air Namibia's routes in 2015/16



COMPARISON TO THE 2010 STUDY OF AIR NAMIBIA'S ECONOMIC IMPACT

In 2010, Oxford Economics conducted a study assessing Air Namibia's economic impact in Namibia in 2009. Since conducting that study, the methodology and data employed by Oxford Economics in its numerous assessments of economic impact throughout the aviation industry have changed. Therefore, the results presented in this new study are not comparable with those reported in 2010.

INTRODUCING ECONOMIC IMPACT ANALYSIS

The economic impact of a company or industry is measured using a standard means of analysis called an economic impact assessment. This consists of two parts. First, we quantify the three 'core' channels of impact that comprise the organisation's 'economic footprint', consisting of:

- ***Direct impact***, which relates to the direct activities of Air Namibia;
- ***Indirect impact***, which encapsulates the activity and employment supported in Air Namibia's supply chain as a result of its procurement of goods and services; and
- ***Induced impact***, comprising the wider economic benefits that arise when employees within Air Namibia and its supply chain spend their earnings, for example in local retail and leisure establishments.

Using these pathways, a picture of Air Namibia's economic footprint in Namibia is presented, using three key metrics:

- ***GDP***, or more specifically, Air Namibia's *gross value added* (GVA) contribution to GDP;
- ***Employment***, as the number of people employed, measured on a headcount basis; and,
- ***Tax revenues*.**

Economic impact assessments traditionally only consider the activity that is generated by the operations of a given business or sector, but Air Namibia's economic footprint also extends to the capital expenditure it makes aviation-related equipment. This study therefore quantifies ***capital*** as well as ***operational*** core impacts.

Second, we examine the '***catalytic***' effect Air Namibia's services or products have in boosting or enabling economic activity elsewhere in the economy.

The ***catalytic*** impact of Air Namibia represents the wider benefits the government, consumers, society and other industries gain from the services the airline provides. For an airline these are primarily captured in the contribution that increased ***air connectivity*** makes to wider economic potential. Research in recent years has demonstrated how greater air connectivity raises the productivity of an economy by opening up new business opportunities, and stimulating innovation and competition. The impact of higher connectivity benefits all parts of the world economy, but one of the important observable outcomes is the tourism facilitated by the activities of the airline. Therefore, as well as quantifying the overall connectivity impact, we also measure the economic footprint of tourism in Namibia enabled by Air Namibia.

Drawing on historical data and projections from a wide range of sources, the modelling on which this report is based calculates the economic contribution of Air Namibia ***in the 2015/16 fiscal year***, and then forecasts the airline's expected impact through ***to the 2020/21 fiscal year***.

Further detail about the economic impact methodology is included in ***Appendix 2***.

2. AIR NAMIBIA'S ECONOMIC IMPACT

Air Namibia provides crucial transport for thousands of passengers every year. The 2015/16 fiscal year saw Air Namibia carry nearly 480,000 passengers on international flights to and from its hubs at Windhoek and Walvis Bay. A further 83,000 used the airline's domestic services. The operation of these services entails a notable and far-reaching interaction with the rest of the Namibian economy. An interaction whose importance is only likely to grow in future.

The airline has ambitious plans to expand its services over the next five years. Route consolidation, capacity expansion and the addition of new services to key destinations such as Gaborone, Durban, Nairobi, Lagos and Accra will see the international network evolve. Air Namibia's internal projections foresee network-wide passenger numbers increasing by nearly 50 percent by 2020/21, with passenger numbers on international routes increasing to nearly 750,000.

The airline directly employs hundreds of people in Namibia to deliver these services, and indirectly sustains thousands more jobs across the country. The procurement expenditures Air Namibia makes with local suppliers supports activity throughout its domestic supply chain. Further activity is stimulated through the spending of people receiving wages from the airline and its Namibian suppliers.

In this chapter we explore each of these effects, before turning to the catalytic benefits experienced by Namibia as a result of the airline's operations. In particular, we explore Air Namibia's contribution to connectivity through its role in linking Namibia to its neighbours and beyond, and the economic footprint of international visitors carried by the airline to the country.[2]

2.1 AIR NAMIBIA'S CORE IMPACT

Air Namibia's economic footprint in Namibia can be quantified in terms of its contribution to GDP, the employment it supports and the tax revenues it generates for the Government of Namibia. The bespoke impact model we have developed for this study maps the airline's complex and interwoven supply chains. It allows us to quantify the full contribution of Air Namibia's activities, including how they spread throughout the Namibian economy.

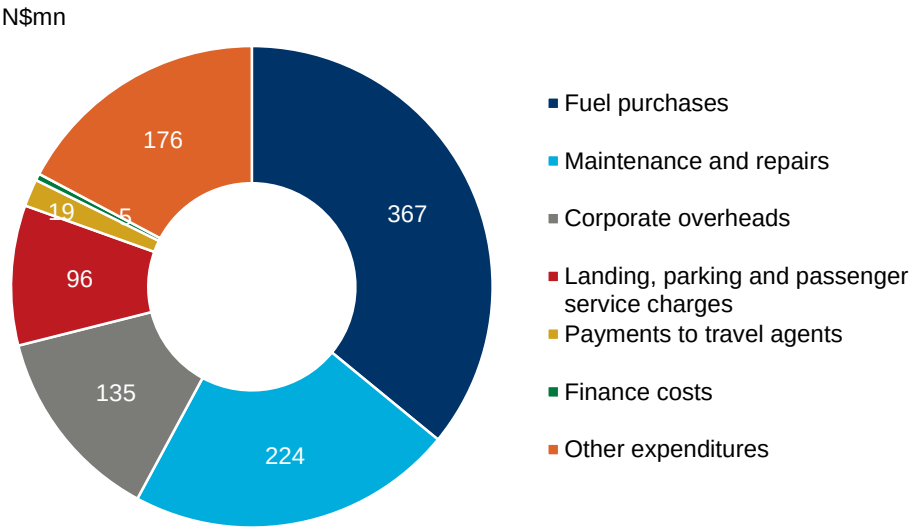
Air Namibia's own activities lie at the heart of its impact on the economy. The airline reported revenue of nearly N$1.8 billion from its passenger and cargo services in 2015/16. The 750 Air Namibia employees were paid N$272 million in wages and salaries that year. With a network-wide load factor of 62 percent, the airline recorded a profit of N$45 million on its services. However, this incorporates the subsidy Air Namibia receives from the Government of

[2] Conducting an economic impact assessment is data-intensive, particularly when a range of years are considered. As part of this process, the modelling and wider analysis contained in this report draws heavily on historical and forecast data provided by Air Namibia, the Namibia Statistics Agency, OECD, and Oxford Economics' own macroeconomic projections. Other sources included OAG (for passenger bookings and average fares), Skyscanner.com (for average flight durations) and Diio (for seat capacity).

Namibia in order to provide its services. This subsidy—amounting to N$579 million in 2015/16—recognises the wider value delivered by the airline to the Namibian economy and society. However, this subsidy must be excluded from the airline's direct contribution to GDP. Therefore, the combination of the airline's profit and the wages it paid its employees, less the subsidy it received, means Air Namibia made a negative direct contribution to the economy of N$263 million.[3]

But Air Namibia's procurement of goods and services from Namibian suppliers more than offsets this. The airline spent over N$1 billion procuring the inputs required for its operations from local companies. This included significant spending on fuel, maintenance and repairs, corporate overheads and landing, parking and passenger charges. A small amount was also spent on purchasing aviation-related capital equipment. A further N$917 million was spent procuring inputs from foreign suppliers.

