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**Between external forces and internal factors:
The geography of domestic airline services in South Africa**

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Abstract

This paper investigates the changes and current patterns of domestic passenger airline networks in South Africa, considering routes operated and volumes of seats supplied by carriers. This market was liberalised in 1991 and the new market-oriented policy was not challenged by the post-apartheid regime. Flag-carrier South African Airways (SAA) has lost its virtual monopoly, and thus significant volumes and market share, although its decrease is smaller if one considers its regional affiliates and subsidiary. Conversely, low-cost airlines have literally boomed, while British Airways has penetrated the market through a franchise agreement with Comair. Route networks by airline show various patterns. The low-cost carriers tend to concentrate on South Africa's Golden Triangle, while SAA regional affiliates mostly serve thin routes without competitors. Furthermore, the rise of low-cost airlines has led to the utilisation of a secondary airport in Johannesburg, the only African city with a multiple-airport system. Finally, our results are interpreted in light of South Africa's geography, intermodal options and social-political issues.

Keywords: air transport geography; airline networks; domestic airline networks; low-cost airlines; South Africa.

1. Introduction

Africa has earned the tag of "aviation's last frontier" (Pirie, 2014) and is still regarded as such (Lubbe and Shornikova, 2018). At the continental level, Africa remains the smallest market by any metric (Tchouamou Njoya, 2016) even though one needs to distinguish between Northern Africa and Sub-Saharan Africa (Pirie, 2014). In the former, air traffic per capita is higher due to a higher GDP per head and international tourism, among others. In the latter, the volumes of international tourism-related air traffic are especially low, the markets are less mature and the networks weaker and unstable, except at large/hub airports such as Lagos, Addis Ababa, Nairobi and Johannesburg. Domestic markets are usually poorly developed and there is an absence of efficient, safe surface options. In contrast with integrated regions such as Europe and East/South-East Asia, intercontinental flows dominate international air traffic due to the lack of intracontinental political and economic integration (Scotti et al., 2018). Airlines usually evolve in rather protectionist environments (Tchouamou Njoya, 2016; Martini and Scotti, 2017; Warnock-Smith and Tchouamou Njoya, 2018).

In this context, South Africa is certainly an atypical country within Sub-Saharan Africa for several reasons. Its urban system is much more polycentric than most other countries in Africa, if not in the Global South. The country accommodates Africa's largest airport (O. R. Tambo International Airport in Johannesburg, which processed 25.7 million passengers in 2019), and has the only significant domestic airline market (Pirie, 2014) due to the emergence of a new

middle class. The liberalisation of the domestic market introduced effective competition from 1991 to the detriment of legacy carrier South African Airways (Luke and Walters, 2013; Luke, 2015; Kindler, 2016; Mhlanga, 2017; Mhlanga and Steyn, 2016). This competition is twofold. On the one hand, and very untypically, British Airways has established a firm presence in South Africa's domestic market through a franchise agreement with a private local airline (Mhlanga and Steyn, 2016). On the other hand, three large, low-cost airlines (of which one is owned by South African Airways) have developed to the point that they control more than 60% of the domestic market, as will be shown below. All this pushed South African Airways to transfer part of its operations to regional affiliates and to a low-cost subsidiary (Mango), which is wholly state owned (Mhlanga and Steyn, 2016).

In short, the domestic air market in South Africa seems atypical compared to other Sub-Saharan countries. Although this market resembles the deeply liberalised markets of Europe and the US, it differs from them in that it has been penetrated by a foreign traditional airline (British Airways) with its own brand name. As a result, part of the South African domestic network is operated under the so-called ninth air freedom, a phenomenon almost absent in Europe, where large traditional airlines penetrate third markets by buying shares in "flag airlines", but not in their own name (for instance, Lufthansa owns Austrian Airways, Brussels Airlines and Swiss Air Lines), in contrast with European low-cost airlines (Dobruszkes, 2013).¹ This contrasts with other African countries, where the flag airline of the former coloniser is usually still very active, but only on the international market.

In contrast, South Africa is nevertheless more typical of Global South countries, especially with the troubles the national flag carrier faces domestically and internationally, due to bad governance in the public sector and other factors (see, e.g., Amankwah-Amoah and Debrah, 2010; Heinz and O'Connell, 2013; Amankwah-Amoah, 2018).

In this context, our paper aims to investigate the geography of South Africa's domestic air services and to consider the factors that shape them, including airport and route level. The remainder of this paper is as follows: Section 2 discusses the extant literature on South Africa's domestic airline networks. Section 3 introduces the South African domestic airline industry, starting with key historical steps and ending with a panorama of current airlines. Section 4 explains data and methods. Results will be found in Section 5 (overall geography by airport and by route) and in Section 6 (at the airline level). Finally, Section 7 discusses the results and concludes.

2. South Africa's airline networks: A brief literature review

Air transport in South Africa has received significant attention from scholars both indirectly (through pan-African studies) and more directly (at the Southern or South Africa level). Particular attention has been given to regulatory regimes and obstructions to liberalisation in Africa (Tchouamou Njoya, 2016; Warnock-Smith and Tchouamou Njoya, 2018). Limited liberalisation arguably restricts the range of air routes operated. Authors have also focused on the specific operational conditions that prevail in Southern Africa (Mhlanga, 2019; Mhlanga and Steyn, 2017; Mhlanga et al., 2017) and involve quite high operational costs and low productivity. Business models of South Africa's airlines have clearly been identified (Heinz and O'Connell, 2013; 2018). In addition, several authors have focused on the choices and preferences expressed by domestic passengers (Campbell and Vigar-Ellis, 2012; Fourie and Lubbe, 2006; Mantey and Naidoo, 2016). Finally, Mhlanga and Steyn (2016) have provided a historical perspective.

¹ To the best of our knowledge, the only exception is a much smaller franchise venture of British Airways with 'SUN-AIR of Scandinavia A/S' Danish regional airline.

In contrast, there has been less geographical investigation of this specific market, and related papers have been restricted to its international dimension (Pirie, 1990, 1992, 2006, 2018). Of course, the specific context of South Africa during the apartheid years and the post-apartheid era justifies interest from scholars. Pirie (2006) clearly demonstrated the move from intercontinental to intracontinental networks, and thus the ‘africanisation’ of South Africa’s international airline routes. However, the domestic dimension has been widely neglected despite its potential relevance in the context of extensive economic and aviation liberalisation and of a multipolar urban system (Baffi et al., 2018). Our paper aims to fill this gap, taking into account recent developments of South Africa’s domestic air transport industry until the end of 2019. In the second quarter of 2020, the Covid-19 pandemic had dramatic impacts on several airlines, but these impacts are outside the scope of this paper, which was written before the health crisis.

3. The South African domestic airline industry

As in many other countries, South Africa’s domestic market used to be dominated by a state-owned ‘flag airline’, namely South African Airways (SAA) (Pirie, 1990 and 2006), with the exception of a few marginal air services operated by Comair, which did not compete with SAA. Comair is a privately held company founded in 1943 as Commercial Air Services, whose first scheduled passenger flights took place in 1948 after entering the charter business in 1946. After 1949, SAA was protected from competition in the domestic market through the so-called International Air Services Act. Other domestic airlines were *de facto* restricted to thin routes not operated by SAA (Luke and Walter, 2013). In addition, SAA was also close to airports and the slot allocation process (Pirie, 1992). In contrast, it suffered from external sanctions against the apartheid regime during the 1980s, so its international services became more complicated if not banned (Pirie, 1990; Mhlanga and Steyn, 2016).

In 1990, South Africa’s Department of Transport published a study that recommended the liberalisation of the country’s domestic market. The government followed and adopted a liberalisation act in 1990 according to which the domestic market would be liberalised for South Africa’s airlines as from July 1991 (Luke and Walters, 2013; Mhlanga, 2017). This was during the transition period between the old apartheid South Africa and the advent of democracy in 1994, which gave birth to the “Rainbow Nation” and the ascent of the ‘New South Africa’. In January 1991, South African Airways still supplied 92% of domestic seat capacity.² However, South Africa’s domestic market changed dramatically in the ensuing years and SAA lost significant market shares as well as its influence on airports and slot allocation following the creation of the Airport Company of South Africa (ACSA) in 1993 to control the nine state-operated airports. This move was initiated to make the airline business fairer and the relationship with SAA more transparent (Goldstein, 2001; Pirie, 2006). ACSA was partially privatised in 1998; 20% of shares were acquired by Aeroporti di Roma and 4.2% by five empowerment consortia (ACSA, 2019). In 2005, Aeroporti di Roma’s share went back to South Africa’s government since they were bought by the state-owned Public Investment Corporation.

Following the liberalisation of domestic aviation in South Africa, Comair experienced two dramatic developments. First, in 1996, it signed a franchise agreement with British Airways. As a result, part of its fleet flies under British Airways’ colours. While feeding British Airways’ intercontinental flights, Comair also started competing head-on with South African Airways in the point-to-point domestic market, including some main routes (SATOL, 2019). Comair has successfully targeted business travellers on some of the main routes, thanks to British Airways’ good reputation, which has been perceived to be better than that of South

² Own computations from OAG.

African Airways, whose service quality has been seen as declining. Second, Comair launched its low-cost brand, Kulula (“It’s easy”), in 2001. Operations were based on a high-density, single-class cabin layout. Comair did not establish a subsidiary or a specific airline but opted for an unusual two-brand, single-airline model, with the British Airways brand on the one hand and the Kulula brand on the other hand. Comair’s low-cost air services came after several unfruitful attempts by other private airlines to establish themselves in South Africa (Schlumberger and Neiva, 2018). Cases include Flitestar (1991-1994), Phoenix Airways (1994-1995), Sun Air (1994-1999), Atlantic Airways (1995) and Nationwide Airlines (which was launched in 1995 and eventually went bankrupt in 2008). The list of failures proposed by Mhlanga and Steyn (2016) suggests a failure rate as high as in Europe (Budd et al., 2014) and also includes low-cost airlines launched after Kulula, including 1time (2004-2012), Velvet Sky (2011-2012) and Skywise (2015), plus Fly Blue Crane (2015-2017) more recently. The two most resounding bankruptcies based on their life and network size were Nationwide and 1time (see Henama, 2014).

While it seems Comair learnt from these failures, two other low-cost airlines have been successful too. First, SAA caused a major stir in 2006 when it launched a low-cost subsidiary called Mango. In contrast with its parent, Mango has proved to be profitable, which makes it a case of successful state-owned, low-cost airline. Mango’s aircraft fleet comprises modern B737s allocated to it by SAA, which acquired Airbus A319/A320 jets. Mango was first in competition with three other low-cost carriers, namely Kulula, Nationwide and 1time. Since the last two went bankrupt, a duopoly of low-cost airlines existed from 2012 to 2015. Then FlySafair appeared in 2015 as another successful low-cost airline. It also operates high-density B737s and its business model rather fits with ultra-low-cost airlines (such as Spirit in the US; Bachwich and Wittman, 2017). Since then, South Africa’s three low-cost air services have been operating efficiently in the country.

In January 2019, five airlines operated South African domestic flights either with B737 or A319/A320 aircraft carrying between 120 and 189 passengers, two Full Network Service Carriers (FSNCs) (South African Airways and Comair for British Airways) and three low-cost carriers (LCCs) (Kulula as a Comair brand, Mango and FlySafair). As Section 6 shows, the five aforementioned airlines serve only the main country’s airports, while other airlines also serve the smaller airports with regional aircraft seating between 29 and 98 passengers. Two regional airlines, SA Express and SA Airlink, operate most of the secondary routes through a strategic alliance with SAA. They operate low-capacity regional aircraft (mostly Bombardier and Embraer), which fit well with shorter runways and thin traffic, especially if they intend to operate more than one daily flight. Their respective fleets show SAA’s livery and thus give the impression that SAA is present at airports at which it has no presence. SA Express was created in 1994 and is fully controlled by the South African government (although independently of SAA). In contrast with Mango, it is not a subsidiary of SAA. SA Airlink was created in 1992 and is 97% owned by private shareholders; the remaining 3% is owned by SAA. Both SA Express and SA Airlink are a consequence of the aviation liberalisation introduced in 1991. Hereafter, they will be named ‘SAA regional affiliates’.

Finally, privately owned CemAir, which was established in 2005, served some secondary, regional routes, usually without any competitor, although most of its aircraft were actually leased to other airlines abroad. In December 2018 the South African Civil Aviation Authority (SACAC) banned CemAir and grounded its fleet. In April 2019, a court ruled that decision illegal (CemAir, 2019) and flights progressively resumed in November 2019. Since this paper focuses mostly on services operated in January 2019, CemAir has not been considered here. Table 1 summarises airlines that operated domestic flights in South Africa in early 2019.

Apparent brand and IATA code	Actual airline	Ownership	Rationale	Inclusion into OAG datasets
South African Airways (SA)	South African Airways (SA)	State owned	Network/service flag carrier	South African Airways (SA)
South African Airways (SA)	SA Express	State owned	SA regional affiliate	South African Airways (SA)
South African Airways (SA)	SA Airlink	Private (and SAA 3%)	SA regional affiliate	South African Airways (SA)
British Airways (BA)	Comair	Private	British Airways franchise	British Airways (BA)
Kulula (MN)	Comair	Private	Low-cost carrier	Kulula (MN)
FlySafair (SA)	FlySafair (SA)	Private	Low-cost carrier	FlySafair (SA)
Mango (JE)	Mango (JE)	SAA subsidiary	Low-cost carrier	Mango (JE)

Table 1. Airlines that operated domestic flights in January 2019

Source: Authors' elaboration

4. Data and methods

Passenger data in South Africa are publicly available but only for the nine airports operated by the Airport Company of South Africa.³ Data on the other dozen airports, including a large one that accommodates low-cost airlines, are not available. Furthermore, there is lack of comprehensive data at airlines and route levels. This scenario means we had to use data on the supply, considering the existence of the OAG dataset. The latter gather information supplied by a very wide range of airlines about their services, including routes at the airport level, airline codes, frequencies, aircraft types and seat capacity. Given its comprehensiveness, this source has been used widely in air transport research. The main restriction of the OAG dataset is that it excludes charter flights. However, these are currently insignificant in South Africa (0.4% of 2018/19 passengers in airports managed by ACSA).⁴

The core analysis has been made for January 2019 to capture the Southern Hemisphere's peak season. We also used a temporal series back to January 1999. The key fields considered were departure and arrival airports as well as monthly capacity expressed in seats supplied. Given the wide range of aircraft capacity, seat capacity was preferred over the number of flights.