Fig. 2: Air Namibia's purchases from local suppliers in 2015/16



Source: Oxford Economics

These purchases represent the first stage in Air Namibia's domestic supply chain, and its wider economic impact. The companies supplying the airline will make their own purchases from other firms in the country, stimulating activity along the entire length of Air Namibia's supply chain. This activity also sustains employment, and the spending of wages by those employed by the airline and in its supply chains represents the final channel of economic impact.

In 2015/16 Air Namibia's operations and aviation-related capital spending supported a N$704 million contribution to Namibian GDP. In addition to the direct contribution described above, this comprises a:

[3] Although Air Namibia receives a subsidy from the Government of Namibia, this is excluded from the airline's direct contribution to GDP.

- N$718 million indirect GDP contribution, as a result of supply chain activities linked to Air Namibia's procurement; and a
- N$248 million induced impact, as employees of Air Namibia and those of firms in its supplier chain spend their wages on consumer goods and services in Namibia.

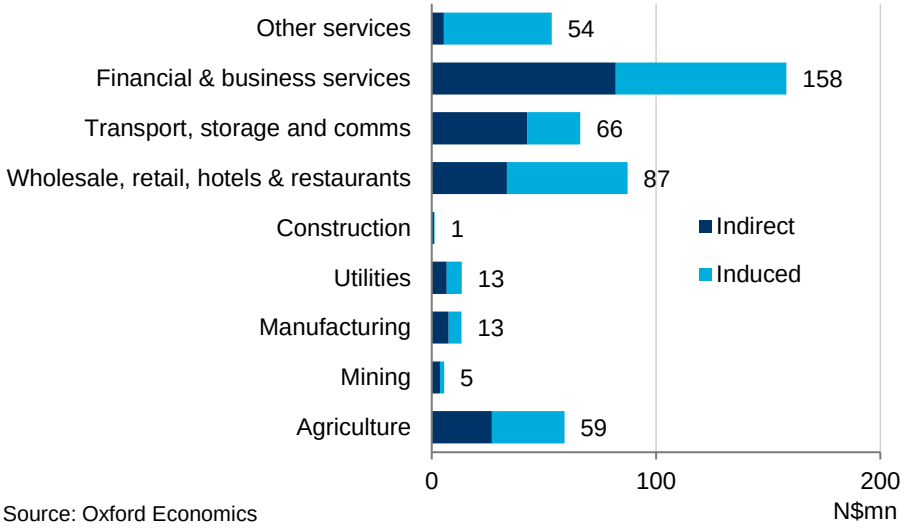
N$704 mn

GDP contribution

Supported by Air Namibia's activities in 2015/16, along with 4,550 jobs

All parts of Namibia's economy benefitted from Air Namibia's operations. The activity supported by the airline reached every sector of the economy. Companies operating in the business services sector experienced a GDP contribution of over N$158 million, and the wholesale and retail, transport, agriculture and other consumer services sectors all saw contributions in excess of $N50 million.

Fig. 3: Indirect and induced contributions to GDP by sector in 2015/16



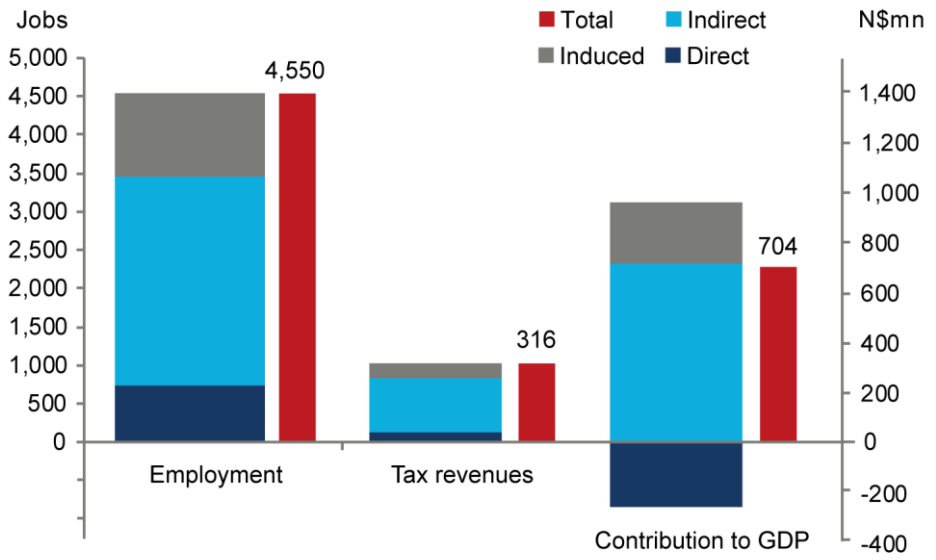
Source: Oxford Economics

The airline's operations are estimated to have sustained 4,550 jobs in Namibia in 2015/16. This is composed of:

- 750 people directly employed by Air Namibia;
- 2,700 indirect jobs that are supported in the airline's Namibian supply chain; and
- 1,100 induced jobs in other sectors, as the airline's employees and those employed in its supply chain spend their wages in the consumer economy.

The Government of Namibia recoups significant tax revenues from the activity and employment supported by Air Namibia. The people employed as a result of Air Namibia's operations pay tax on their incomes and the products they purchase, in addition to making social security contributions. Further, the companies in Air Namibia's supply chain pay corporation tax on the profits earned from these activities. In total, we estimate the activity and employment sustained by Air Namibia generated N$316 million in taxes for the Government of Namibia, equivalent to approximately 55 percent of the subsidy.

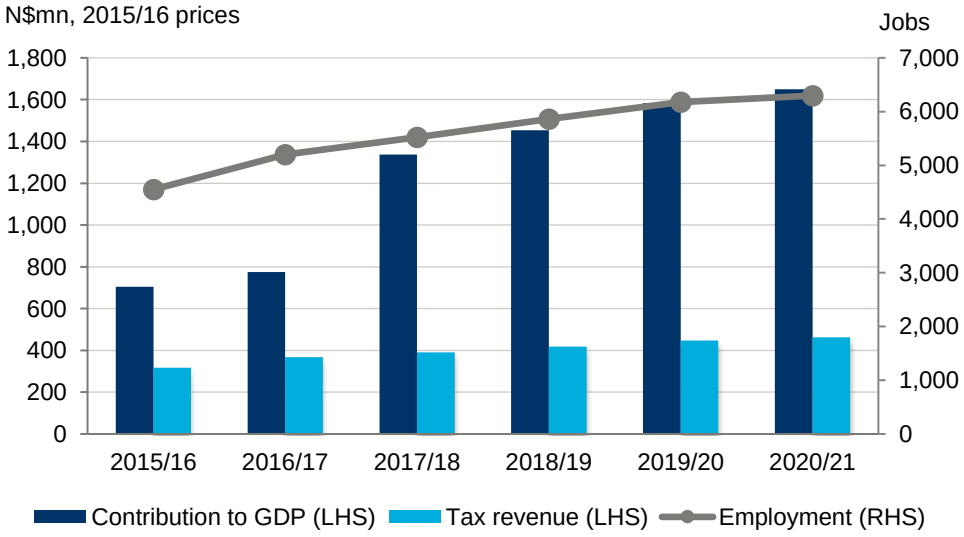
Fig. 4: Air Namibia's economic impact in Namibia in 2015/16



Source: Oxford Economics

Air Namibia' planned growth over the coming years will see its impact on the Namibian economy increase substantially. By 2020/21 we forecast that Air Namibia's economic footprint will increase by 134 percent in real terms, reaching nearly N$1.7 billion in 2015/16 prices. This growth will be accompanied by a 38 percent uplift in the number of jobs supported by the airline, with nearly 6,300 people projected to be employed as a result of Air Namibia's operations that year. We estimate that this enlarged footprint will generate a fiscal impact of N$463 million, measured in 2015/16 prices.

Fig. 5: Air Namibia's economic impact in Namibia from 2015/16 to 2020/21



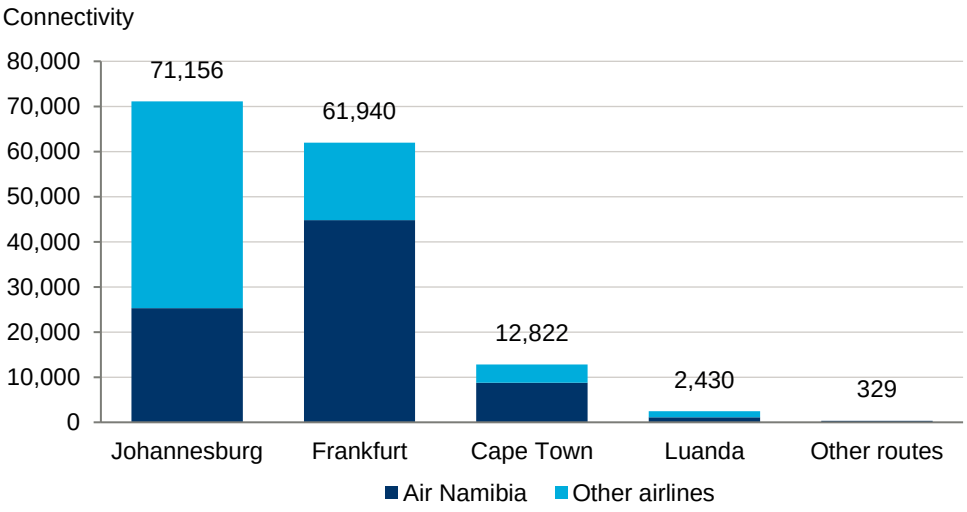
Source: Oxford Economics. Note: LHS is left-hand scale, RHS is right-hand scale

2.2 AIR NAMIBIA'S CATALYTIC IMPACT

While the impacts described above are sizable, they represent only a portion of Air Namibia's economic impact in the country. By connecting Namibians and Namibian businesses with the rest of the world it facilitates a wide range of economic activity in both the local and global economy; from enabling business interaction to facilitating foreign investment, and encouraging tourism and trade. Ultimately, these inter-related 'catalytic' benefits act to boost the productivity of the economy and hence GDP. Air Namibia generates catalytic benefits for Namibia by enhancing linkages between Namibia and major cities and markets throughout Southern Africa and beyond.

Air Namibia accounts for over half of the country's connectivity. Measured by the number of seats available from Namibia weighted by the importance—in terms of potential onward connections—of the destinations served, connectivity can be gauged, and its boost to economic activity estimated. While Air Namibia operates crucial domestic routes providing important social and economic links between Windhoek and the rest of the country, it is its international routes that drive the connectivity benefit experienced by Namibia. Indeed, the vast majority of Namibia's connectivity is derived from three links to three destinations: Frankfurt, Johannesburg and Cape Town. And Air Namibia accounts for a sizable share of capacity to each.

Fig. 6: Air Namibia's contribution to Namibia's overall connectivity, by destination, in 2015/16



Source: Diio; Oxford Economics

N$1.4 bn

productivity boost in 2015/16

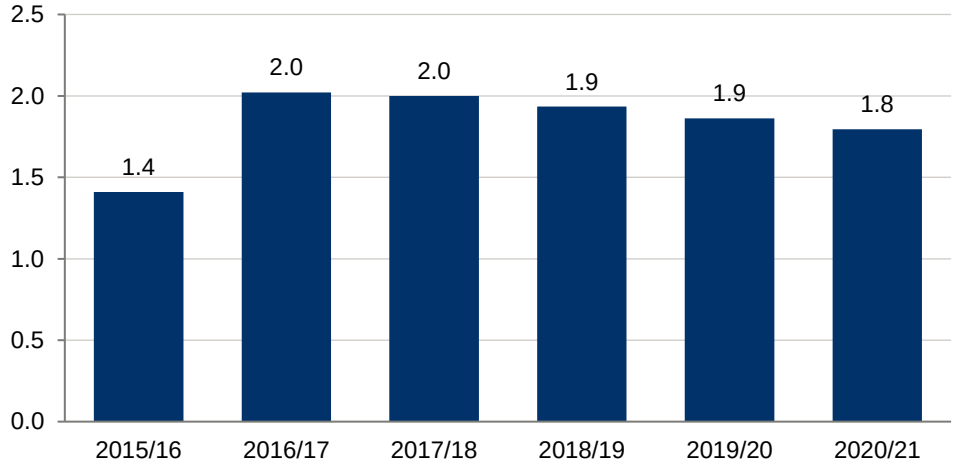
From Air Namibia's connectivity; equivalent to 0.9% of Namibian GDP

We estimate Air Namibia's contribution to Namibia's air connectivity boosted the country's productivity by some N$1.4 billion in 2015/16. This constitutes 0.9 percent of national GDP, underling the wider benefit Air Namibia brings to the economy. The evolution of the airline's network, and particularly the addition of services to the major hubs at Lagos and Nairobi, is expected to result in a considerable increase in the productivity boost associated with Air Namibia's connectivity. Indeed, by 2020/21 nearly N$1.8 billion, measured in 2015/16 prices, equivalent to 0.9 percent of GDP. This is lower than the boost

forecast in 2016/17; the decline in the productivity boost witnessed between from this point is a result of GDP growing faster than connectivity.

Fig. 7: Productivity boost from Air Namibia's contribution to Namibia's air connectivity, between 2015/16 and 2020/21

N$bn, 2015/16 prices



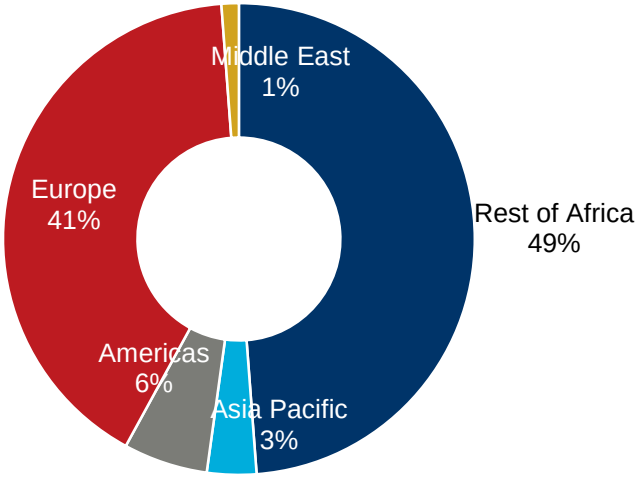
Source: Oxford Economics

Spending by visitors arriving in Namibia by air is a clear example of the benefits derived from Air Namibia's connectivity. Without air transport services it is likely that many international visitors to Namibia would not have travelled to the country. Consequently, the Namibian tourism sector benefits from increased visitor spending as a result of the aviation sector.

The contribution of Air Namibia to the tourism sector—that is the impact of spending by international visitors travelling to Namibia on the airline—can be quantified as the economic footprint resulting from this spending. In 2015/16, Air Namibia carried 480,000 passengers on international flights to and from Namibia. Among these, some 140,000 were international visitors to the country. While nearly half of these arrivals were visitors from the rest of Africa predominantly traveling on the airline's network across Southern Africa, the data show the importance of the airline for bringing intercontinental visitors to Namibia. Over four in ten visitors carried by the airline were Europeans, with 60 percent of these using the Windhoek-Frankfurt route. And a further nine percent came from either the Americas or Asia Pacific.