The OAG data needed to be adapted to some extent before computation. First, CemAir, although still visible in the OAG data in January 2019, was excluded following its grounding from mid-December 2018. In addition, airlines' codes in the OAG datasets do not always match our needs. Especially, OAG considers South African Airways' IATA code SA not only appropriate for South African Airways' flights, but also for those operated on its behalf by SA Express and Airlink through codeshare agreements (see Table 1). To better highlight the network strategy of South African Airways as a flag carrier compared to its regional affiliates, we split the SA code into two distinct codes so the regional affiliates get a specific code. This was done through filters on aircraft type, bearing in mind that South African Airways only operates Airbus aircraft while the affiliates only operate regional airliners.

Note the domestic supply under investigation in this paper – especially SA- and BA-coded domestic flights – is to some extent also used by an unspecified proportion of international passengers connecting within the Star Alliance and One World alliance systems, respectively. Most of these direct transfers take place at Johannesburg's OR Tambo International Airport (JNB), where the international and domestic terminals are not connected on the runway side.

³ Johannesburg ORT, Cape Town, Durban, Port Elizabeth, East London, George, Bloemfontein, Kimberley and Upington.

⁴ April-March year. Source: ACSA.

Many international passengers transferring to/from domestic flights make separate bookings for these domestic flights, including on low-cost airlines. It is thus impossible to estimate the actual share of connecting international passengers to domestic flights.

5. The overall geography at the airport and route levels

Table 2 shows current seat volumes supplied by scheduled airlines at South Africa's airports in both domestic and international markets, along with changes in domestic volumes since 1999. The current pattern (see also Figure 1) shows the overwhelming domination by the country's three largest airports, which account for 84.0% of total seats and 99.8% of international seats. Privately owned Lanseria Airport in Johannesburg complements OR Tambo International Airport and adds to the city's importance as an international tourist destination. This ranking partially reflects the size of the urban areas, with Johannesburg being the largest agglomeration by any metric (see Baffi et al., 2018). However, while Cape Town is a bit more populated than Durban, it is served by a significantly greater volume of air services. This is due to tourism (Rogerson and Rogerson, 2019) and a longer distance from Johannesburg compared to Johannesburg-Durban. International seats on carriers arriving and departing from South Africa's three main airports account for 99.8% of total international seats, while these three airports account for 76.7% of domestic seats. Johannesburg's main airport accounts for 76.1% of international seats versus 34.9% for domestic seats. The only other airport where the international market accounts for a significant share of total seats is Cape Town. Durban has not yet succeeded in attracting many international services, despite the establishment of a new airport in 2010 (Robbins, 2015). The only other airport with more than 100,000 total seats is Port Elizabeth Airport. Port Elizabeth is the country's fourth biggest city and a major economic metropolis (Adler, 1993), which has significant support from the central government. These business activities contribute to air traffic generation.

Airport code & name	1999/1	2004/1	Domestic			Internat.	Total
			2009/1	2014/1	2019/1		
JNB Johannesburg ORT	394.4	458.0	553.2	517.6	615.9	612.1	1,228.1
CPT Cape Town	226.0	269.7	358.6	371.4	438.3	171.5	609.8
DUR Durban King Shaka	160.7	188.1	244.7	238.5	299.0	18.9	317.9
HLA Johannesburg Lanseria	0.0	1.7	17.5	83.2	121.4	0.0	121.4
PLZ Port Elizabeth	70.8	76.1	85.1	72.2	101.2	0.0	101.2
ELS East London	32.0	26.8	39.0	38.7	49.2	0.0	49.2
GRJ George	17.8	31.3	34.0	37.0	42.0	0.0	42.0
BFN Bloemfontein	17.0	13.1	22.0	23.7	21.6	0.0	21.6
KIM Kimberley	5.4	5.4	6.8	10.5	16.0	0.0	16.0
MQP Nelspruit	0.0	9.6	12.7	15.6	14.1	1.9	15.9
HDS Hoedspruit	2.2	4.8	2.3	5.3	10.8	0.0	10.8
PZB Pietermaritzburg	5.5	5.4	3.5	10.3	6.8	0.0	6.8
RCB Richards Bay	5.9	5.1	4.1	5.2	6.8	0.0	6.8
SZK Skukuza	5.8	0.0	0.0	0.0	5.1	0.0	5.1
UTT Umtata	1.4	1.2	1.7	1.9	4.3	0.0	4.3
UTN Upington	1.4	2.1	3.5	3.9	4.2	0.0	4.2
PTG Polokwane	2.3	1.8	2.6	3.0	2.5	0.0	2.5
PHW Phalaborwa	1.9	1.1	1.9	1.9	1.3	0.0	1.3
Others	15.5	10.7	2.4	0.4	3.1	0.0	3.1
Grand total	965.9	1,111.9	1,395.6	1,440.1	1,763.3	804.4	2,567.7
Whole of Africa in comparison	2,346.3	2,707.4	3,688.6	3,926.0	5,020.2	8,424.2	13,444.4
South Africa within Africa	41%	41%	38%	37%	35%	10%	19%

Table 2. Trends in departing seats by airport in January (thousands)

Source: Authors' computations based on OAG.