Fig. 8: Origins of visitor arrivals carried by Air Namibia in 2015/16

Origin of international visitors



Source: OAG; Oxford Economics

N$971 mn

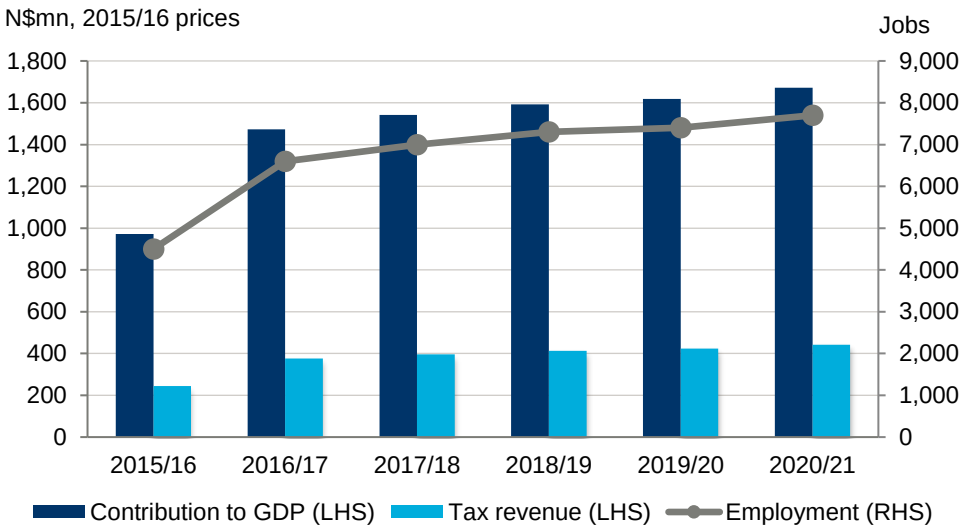
GDP in 2015/16

Attributable to the tourism spending of visitors brought to Namibia by Air Namibia

The spending of these visitors is estimated by using Oxford Economics' spending per visitor forecasts for Namibia, which are produced in cooperation with the World Travel and Tourism Council. In 2015/16, we estimate international visitors carried by Air Namibia will spend slightly more than N$ 1 billion in the Namibian economy. The economic footprint of this Air Namibia-facilitated visitor spending, on accommodation, food, recreation and so on, is extremely significant. In 2015/16, we quantify the footprint of the airline's visitor arrivals in the country at an estimated N$971 million in GDP for Namibia, supporting some 4,400 jobs and generating N$245 million in tax revenues for the Government of Namibia.

The enhancement of Air Namibia's network will see this impact increase in future years. By 2020/21, the number of visitor arrivals carried by the airline is expected to rise to over 230,000, with their total spending increasing to nearly N$1.8 billion, measured in 2015/16 prices. As a result, the GDP contribution from visitor spending is expected to grow to nearly N$1.7 billion, sustaining 7,700 jobs in the Namibian economy and raising over N$440 million in tax revenues, also measured in 2015/16 prices.

Fig. 9: Air Namibia's tourism impact in Namibia from 2015/16 to 2020/21



Source: Oxford Economics. Note: LHS is left-hand scale, RHS is right-hand scale

3. THE IMPACT OF AIR NAMIBIA'S ROUTES

The previous chapter explores several avenues through which Air Namibia's aviation operations contribute to the economy of Namibia. These economic contributions are quantified on a 'gross' basis. This means that they do not take account of what the people and resources employed by Air Namibia (and its suppliers) could have contributed to the Namibian economy, if Air Namibia did not exist.

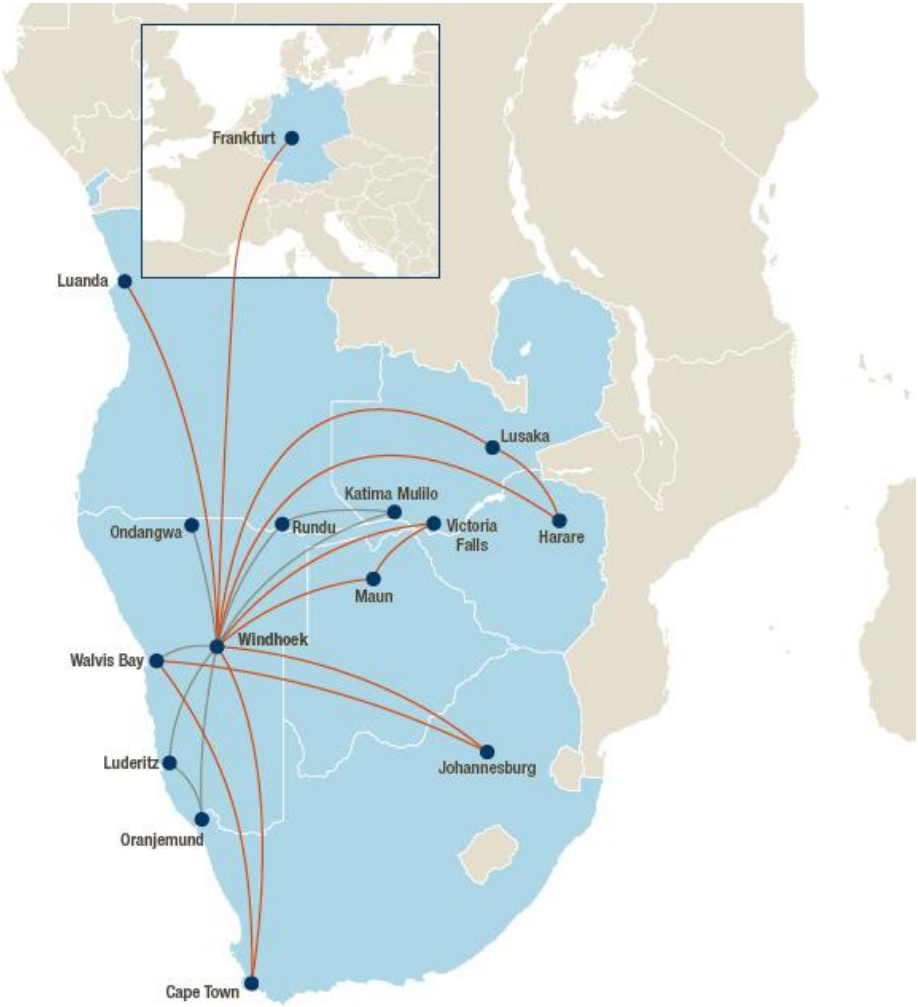
But it can be instructive to consider what degree of economic benefits may have arisen in Air Namibia's absence. In other words, if Air Namibia did not operate its services, would the economic benefits delivered by them simply be provided by other airlines? This question amounts to an assessment of the *additionality* of Air Namibia's tourism and connectivity contribution.

To investigate this issue, our starting point is the assumption that Air Namibia's services on ten key routes were not provided during the financial year 2015/16. We then model a 'counterfactual' scenario, to assess the likely demand- and supply-side responses to these withdrawals. In this scenario, the passengers that Air Namibia transported during 2015/16 must travel on comparable direct services provided by competitor airlines, or else indirectly through flights with additional stops via other regional hubs.

The ten routes we analyse are the services that Air Namibia operates between the following cities:

(1) Windhoek and Frankfurt;
(2) Windhoek and Cape Town;
(3) Windhoek and Johannesburg;
(4) Windhoek and Maun, via Victoria Falls;
(5) Windhoek and Victoria Falls, via Maun;
(6) Windhoek and Harare, via Lusaka;
(7) Windhoek and Luanda;
(8) Windhoek and Lusaka, via Harare;
(9) Walvis Bay and Cape Town; and
(10) Walvis Bay and Johannesburg.

Fig. 10: The ten Air Namibia routes withdrawn in counterfactual scenario



Note: Red lines indicated routes which are 'dropped', leaving only grey-shaded routes.

This scenario can be thought of as an assessment of the short-run effect of suspending the above ten routes. In other words, it assumes that the seat capacity of the wider aviation network does not change. Over the longer-term, other airlines could respond to Air Namibia's exit by providing additional services on existing routes, or otherwise increasing capacity. But these changes are likely to be hard to implement immediately, and forecasts of these processes are subject to great uncertainty.

3.1 PASSENGERS' RESPONSE TO ROUTE WITHDRAWAL

Had all of these ten Air Namibia services been withdrawn during 2015/16, there would have been approximately 475,000 passenger journeys that could not have taken place.

Based on the capacity and load factors on the remainder of Namibia's aviation network, we estimate that just over 97,000 of these Air Namibia passengers could have made equivalent direct journeys, using other providers. Most of these are absorbed by the direct services to Capetown and Johannesburg provided by South African Airways, as well as the Windhoek-Johannesburg

route flown by British Airways. Together, these airlines account for 85 percent of the direct journeys that can be accommodated by the existing aviation network.

However, the direct journeys of the remaining 378,000 Air Namibia passengers could not have been accommodated on the existing aviation network. This is because of a shortage of capacity along equivalent direct routes, due either to insufficient services, high existing load factors, or both.

As such, these 378,000 passengers would have had to take indirect routes, with additional connections. Their precise choice of route would also depend upon the capacity and seat availability on the indirect services between their origins and destinations.

Fig. 11: Illustration of additional travel necessitated by indirect routes between Windhoek and Johannesburg

While indirect flights are typically cheaper than direct ones, they involve more flights and additional waiting time, as illustrated by Fig. 11, and are thus less convenient. When making their travel decisions, passengers would take into consideration these lower ticket costs, but also the additional inconvenience presented by this extra travel time. This is important because overall increases in monetary and time-costs would deter some passengers from making their trip at all.

We source ticket cost data from OAG, to which we apply an increase, in recognition of lower competition in our counterfactual scenario.[4] We then examine the time required for additional flight legs, estimated from an average of durations published on Skyscanner.com. We ascribe a monetary value to this additional flight time, using estimated Values of Time (VoTs) for aviation passengers, in each country where Air Namibia's 2015/16 passengers were from. From the perspective of a traveller, VoTs represent a monetary valuation of the forgone work or leisure time, that is sacrificed as a result of travelling.[5]

Combining these ticket and time-costs into a 'generalised cost of travel', we then estimate the demand response of passengers to this effective price rise. This calculation uses elasticities from IATA research, that measure the responsiveness of passengers to changes in the costs of air travel.[6] From this we quantify how many Air Namibia passengers, in the face of its withdrawal from the ten key routes, would have been deterred from travelling. Fig. 12 summarises the results of this process.

Fig. 12: Summary of Air Namibia passenger displacement on alternative routes, 2015/16

Route	Air Namibia Pax	Allocated to other carriers		Passengers deterred by cost increase	Remaining passengers	% reduction
		Direct	Indirect			
Windhoek and Frankfurt	118,226	313	117,913	43,613	74,613	-37%
Windhoek and Johannesburg	136,746	61,939	74,807	72,109	64,637	-53%
Windhoek and Capetown	99,647	1,589	98,058	42,170	57,477	-42%
Windhoek and Luanda	53,712	12,310	41,402	26,226	27,486	-49%
Windhoek and Harare, via Lusaka	8,997	1,236	7,761	8,143	854	-91%
Windhoek and Lusaka, via Harare	10,916	992	9,924	8,718	2,198	-80%
Windhoek and Maun, via Victoria Falls	4,522	0	4,522	3,361	1,161	-74%
Windhoek and Victoria Falls, via Maun	4,464	0	4,464	3,725	739	-83%
Walvis Bay and Johannesburg	19,247	11,114	8,133	8,105	11,142	-42%
Walvis Bay and Capetown	18,447	7,759	10,688	10,150	8,297	-55%
Totals	**474,924**	**97,251**	**377,673**	**226,320**	**248,604**	**-48%**

This demonstrates that dropping these ten Air Namibia routes would lead to a loss in passenger volumes of around 48 percent. **This is equivalent to over 226,000 fewer trips to and from Namibia,** as a result of increased ticket costs and less convenient indirect services.

[4] This increase was estimated using OAG data. Changes in the number of airlines operating a sub-Saharan African route are compared to changes in the route's average ticket prices, during the period 2012-2016. We find that one airline exiting a route tends to be accompanied by a 6.6% rise in average fares among other carriers on the route.

[5] VoTs are discussed in more detail in Appendix 2: Methodology.

[6] IATA, "Measuring the responsiveness of air travel demand to changes in prices and incomes" (IATA Economics Briefing No 9, 2008).

3.2 THE ECONOMIC IMPACT OF AIR NAMIBIA'S ROUTES

This scale of reduction undoubtedly has important economic implications. Reducing the amount of visitors to and from Namibia would erode the country's tourism earnings, and hamper the establishment of business relationships which generate international trade and investments.

One result of deterring these passengers will be reductions in the inbound tourism expenditures accrued by Namibia. We quantify this fall, by isolating inbound journeys made by foreign residents from the overall total of 226,000 forgone passenger journeys.

Around 115,000 inbound trips were among this total, of which approximately 79,000 were accounted for by non-Namibian passengers. These 79,000 discouraged inbound journeys constitute 56 percent of the 140,000 inbound journeys enabled by Air Namibia during 2015/16. The tourist spending that was contributed by these journeys was estimated through an analysis of the nationalities of inbound passengers using each of these routes.

Using the methodology outlined in Chapter 2.1, we estimate the economic impacts associated with this degree of tourism spending. These impacts are disaggregated by route, taking account of the nationalities of (and average spending by) the inbound passengers carried to Namibia on these services. Fig. 13 sets out the results of this analysis.

Fig. 13: Estimated foregone economic contribution from tourism, as a result of ten Air Namibia route suspensions

Route	Reductions in:			
	Inbound visitor spend (N$m)	GDP contribution (N$m)	Employment supported (jobs)	Tax revenue (N$m)
Windhoek and Frankfurt	-67	-62	-275	-16
Windhoek and Johannesburg	-152	-142	-650	-36
Windhoek and Capetown	-51	-48	-225	-12
Windhoek and Luanda	-109	-102	-450	-26
Windhoek and Harare, via Lusaka	-7	-6	-25	-2
Windhoek and Lusaka, via Harare	-38	-36	-150	-9
Windhoek and Maun, via Victoria Falls	-12	-11	-50	-3
Windhoek and Victoria Falls, via Maun	-14	-13	-50	-3
Walvis Bay and Johannesburg	-13	-12	-50	-3
Walvis Bay and Capetown	-20	-19	-75	-5
Totals	**-484**	**-452**	**-2,050**	**-114**

Note that totals may not sum, due to rounding

The withdrawal of Air Namibia's services would not have led to the elimination all of tourism earnings contributed by the inbound tourists on its services. Due to the availability of alternative direct and indirect services, many of these inbound tourists would still make their trips.

But significant numbers of trips would be discouraged by greater cost. After adjusting for the different compositions of nationalities on Air Namibia's routes, and the average tourist spend contributed by international visitors to Namibia

from different regions and countries, we estimate that **Namibia's tourism earnings would have declined by over N$480 million**.