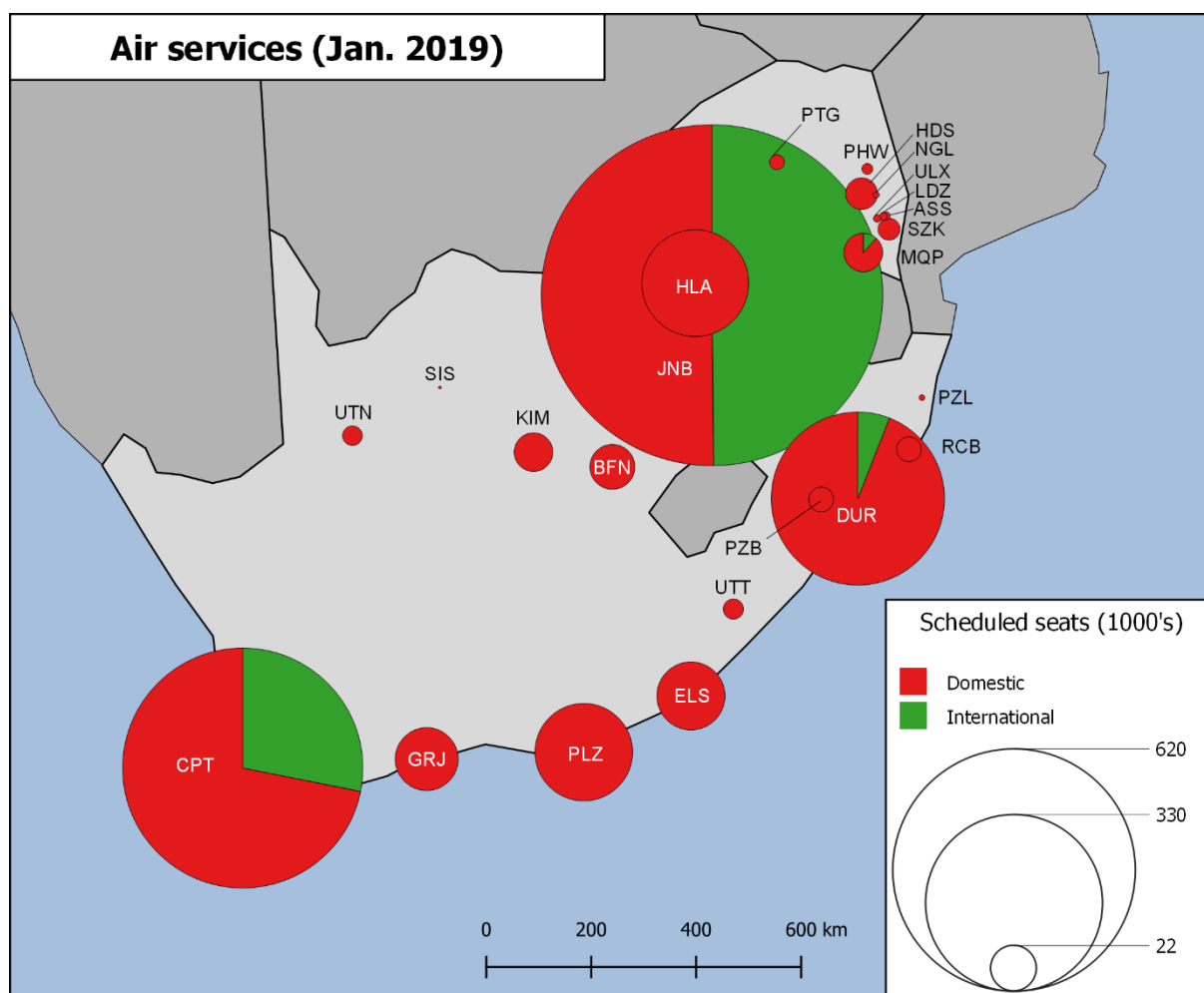


Figure 1. Air services by airport (January 2019)

Source: Authors' elaboration based on OAG

Table 2 shows there has been an 83-% increase in the number of domestic seats over the past two decades. Among the larger airports, Johannesburg (OR Tambo International Airport, JNB) has increased less quickly, which suggests less concentrated traffic than before. Actually, Johannesburg's city is now served by a second airport, namely Lanseria (Kriel and Walters, 2016⁵). If one considers the two airports jointly, Johannesburg experienced an 86-% increase in seat capacity. As a result, the geographical concentration at city level has remained nearly unchanged. In operational terms, it is clear Lanseria Airport has contributed to the emergence of a multiple-airport system in Johannesburg (Zietsman and Vanderschuren, 2014), which is unique in Africa (de Neufville and Odoni, 2013). In addition, Cape Town, Durban and some smaller airports have enjoyed a significant increase in air traffic.

Finally, the last two lines of Table 2 show that domestic services in Africa as a whole have grown even faster than in more mature South Africa, with a 114% increase in seats supplied from 1999 to 2019. As a result, South Africa's contribution to seats supplied by Africa has decreased from 41% to 35%, which remains significantly large for one single country.

⁵ See also Lanseria International Airport's website, About the airport, History and News pages, <https://lanseria.co.za> (Accessed 09.10.2019)

Moving to route level at the inter-airport level, Figure 2 also shows a clear geographical concentration. South Africa's domestic network is dominated by the Johannesburg-Cape Town and Johannesburg-Durban routes, both of which have been duplicated by using also Lanseria Airport. Other significant routes include Cape Town-Durban (the third side of the so-called Golden Triangle) and Johannesburg-Port Elizabeth. The latter puts into perspective the weight of the Golden Triangle to some extent, and is arguably driven by the aforementioned factors that support air traffic from/to Port Elizabeth. Most other routes are radial and link Johannesburg to cities such as East London and George. However, there are some other non-radial routes that link third-tier cities with Cape Town and Durban only but not each other. Johannesburg is operated as a hub by SAA and its partners, with optimised connections.

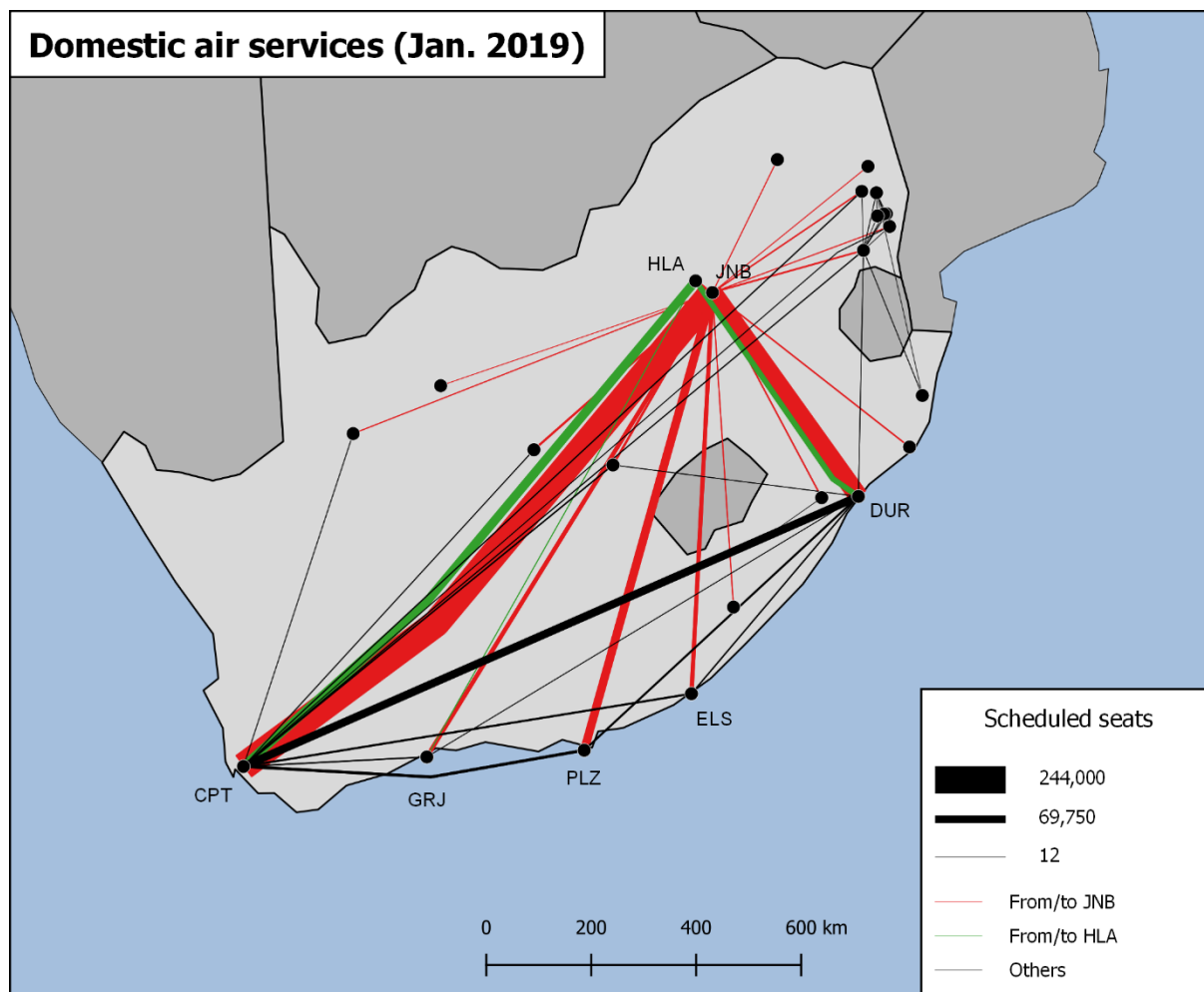


Figure 2. Air services by route (January 2019)

Source: Authors' elaboration based on OAG

6. The incumbent flag airline against newcomers

Figure 3 and Table 3 unveil changes in the South African domestic market based on the volume of seats supplied over the past two decades. It first appears this market experienced a dramatic increase in absolute terms, the number of seats being multiplied by 1.83 between January 1999 and January 2019. But this market development clearly did not benefit all airlines in the same manner. As Figure 3 clearly shows, the number of seats supplied by SAA has decreased dramatically, although this was slightly balanced by the development of its re-

gional affiliates. In contrast, British Airways/Comair has grown dramatically (its volume of seats being multiplied by about 2.4). This is very much in line with the relative demise of flag carriers often observed in domestic markets that are large enough to accommodate a second domestic FSNC (even though if the challenger is usually more fragile, as can be seen in Australia with Ansett, then Virgin Australia, versus Qantas).