This amount is equivalent to around 47 percent of all inbound tourism receipts enabled by Air Namibia. Reducing tourism receipts by this degree would have important economic implications, including:

- A reduction in the GDP contribution of inbound tourists of N$452 million;
- Over 2,000 fewer jobs supported by inbound tourism; and
- A fall in tax revenues generated by tourism, in the order of N$114 million.[7]

The curtailed connectivity between Namibia and the rest of the world would also have deeper supply-side impacts, dampening the productive potential of the country. The resultant thinner links between Namibia and major regional and global markets would dilute its attractiveness as an investment destination, frustrate business relationships, and constrain trade.

Had these ten Air Namibia routes not been flown in 2015/16, virtually all of the benefits associated with Air Namibia's connectivity would not have materialised. This is because these ten routes, and in particular the services to Frankfurt, Johannesburg and Cape Town, are the major components of Air Namibia's connectivity contribution.

We estimate that the impaired productivity associated with the absence of these routes **would have reduced GDP in 2015/16 by some N$1.4 billion.**

This sum, which corresponds to over 99.9 percent of Air Namibia's connectivity boost, would not be offset by any displaced passengers taking alternative services and routes. This is because the productivity impact of connectivity is associated with available seats–that is, the capacity of the aviation network–rather than passenger movements. Hence a reduction in capacity along routes which are so crucial to Namibia's aviation connectivity would have a pronounced negative economic effect. This serves to underline the positive contribution made by Air Namibia's provision of these services.

[7] These impact figures encompass direct, indirect and induced impacts associated with the relevant tourism spending.

4. CONCLUSION

This report has explored the contribution Air Namibia makes to the Namibian economy. The airline's operations and capital spending are estimated to have contributed N$704 million to the economy in 2015/16. This activity sustained some 4,550 jobs and generated N$316 million in tax revenues for the Government of Namibia.

However, the analysis has shown the airline's contribution to the economy extends far beyond the impact of its procurement spending. We estimate that the catalytic impact of Air Namibia, as a result of enhanced connectivity between Namibia and the world economy, was around N$1.4 billion in 2015/16, constituting 0.9 percent of national GDP. The spending of the 140,000 international visitors carried to Namibia by the airline also left a significant economic footprint, contributing N$971 million in GDP for the country, supporting some 4,400 jobs and generating N$245 million in tax revenue.

Ambitious expansion plans will lead to an increase in the airline's contribution to Namibia. We forecast that by 2020/21 its core contribution will reach nearly N$1.7 billion, some 6,300 jobs and tax revenues of N$463 million. Meanwhile, the airline's catalytic impact is expected to increase to N$1.8 billion. It is projected that by 2020/21, the number of visitor arrivals carried by Air Namibia is expected to rise to over 230,000, by which time we estimate the associated tourism spending will contribute nearly N$1.7 billion to GDP, sustain around 7,700 jobs and generate N$440 million in taxes.[8]

The value of Air Namibia to the country is underlined by the route level analysis presented in this report. Our modelling suggests that, had ten of Air Namibia's key services not been provided in 2015/16, there would have been 226,000 fewer journeys to and from Namibia in that time. This would have reduced Namibia's tourism GDP by some N$452 million, forgone around 2,050 tourism jobs and seen N$114 million less in tax revenues. The absence of those services would also have eliminated virtually all of Air Namibia's N$1.4 billion productivity boost to Namibian GDP.

The results of our analysis highlight the considerable importance of Air Namibia to the economy. And, although the airline receives a subsidy from the Government, we estimate that nearly all of this is recouped through the gross tax revenues generated by the airline. Fig. 14 summarises the channels of Air Namibia's impact, and compares its connectivity and tourism footprint in both 'gross' and 'net' terms. This comparison provides useful context for understanding how the subsidy provided by the Government of Namibia underpins a broad and valuable economic impact.

[8] All monetary sums discussed here are expressed in constant 2015/16 prices.

Fig. 14: Summary of Air Namibia's impact on the economy of Namibia

Channels of Air Namibia's impact in 2015/16	Metric		
	GDP contribution (N$m)	Employment supported (jobs)	Tax revenue (N$m)
Core impact	**704**	**4,550**	**316**
Connectivity impact (gross)	1,409	-	-
Connectivity impact (less 10 key routes)	0	-	-
Connectivity impact (net)	**1,409**	-	-
of which: Tourism impact (gross)	971	4,400	245
Tourism impact (less 10 key routes)[9]	520	2,350	131
Tourism impact (net)	**452**	**2,050**	**114**
Subsidy	**579**	-	-

Source: Oxford Economics

[9] On this row of the table, the tourism impact is driven by Air Namibia's 2015/16 *passengers.* But in this counterfactual scenario, they are assumed to have travelled on other carriers and services.

5. APPENDIX 1: GLOSSARY

Catalytic impacts: refer to the activity in the economy enabled and/or stimulated by aviation services. The impacts revolve around the benefits of ***air connectivity***. The services provided by air transport connect people and businesses in one country with the rest of the world, facilitating a wide range of economic activity in both the local and global economy; from enabling business interaction to facilitating foreign investment, and encouraging tourism and trade. Ultimately, these inter-related 'catalytic' benefits act to boost the ***productivity*** of the economy and hence GDP.

Compensation of employees: gross wages of employees in employment (excluding the self-employed), including the value of employees' and employers' social contributions.

Connectivity: measures how well-connected a country is to the global air transport network. Defined as the number of seats available from an airport or country, weighted by the importance of the destinations served. The weights reflect how "connected" each destination is in terms of potential onward connections, and are approximated by the total number of passengers at each destination airport relative to Atlanta (the world's largest airport in terms of annual traffic). The ***catalytic impacts*** of aviation are centered on the concept of connectivity and its benefits.

Core impacts: the economic 'footprint' of a company or sector within an economy, as measured by the activity relating to the operations and capital spending of the relevant company or sector. The metrics used in the measurement are usually ***GDP*** and ***employment***.

Direct impact: The economic activity that relates to the company's own operations.

Employment: the number of people employed, measured on a headcount basis.

GDP, or Gross Domestic Product: The total value of final goods and services produced in the economy within a given time period. The contribution of an individual producer, industry or sector to GDP can be understood as either: 1) the value of output (goods or services) less the value of intermediate inputs used in the production process; or 2) the sum of ***compensation of employees*** (gross wages) and ***gross operating surplus*** (profits).

Gross operating surplus: profits, defined as earnings before interest, taxes, depreciation and amortization (EBITDA).

Indirect impacts: The economic activity generated by the procurement of inputs of goods and services from local suppliers.

Induced impacts: The economic activity supported in the economy by staff (direct employment) and those employed in the company's indirect supply chain spending their wage income, for example at retail and leisure outlets throughout the country.

Operational impacts: GDP and employment relating to the operations of the company or sector itself (***direct impact***) and the subsequent activity supported in the supply chain (***indirect impact***) and employees' spending (***induced impact***).

Productivity: The ratio of GDP per person employed i.e., labour productivity.

Tourism/visitors' spending: consumer spending by foreign visitors, principally on accommodation, catering, recreation, retail and other tourism-related goods/services.

Visitors: in the study visitors are foreign tourists or business travelers who are not normally resident in the country in question.

6. APPENDIX 2: METHODOLOGY

The study measures the economic impact of Air Namibia, using a standard means of analysis called an economic impact assessment. This consists of two parts. First we quantify the three 'core' channels of impact that comprise the organisation's 'economic footprint'. Second we examine the 'catalytic' effect that Air Namibia's services have in boosting economic activity elsewhere in the economy, as well as examining one specific example of this kind of catalytic impact, namely tourism.

Air Namibia's core economic impact comprises the activity supported by its operations and its capital spending on aviation equipment. The same impact methodology is used to calculate each of these impacts. This section of the appendix explains in detail how the methodology is applied to calculate the impact of the airline's operations. But first, we present a short introduction to economic impact assessments.

6.1 THE CHANNELS OF IMPACT

To capture the full extent of Air Namibia's economic impact, it is necessary to consider all of the means by which it interacts with the Namibian economy. Typically, when assessing the economic contribution of an entity, three main channels of impact are assessed:

- At the core of any economic impact assessment is the **direct effect**. This is the impact generated by the entity itself.
- The second channel of impact focuses on how an entity interacts with other businesses in the economy. The entity's **indirect effect** is the activity that is supported elsewhere in the economy as a result of its procurement of inputs of goods and services for use in producing its own output. This expenditure creates activity along the entity's supply chain.
- The final channel of impact is known as the **induced effect**, and captures the activity that is stimulated by the consumer spending of the individuals employed by the entity and in its supply chain. These purchases take place predominantly in the sectors that supply consumer goods and services, such as retail and leisure outlets. By supporting this expenditure – through the payment of wages – the entity is inducing additional economic activity in these businesses. It also creates demand for goods and services along the retailers' and leisure outlets' domestic supply chains.

Brought together, these individual channels present a complete picture of the economic impact of the entity as it ripples from the direct effect out through the rest of economy. The total impact of the entity is the summation of the three effects.

6.2 CONSTRUCTING AN INPUT-OUTPUT TABLE FOR NAMIBIA

To calculate indirect and induced impact, we use an input-output (I-O) model of the Namibian economy. I-O tables are spreadsheet representations of a national economy. They are typically the most detailed representation of all the transactions within that economy: setting out how industries, households, government, and the external sector interact to generate national income and GDP. Since we did not have access to an official I-O table for Namibia, we were required to estimate one.

The estimation procedure rested upon Namibia's macroeconomic statistics, as published by the Namibia Statistics Agency (NSA). The starting point was the NSA's official data regarding Namibian GDP, sectoral output, imports, exports, employment and consumption. We then

drew upon a production function sourced from Namibia's Social Accounting Matrix for 2004, prepared by the Namibian Economic Policy Research Unit (NEPRU). This measures how much Namibian industries procure from one another, in order to produce their output. These production functions are key data in the construction of I-O tables, allowing the mapping of inter-industry transactions, and hence the calculation of supply chain effects.

We then manipulated, scaled and optimized these data, to fit the known macroeconomic aggregates published by NBS for the year 2012. This manipulation ensured that the I-O table reflected the underlying structure of the Namibian economy, in the latest year for which we have comprehensive macroeconomic information.

6.3 MEASURING AIR NAMIBIA'S CORE IMPACT

The **direct** value-added contribution Air Namibia makes to Namibia is the sum of its profits (measured in terms of earnings before interest payments, taxation, depreciation and amortisation), and the payments of wages and salaries it makes to its employees. These data were provided by Air Namibia.

Our I-O model enables the calculation of Air Namibia's **indirect** impact within Namibia. For this, it was necessary to identify the expenditure Air Namibia makes with Namibia-based suppliers. Air Namibia provided data on their domestic procurement, split by sector, which we aligned to the sectors from which these inputs were sourced. The model then calculates the subsequent supply chain purchases that occur within Namibia, as a result of Air Namibia's initial procurement expenditure.

The calculation of **induced** impact also uses the I-O model of Namibia. First, Air Namibia provided information on salary payments to Namibia-resident employees. We mapped these sums to economic sectors, in a manner reflecting the spending profile of the average Namibian household. We also incorporate the salaries paid to workers within Air Namibia's supply chains, as a result of their Air Namibia-related production. These were calculated within the I-O model, which uses macroeconomic data regarding the rate of employee compensation within each industry. The I-O multiplier process then calculates the production in response to the wage-financed spending of Air Namibia's suppliers, and those of its supply chain.

We convert both indirect and induced production or 'gross output' into a GDP contribution, by applying ratios that describe how much value-added is generated per unit of production within each sector. The employment supported as a result of the indirect and induced GDP contributions is derived by applying sector-level labour productivity information, calculated based on NSA employment information and Namibia's national accounts.

Tax revenues are calculated through several processes. For corporation tax, we apply the corporation tax rates applicable to non-mining and mining companies, to the estimated profits that are generated through the economic activity supported by Air Namibia. Average profit rates by industry are sourced from Namibia's national accounts. Income taxes and social security contributions are calculated by combining Air Namibia's employment impact, by sector, with the average wages observed in those industries. In addition, national accounts provide average effective product tax rates (such as VAT and import duties), which are applied to Namibian transactions. We apply these rates to the economy-wide transactions that are attributable to Air Namibia (e.g. encompassing supply chain and consumer spending impact).

6.4 MEASURING AIR NAMIBIA'S CATALYTIC IMPACT

Quantifying the catalytic benefits that arise from an airline's services is not straightforward. The benefits of a strong air transport infrastructure stem from its role in boosting competition, promoting international trade, facilitating tourism and encouraging inward investment. Each of these is an example of catalytic benefits that Air Namibia's services contribute to the Namibian economy. But trying to quantify an airline's overall catalytic contribution to an economy is difficult, because many of these effects take time to appear, and are hard to measure individually.

Estimating Air Namibia's catalytic contribution requires us to disentangle connectivity's overall contribution to long-term growth, from the many other factors that affect an economy's performance. This is done by looking at how the economies of countries with faster-growing air connectivity perform relative to ones with slower-growing networks.

Many studies in recent years have investigated the catalytic impact of aviation on GDP growth. A January 2015 econometric analysis by InterVISTAS deployed the most recent available data on connectivity, isolating its relationship to growth while controlling for other factors that may have an impact of GDP (such as education levels, R&D investment, capital spending, and institutional and regulatory factors).

This study used a definition of air connectivity developed by IATA, that counts the number of seats available from an airport or country, and weights them by the importance of the destinations served from that airport or country. The weights reflect how 'connected' each destination is, in terms of potential onward connections, and is approximated comparing the total passengers at each airport to Atlanta (the world's busiest airport in terms of passenger movements). Services to regional and global hubs therefore provide a greater boost to connectivity than flights to smaller airports. For example, one available seat to Johannesburg will contribute more connectivity for Namibia than an available seat to Maun.

The research found that a 10 per cent increase in connectivity (relative to GDP) was associated with an increase in GDP per capita of 0.5 per cent. As the relationship is expressed in growth terms, a base year must be chosen, from which to estimate connectivity impacts. In other words, the impact is the additional GDP since the base year associated with the increase in connectivity that occurred over the relevant period.

Using data sourced from Diio, which records aviation services and their capacities, Oxford Economics applied this methodology to estimate connectivity's contribution to Namibia's overall growth since 2000/01. This base year was chosen as it reflects the earliest available data from Diio. An equivalent calculation was performed using flights and capacity data that excluded Air Namibia's services. The difference between these two estimates represents the impact of Air Namibia to Namibia's GDP, through connectivity effects. To forecast how this contribution may change over future years, Air Namibia provided estimates of passenger numbers and load factors.

6.5 MEASURING AIR NAMIBIA'S TOURISM IMPACTS

The approach employed to estimate the tourism impact of Air Namibia involved three main steps. First, foreign arrivals carried on each route were estimated, split by true origin. 'True origin' is the country in which the passenger is resident, and is not necessarily the same as the departure point of the flight. True origins are estimated using OAG data, detailing bookings by their points of sale (i.e. the nations in which passengers purchased their Air Namibia flights).