All together, the low-cost airlines have reached a dominant position in South Africa. Each of the three low-cost airlines is in the top three by number of seats and each one supplies about twice the number of seats than SAA does. The last two newcomers have grown so quickly they have become first and second domestic airlines.

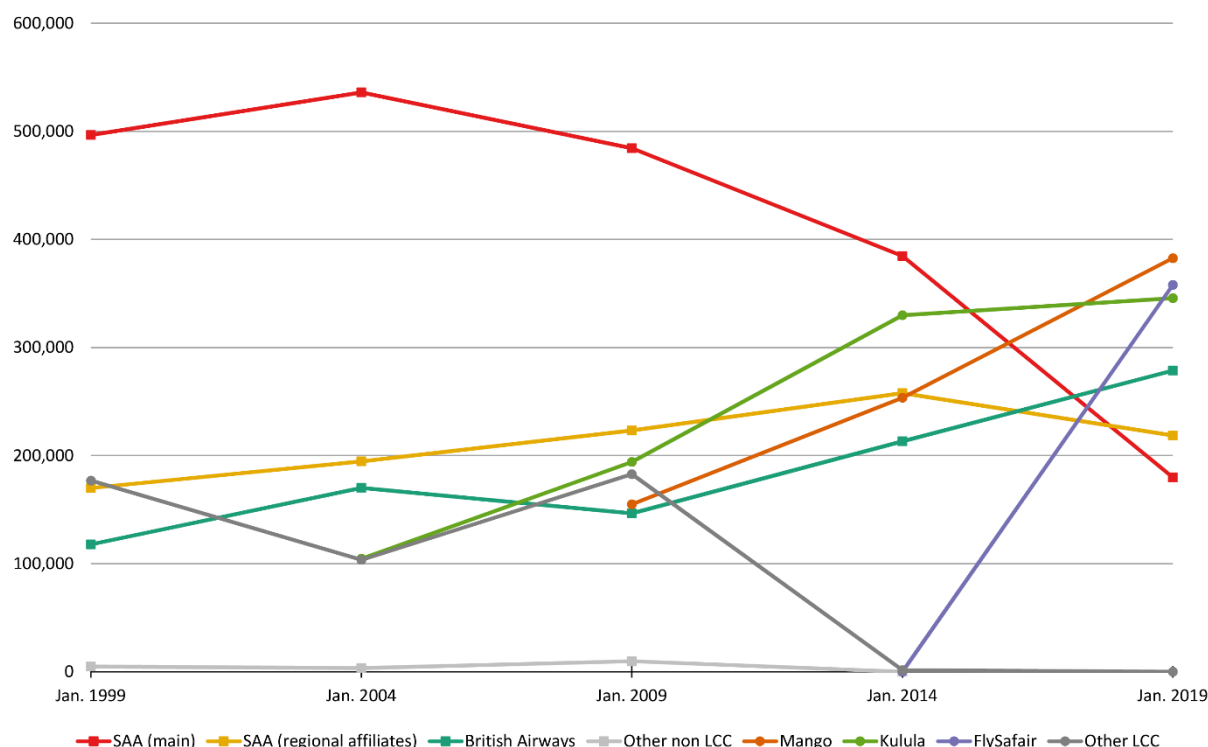


Figure 3. Airline seats on the South African domestic market (1999-2019)

Source: Authors' elaboration based on OAG

	Jan. 1999	Jan. 2004	Jan. 2009	Jan. 2014	Jan. 2019
SAA (main)	51.4%	48.2%	34.7%	26.7%	10.2%
SAA (regional affiliates)	17.6%	17.5%	16.0%	17.9%	12.4%
British Airways	12.2%	15.3%	10.5%	14.8%	15.8%
Other traditional airlines	0.5%	0.3%	0.7%	0.0%	0.0%
Mango	0.0%	0.0%	11.1%	17.6%	21.7%
Kulula	0.0%	9.4%	13.9%	22.9%	19.6%
FlySafair	0.0%	0.0%	0.0%	0.0%	20.3%
Other low-cost airlines	18.3%	9.3%	13.1%	0.1%	0.0%
<i>Traditional airlines</i>	<i>81.7%</i>	<i>81.3%</i>	<i>61.9%</i>	<i>59.4%</i>	<i>38.4%</i>
<i>Low-cost airlines</i>	<i>18.3%</i>	<i>18.7%</i>	<i>38.1%</i>	<i>40.6%</i>	<i>61.6%</i>
Seats	965,930	1,111,861	1,395,614	1,440,144	1,763,323

Table 3. Airlines' market share on the South African domestic market (seats, 1999-2019)

Source: Authors' computations based on OAG

As a result of these changes, the overall market share of the traditional airlines has dropped from 81.7% to 38.4%. Conversely, the share of the low-cost airlines has jumped to 61.6% (Table 3). The most dramatic change is the shrinking of SAA, whose domestic market share has been divided by a factor of five. However, this did not prevent the development of British Airways, which suggests there is still a rationale for traditional airlines in South Africa. SAA ultimately faces two kinds of competition: through prices (low-cost airlines) and through service quality (British Airways).

Beyond brand names, however, it is relevant to consider actual ownership and market agreements. From this perspective, the ‘SAA galaxy’⁶ (SAA itself, its regional affiliates and its low-cost subsidiary, Mango) has performed better. Indeed, its aggregated number of seats is more or less stable (being multiplied by 1.17 only), so its market share dropped from 69.0% to “only” 44.3%. From such a perspective, SAA is still the dominant player. As for the Comair brands (namely, services operated under the British Airways franchise plus low-cost airline Kulula, see above), the aggregated volume of seats has been multiplied by 5.3 and the market share by 2.9 over the past two decades. Comair thus controlled 35.4% of the early 2019 market. In this perspective, it now occupies second place in the South African domestic market. Comair is even the leader if one compares it to SAA and Mango (thus excluding the regional affiliates, which does not belong to SAA and whose the network geography is very different).

Turning to network geography, Figure 4 shows each airline’s network, while Table 4 summarises main related attributes. SAA appears to have a residual geography, with just four routes between Johannesburg and the four largest destinations. The network has become so skeletal that SAA does not even serve the third side of the Golden Triangle since this route has been transferred to its subsidiary, Mango. In contrast, SAA regional affiliates operate a myriad of thin routes (about 5,000 monthly seats on average), including short ones. These shorter routes mostly link Johannesburg to the eastern game parks for international connecting passengers (Lamy-Giner, 2017). British Airways shows a somewhat more elaborate network, serving the whole Golden Triangle plus another three routes serving Port Elizabeth. In contrast with SAA, British Airways does not serve East London at all and supplies significantly more seats between Johannesburg and Port Elizabeth. The rationale behind this choice might be that Port Elizabeth has a stronger economic basis than East London. The economic structure and volume generate much more demand for business-oriented air travel. As a state-owned airline, SAA may feel compelled to offer its services to both cities, considering they were historical strongholds of the African National Congress (Southall, 1999).

The three low-cost airlines (right part of Figure 4), focus mostly on the main destinations and serve more routes than both SAA and British Airways. They also serve Lanseria, Johannesburg’s secondary airport (see above), and significantly focus on the Golden Triangle, although Kulula offers a limited service between Cape Town and Durban to avoid cannibalisation between the two brands of Comair airline, considering the higher volume supplied by British Airways on this route. Finally, FlySafair operates more routes than the two other low-cost carriers. Since its total volume is similar, the average number of seats per route is thus smaller on average (about 30,000 against 45,000, see Table 4).

⁶ By ‘galaxy’, we mean the mother company SAA itself, its fully-owned LCC brand, Mango, and its two regional affiliates linked with SAA through with a commercial agreement, although financially independent, be it SA Express (a public-owned sister company) or SA Airlink (a privately owned airline wherein SAA has just a 3% share). These four airlines can be regarded as the four complementary pillars of a coordinated marketing strategy to cover all segments of the South African domestic market, from FSNC to LCC, and from trunk lines to marginal regional services.

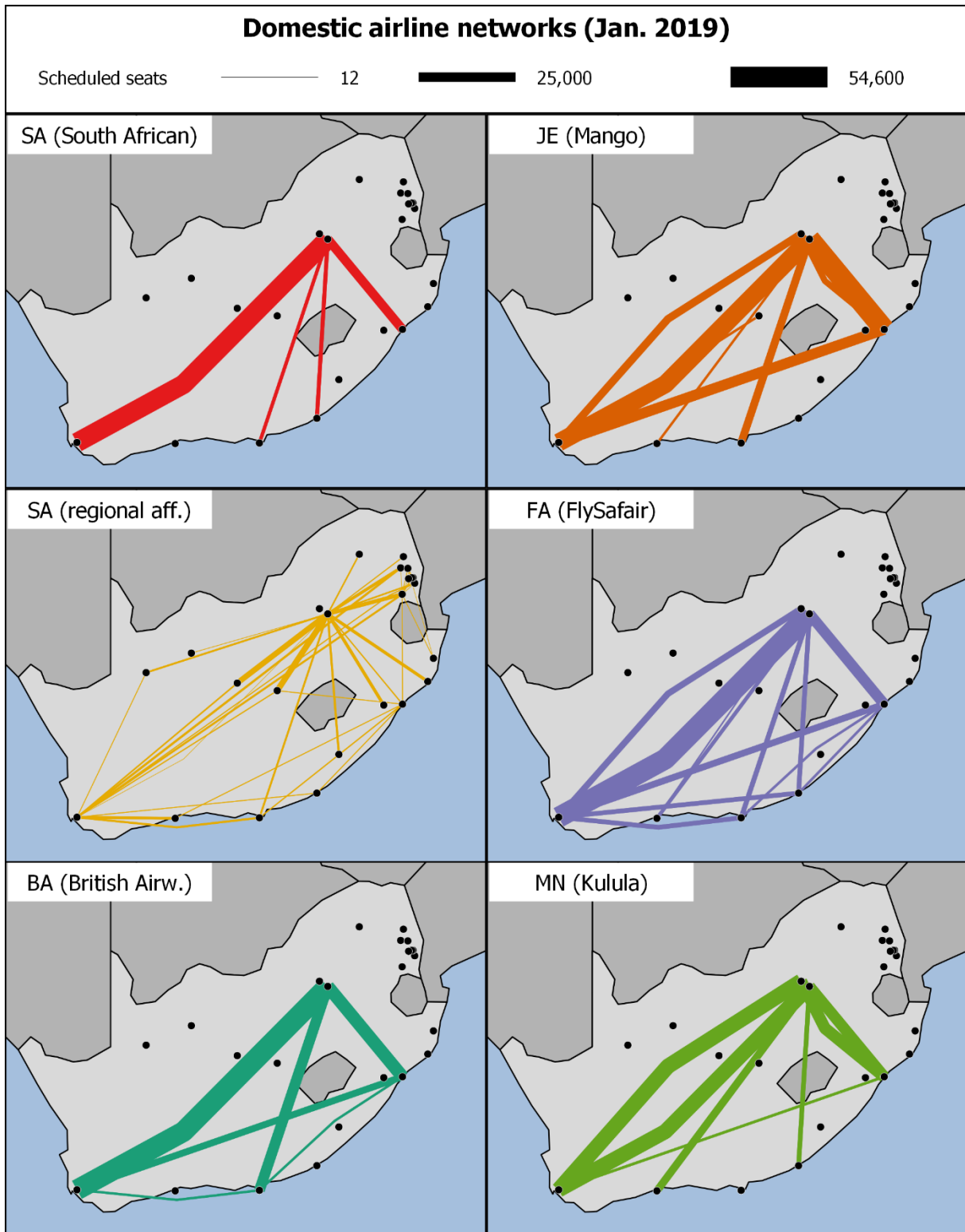


Figure 4. Airline domestic networks (January 2019)
Source: Authors' elaboration based on OAG

	Seats	Airports	Routes	Seats/route
SAA (main)	179,646	5	4	44,912
Mango	382,904	7	8	47,863
SAA (regional affiliates)	218,611	23	43	5,084
FlySafair	357,510	5	12	29,793
British Airways	279,160	4	6	46,527
Kulula	345,492	6	7	49,356

Table 4. Key network attributes on the South African domestic market (January 2019)