Passengers who are resident in Namibia, who by definition do not contribute to tourism impacts, are excluded from the subsequent spending analysis.

The second step involved applying historical and projected figures on spending per arrival, by origin country/region. This uses Oxford Economics' Tourism Decision Metrics (TDM) data. This gave total tourism spending by origin country reliant on Air Namibia.

The final step was then to convert the tourism spend into GDP, employment and tax impacts. This was achieved by breaking down total tourism spending into specific tourism products (e.g. accommodation) using data from the National Travel and Tourism Office. The products were then allocated to industry sectors consistent with Namibia's I-O model. The I-O model then produced direct, indirect and induced GDP and employment impacts, resulting from tourism spending. This approach is akin to the methodology adopted in the core impact analysis.

6.6 ROUTE-LEVEL AND COUNTERFACTUAL ANALYSIS

This methodological chapter has so far described our approaches for assessing how Air Namibia's operations contribute Namibia's economy. These contributions are quantified on a 'gross' basis. This means that they do not take account of what the people and resources employed by Air Namibia (and its suppliers) could have contributed to the Namibian economy, if Air Namibia did not exist.

But it can be revealing to consider what degree of economic benefits may have arisen in Air Namibia's absence. In other words, if Air Namibia did not operate its services, would the economic benefits delivered by them simply be provided by other airlines? This question amounts to an assessment of the 'additionality' of Air Namibia's operations.

Our starting point is the assumption that Air Namibia's services on ten key routes were not provided during the financial year 2015/16. We then model a counterfactual scenario, to assess the likely demand- and supply-side responses to these withdrawals. In this scenario, the passengers that Air Namibia transported during 2015/16 must travel on comparable direct services provided by competitor airlines, or else indirectly through flights with additional stops via other regional hubs.

This counterfactual can be thought of as a short-run impact of suspending the above ten routes. In other words, it assumes that the seat capacity of the wider aviation network does not change. Over the longer-term, other airlines could respond to Air Namibia's exit by providing additional services on existing routes, or otherwise increasing capacity.

For our assessment, we perform the following analytical steps. First, were a route is suspended, we consider how many Air Namibia passengers could be accommodated by competitors' direct flights, assuming a maximum load factor of 100%.

Fig. 15: Direct route allocations of Air Namibia passengers in 2015/16

Route	Air Namibia pax loss	Pax absorbed on other direct services	Remaining demand
Windhoek and Frankfurt	118,226	313	117,913
Windhoek and Johannesburg	136,746	61,939	74,807
Windhoek and Capetown	99,647	1,589	98,058
Windhoek and Luanda	53,712	12,310	41,402
Windhoek and Harare, via Lusaka	8,997	1,236	7,761
Windhoek and Lusaka, via Harare	10,916	992	9,924
Windhoek and Maun, via Victoria Falls	4,522	0	4,522
Windhoek and Victoria Falls, via Maun	4,464	0	4,464
Walvis Bay and Johannesburg	19,247	11,114	8,133
Walvis Bay and Capetown	18,447	7,759	10,688
Total	**474,924**	**97,251**	**377,673**

However, where insufficient direct capacity exists for all of Air Namibia's passengers, we then consider seat availability on indirect routes between these origins and destinations. The results of this process are shown in Fig. 16.

Fig. 16: Indirect route allocations of Air Namibia passengers in 2015/16

Air Namibia Route	Leg	Indirect Route	Pax
Walvis Bay and Capetown	CPT - WVB	CPT - JNB - WVB	5,531
	WVB - CPT	WVB - JNB - CPT	5,157
Walvis Bay and Johannesburg	JNB - WVB	JNB - WDH - WVB	5,004
	WVB - JNB	WVB - CPT - JNB	3,129
Windhoek and Capetown	CPT - WDH	CPT - JNB - WDH	47,362
	WDH - CPT	WDH - JNB - CPT	50,696
Windhoek and Frankfurt	FRA - WDH	FRA - JNB - WDH	53,081
		FRA - ADD - JNB - WDH	6,799
	WDH - FRA	WDH - JNB - FRA	53,054
		WDH - JNB - ADD - FRA	4,979
Windhoek and Harare, via Lusaka	HRE - WDH	HRE - JNB - WDH	3,814
	WDH - LUN	WDH - JNB - LUN	3,947
Windhoek and Johannesburg	JNB - WDH	JNB - LAD - WDH	37,891
		JNB - WVB - WDH	6,502
		JNB - CPT - WDH	1,388
	WDH - JNB	WDH - HRE - JNB	20,851
		WDH - WVB - JNB	6,502
		WDH - CPT - JNB	1,388
		WDH - LUN - JNB	287
Windhoek and Luanda	LAD - WDH	LAD - JNB - WDH	20,402
	WDH - LAD	WDH - JNB - LAD	16,350
		WDH - SDD - LAD	4,650
Windhoek and Lusaka, via Harare	LUN - WDH	LUN - JNB - WDH	5,076
	WDH - HRE	WDH - JNB - HRE	4,849
Windhoek and Maun, via Victoria Falls	MUB - WDH	MUB - JNB - WDH	1,194
	WDH - VFA	WDH - JNB - VFA	3,328

Windhoek and Victoria Falls, via Maun	VFA - WDH	VFA - JNB - WDH	2,408
	WDH - MUB	WDH - JNB - MUB	2,056
Total	**-**	**-**	**377,675**

The degree to which Air Namibia passengers would take up these direct and indirect services depends upon the financial and time-costs of these journeys. We assess ticket prices using OAG Traffic Analyser, with flight leg timings drawn from an average of durations drawn from Skyscanner.com.

Ticket prices on these direct and indirect routes are assumed to rise, as a result of lower competition following one airline's exiting from the route. The extent of this rise was estimated using OAG Traffic Analyser data, through which we compared changes in the number of airlines operating a sub-Saharan African route, to observed changes in average ticket prices between 2012 and 2016. Our analysis suggests that one airline exiting a route tends to be followed by a 6.6 percent rise in average fares among other carriers on the route.

We then incorporate estimates for the value of passengers' time (VoTs). VoTs describe the value of forgone work or leisure time, that passengers could have otherwise undertaken if they had not travelled. They are quantified through methods which estimate how much money a traveler would be willing to pay in order to undertake a shorter journey, or how much compensation they would require for a longer one.

The VoTs we adopt are based on those published by the UK's Airports Commission in 2014.[10] Separate VoTs are provided for leisure and business passengers. We compute 'average' VoTs by weighting the two estimates according to the proportions of inbound leisure and business tourism, as published in Namibia's Tourism Satellite Accounts (TSAs) for 2012. We then adjust these in line with GDP per capita in each country where Air Namibia's passengers are drawn from.

This process allows us to ascribe a monetary value to the inconvenience associated with longer journey durations, that passengers face by flying on indirect routes.

We then combine the ticket and time-costs into a total, or 'generalized cost of travel'. To this increased cost we apply a price elasticity of demand, based on air travel demand analysis by InterVISTAS and published by IATA.[11]

The elasticities adopted for our study are those estimated at the route level, and include the recommended adjustments for short- and long-haul travel in the sub-Saharan African market. The application of these elasticities allows us to estimate the extent of discouraged travel, as a result of the higher monetary and time-costs of these indirect services.

[10] Airports Commission, "Economy: Delay Impacts Assessment" (Methodology Paper, 2014), 6.

[11] IATA, "Measuring the responsiveness of air travel demand to changes in prices and incomes" (IATA Economics Briefing No 9, 2008).

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