Source: Authors' computations based on OAG based on legs⁷

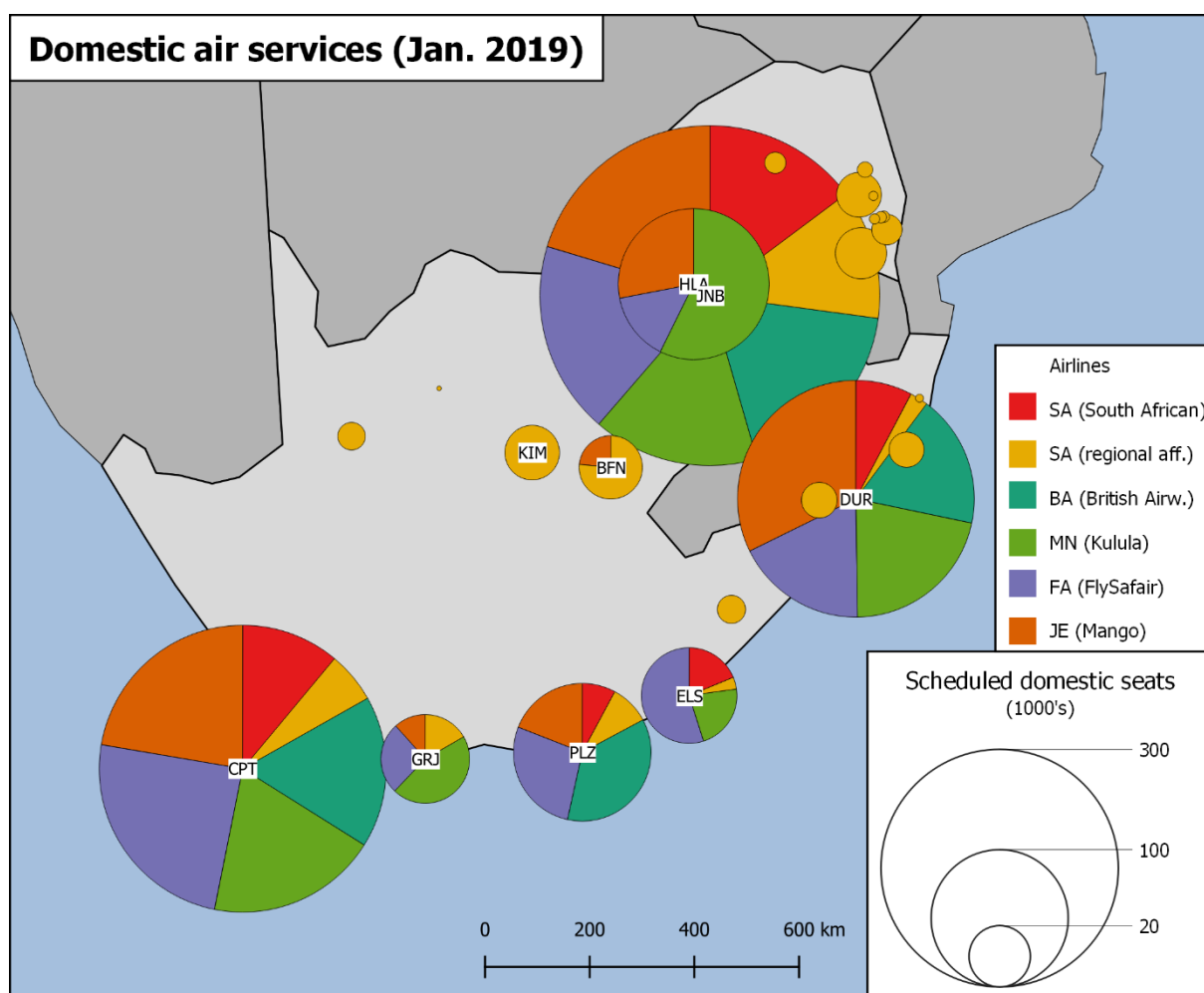


Figure 5. Airline split by airport (January 2019)

Source: Authors' elaboration based on OAG

These network strategies are translated into the specific airline split per airport illustrated in Figure 5 and summarised in Table 5. Smaller airports are dominated by SAA regional affiliates, which are usually the only carriers serving them. In the larger airports (with the exception of Lanseria), there are three to six carriers, including the regional affiliates. Lanseria, as

⁷ Supposing one airline operated A-B-C flights under one single flight number; we thus considered the A-B and B-C legs.

Johannesburg's secondary airport, accommodates the three low-cost carriers only and is further from the Johannesburg city centre than OR Tambo International Airport. Lanseria is less accessible by road and by public transport. This airport fits with the model of large cities' multiple-airport systems in which one private facility specialises in low-cost operations. The low-cost air services offered by OR Tambo International Airport are three times larger (by seats) than those offered by Lanseria. In addition, South Africa's six airlines are all represented at the two other large markets, namely airports in Cape Town and Durban. In contrast, the market is somewhat more concentrated at the medium-sized airports in Port Elizabeth, East London and George. In Port Elizabeth, the traditional airlines (SAA, its affiliates and British Airways) are still dominant (54.3%), whereas in George and East London, the low-cost carriers dominate. As a gateway to Knysna on South Africa's popular Garden Route, George is served by the second-highest share of low-cost carriers (83.3%).

Airport code & name	Seats (1,000's)	SAA+BA (%)	SAA reg. affil. (%)	Low-cost (%)
JNB Johannesburg ORT	615.9	33.2	12.4	54.4
CPT Cape Town	438.3	28.1	5.8	66.1
DUR Durban King Shaka	299.0	25.8	2.5	71.7
HLA Johannesburg Lanseria	121.4	0.0	0.0	100.0
PLZ Port Elizabeth	101.2	44.1	9.3	46.6
ELS East London	49.2	18.8	4.1	77.1
GRJ George	42.0	0.0	16.7	83.3
BFN Bloemfontein	21.6	0.0	76.4	23.6
KIM Kimberley	16.0	0.0	100.0	0.0
MQP Nelspruit	14.1	0.0	100.0	0.0
HDS Hoedspruit	10.8	0.0	100.0	0.0
PZB Pietermaritzburg	6.8	0.0	100.0	0.0
RCB Richards Bay	6.8	0.0	100.0	0.0
SZK Skukuza	5.1	0.0	100.0	0.0
UTT Umtata	4.3	0.0	100.0	0.0
UTN Upington	4.2	0.0	100.0	0.0
PTG Polokwane	2.5	0.0	100.0	0.0
PHW Phalaborwa	1.3	0.0	100.0	0.0
Others	3.1	0.0	100.0	0.0
Grand total	1,763.3	26.0	12.4	61.6

Table 5. Airline type split by airport (January 2019)

Source: Authors' computations based on OAG

7. Discussion and conclusions

This series of results echoes both external forces and internal factors. Regarding the external forces, South Africa has long been a tourist destination from the Global North. Since international flights mostly serve Johannesburg, connecting passengers need to turn to domestic flights. In other words, the domestic pattern of South Africa's airline network is shaped to some extent by this international dimension. In addition, the low-cost airline business has become a well-established model that tends to disseminate toward more and more regions, including the Global South. Accordingly, the development of low-cost air services in South Africa is not surprising given the country's characteristics and recent history, which includes aviation liberalisation and the emergence of a new middle class.

The internal factors are first related to South Africa's urban system. The country has several big cities, with six so-called metropolitan municipalities⁸ of at least one million inhabitants (Baffi et al., 2018). Given the country's size and inter-city distances, these cities are distant enough to justify air services, and the collapse of long-distance passenger trains over the past two decades has fuelled the growth of domestic air services (Baffi, 2014).⁹ Coach services have better resisted the impact of the increasing popularity of air services, but have been broadly confined to middle-distance markets and have remained rather protected. South Africa's economic structure mirrors its urban system, and this could only reinforce the demand for long-distance inter-city travel within the country. Let us also recall that beyond the urban system, Port Elizabeth and East London enjoy strong political support from the new regime, considering they are the ANC's cradle and the poorest province (Southall, 1999; Reynolds, 2018; Charlier, 2019). This political connection potentially influences airline networks in two ways: it objectively increases demand for air travel but also may involve some over-service by state-owned airlines. Finally, tourism plays a major role in the increase in air traffic between the domestic tourist destinations, especially Cape Town (which is also international) and George (which is mostly domestic).

Domestic air travel has also been supported by the development of the new middle class following the abolition of apartheid and the election of the ANC as the new democratic government in 1994, post-apartheid regime. The propensity to travel of the new middle class could have been favoured by the emergence of the low-cost airlines and the new degree of competition between airlines, which is induced by both the low-cost airlines and British Airways' entry into the South African market.

These changes cannot be isolated from the political and social dimensions of the apartheid years and the political changes that accompanied the institution of the ANC government. The liberalisation of the domestic market was still initiated during the apartheid years by the white Anglo-Saxon minority, which has traditionally wielded significant economic power. Such liberalization wrested control of SAA from the ruling National Party (and thus the Afrikaners, which had the political power at the time) before the country's democratization. This interpretation is somewhat speculative and deserves further investigation. Then the ANC has not challenged aviation liberalisation. On the contrary, ANC leaders embraced the neoliberal orthodoxy, notably because they really needed international investors to boost the weak economy they inherited from the apartheid regime (Beresford, 2016). But it could also be that the new regime could only support the idea of new entrants through the so-called Black Economic Empowerment initiative (see Seekings and Nattrass, 2015) introduced to address social inequalities based on colour in the workplace and in social life.

To understand South Africa, one needs to consider the country's strong, persistent social-racial divide. The collapse of apartheid has led to formal legal equality across races. But while the abolition of apartheid has driven the emergence of a small Black elite and a new Black middle-class, social inequality has become even stronger since 1994 – among the highest in the world (Beresford, 2016; Clarno, 2017). Apart from legal equality, ethnic groups do not mix much with each other generally. Simply said, “(...) South Africa has not become the rainbow nation that Nelson Mandela and Desmond Tutu hoped for, but rather remains a deeply divided country” (Picard and Mogale, 2015:9). In this context, the use of airlines by the various ethnic groups seems uneven, as suggested by a series of observations *in situ* by one of the authors, who took about 50 domestic flights between 1992 and 2019 (of which 29 were

⁸ Under the official South Africa regime, which gives the functions of local government to a city or a conurbation (aka Category A municipality).

⁹ In January 2019, there were just four weekly return trips by train between Johannesburg and Cape Town, and just three between Johannesburg and Durban, Port Elizabeth or East London.

with South African Airways or one of its regional affiliates, and 16 with British Airways/Comair) (see Appendix 1). For instance, the share of white passengers seems higher aboard British Airways flights, especially in business class. Conversely, SAA cabin crews seem currently mostly black (while they used to be mostly white in the apartheid days). In contrast, British Airways cabin crews apparently still show a higher proportion of white members. This deserves extra investigations by scholars, based on a more systematic approach and on a wider sample.

In conclusion, this paper demonstrates the extent to which airline networks do not just randomly appear but are the result of three interacting forces: the attributes of the destinations, public actors' policies and strategies pursued by private stakeholders. From this perspective, the investigation of air transport geography forces scholars to integrate all these factors into their analyses. The case of South Africa is a typical example of how (geo)political, social and economic factors combine to shape air networks. This paper helps to fill a research gap in domestic airline markets in general, (particularly in view of the fact that they account for 59% of global revenue passengers in 2018¹⁰) and more specifically in Global South countries. However, further research is needed.

Covid-19 Postscript

Most of this paper was designed and written before the ongoing Covid-19 health crisis and its related social and economic turbulences. It was submitted in late January 2020, thus at a time when the crisis was still restricted to Asia. The revision was made in May 2020, at a time when the aviation industries of most countries, including South Africa, were still hard hit by confinements and travel bans. At the time, the future of many airlines and perspectives of recovery, if any, were still unclear. In this context, we can only note that South African Airways, which already faced serious difficulties before the crisis, will eventually be liquidated. Its regional affiliate, SA Express, is currently in business rescue (similar to the US Chapter 11 bankruptcy protection). SA AirLink, the other regional affiliate, which is 97% privately owned, has become independent, with its own certificate and its own airline code for future operations. British Airways' Comair and Kulula's Comair are both in business rescue. Only Mango and FlySafair seem to have been spared at this stage, but will the former survive the fall of SAA? The impact of these unprecedented events on South Africa's aviation landscape is still unclear.

Appendix 1: Domestic South African flights of one of the authors between 1992 and 2019

Month	Flight	Airline	Aircraft	Class
11/1992	JNB-DUR	SAA	B737	Y
11/1992	DUR-ELS	SAA	B737	Y
11/1992	ELS-PLZ	SAA	B737	Y
11/1992	PLZ-CPT	Flitestar	ATR 72	Y
12/1992	CPT-JNB	SAA	A300	Y
03/1994	JNB-DUR	SAA	B737	Y

¹⁰ Source: ICAO's 2018 Air Transport Statistical Results, retrieved from <https://www.icao.int/annual-report-2018/Pages/the-world-of-air-transport-in-2018-statistical-results.aspx> (accessed 16 January 2020).

03/1994	DUR-JNB	SAA	B737	Y
03/1996	JNB-DUR	SAA	B737	C
03/1996	DUR-JNB	SAA	B737	Y
03/1998	JNB/PLZ	BA (Comair)	B737	Y
03/1998	PLZ/JNB	BA (Comair)	B737	Y
11/1998	JNB/CPT	Nationwide	B727	Y
11/1998	CPT/PLZ	SAA	B737	Y
11/1998	PLZ/DUR	SAA	B737	Y
11/1998	RBC/JNB	SAA regional	Dash 8	Y
03/2000	JNB/RBC	SAA regional	Dash 8	Y
03/2000	DUR/JNB	Nationwide	BAC 111	Y
05/2000	JNB/CPT	SAA	A300	Y
05/2000	CPT/JNB	SAA	A300	C
11/2001	JNB/PLZ	BA (Comair)	B737	C
11/2001	PLZ/JNB	BA (Comair)	B737	C
08/2002	JNB/DUR	SAA	B737	C
08/2002	DUR/PLZ	BA (Comair)	B737	C
08/2002	PLZ/JNB	BA (Comair)	B737	C
01/2009	JNB/DUR	BA (Comair)	B737	Y
01/2009	DUR/JNB	BA (Comair)	B737	C
02/2009	JNB/CPT	Mango	B737	Y
02/2009	CPT/PLZ	SA regional	CRJ	Y
02/2009	PLZ/JNB	BA (Comair)	B737	Y
02/2011	JNB/PLZ	SAA	B737	Y
02/2011	PLZ/CPT	SAA regional	CRJ	Y
02/2011	JNB/CPT	SAA	B737	C
02/2011	CPT/JNB	SAA	A340	Y
06/2011	JNB/CPT	SAA	B737	Y
06/2011	CPT/JNB	SAA	B737	Y
11/2013	JNB/PLZ	SAA	A319	Y
11/2013	PLZ/CPT	BA (Comair)	B737	Y
11/2013	CPT/JNB	Mango	B737	Y
11/2014	JNB/DUR	SAA	A319	Y
11/2014	DUR/ELS	SAA regional	CRJ	Y
11/2014	GRJ/JNB	SAA regional	CRJ	Y
11/2015	JNB/DUR	BA (Comair)	B737	C
11/2015	DUR/PLZ	BA (Comair)	B737	C
11/2015	PLZ/CPT	SA regional	Dash 8	Y
11/2015	CPT/JNB	BA (Comair)	B737	C
11/2016	CPT/JNB	BA (Comair)	B737	C
11/2016	JNB/BMF	SA regional	CRJ	Y

11/2016	KIM/JNB	SA regional	Dash 8	Y
02/2019	JNB/CPT	BA (Comair)	B737	Y
02/2019	CPT/JNB	BA (Comair)	B737	C

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