Cleared For Takeoff

Determining The Next Major Airport Hubs in Africa

Introduction

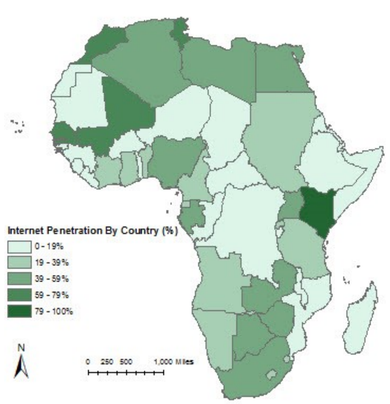
Africa is the last great economic frontier. Commercial aviation of both passengers and freight is an integral aspect of economic development. This is especially true in a place such as Africa where travelling by ground is largely prohibitive due to the vast distance between points, infrastructure shortcomings, safety concerns, or all of the above. While some nations have successfully developed their own airlines, most small domestic airlines have failed to turn a profit and subsequently gone out of business. This has largely been due to inconsistent as well as relatively inelastic demand. Most people who fly in Africa are not middle class, as is such in most other parts of the world. Instead, most passengers are upper class and therefore are not concerned with price. This might seem like a good problem for the airline industry, after all having people who will pay anything for a ticket is a positive, but it belies an underlying issue in Africa: there is no measurable middle-class yet. The middle-class is important because it represents a huge group of people with the means to fly.

As Africa's economy grows, so too does its middle class. This growth has been uneven across the continent, with West and East Africa experiencing some of the most impressive gains. Some nations in West Africa for example, are growing at over 6% per year. Simultaneously, some East African nations are beginning to invest heavily in human capital and infrastructure, leading global brands such as Google to establish headquarters in the region. The growth of certain regions, and certain countries in particular, no longer seems to be a question of if, but when. Taking that into account, major airlines (Delta), low-cost carriers (JetBlue) as well as international investors are eager to find where the next large inter and intracontinental airport hubs will be. In order to do this, this project looks past the largest 20 airports on the continent in an effort to uncover the less-obvious nations, and their respective airports, that are well suited to serve as future hubs for Africa's air traffic.

Quantitative Analysis

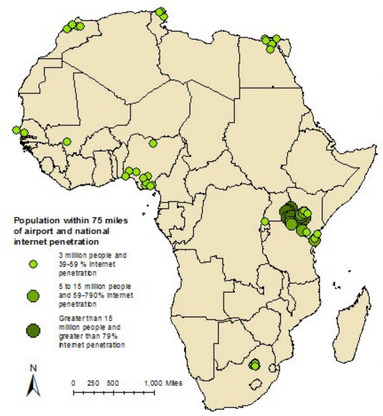
Simply using GDP as a predictor of growth would not suffice for this analysis because in order for the modern aviation industry to thrive, there must be a high degree of connectivity amongst its passengers. This allows people to book and modify reservations. Internet connectivity is also incredibly crucial for an airline's safety and maintenance programs, since most modern aircraft maintenance and reporting are done via cloud software. An airline's safety record is directly tied to people's willingness to fly it. Poor maintenance due to unreliable connectivity poses a safety hazard, and thus a hazard to the viability of the company. For these reasons, Internet Penetration (%) was used as a quantitative metric. Studies have shown that a nation tends to begin transitioning towards a more stable economy when internet penetration rises above 20%. That was used a floor for evaluations, but the real focus was on nations that had connectivity of at least double that minimum standard. This yielded several surprising results.

Internet Penetration in Africa 2016



Next, every airport (and its respective host nation in Africa) was joined to estimated population data for 2020. This helped determine where population growth at the national level could be expected in the next two years, however, it did not yet tie in the airports to population density. To do this, a buffer of 75 miles around each airport in Africa was created and the total number of people living in that buffer was calculated. Getting the population around an airport proved useful because it can be compared to population statistics of Top 20 airports. From this patterns began to emerge. Most Top 20 airports have at least 5 million people within 75 miles. This became another metric. Finally, you may be asking why 75 miles? Why not 50 or 100? 75 miles was determined to be a good buffer zone because it equated to about a 2 to 2.5 hour drive on most of the roads in Africa.

Airports in High Population Areas with High Internet Penetration



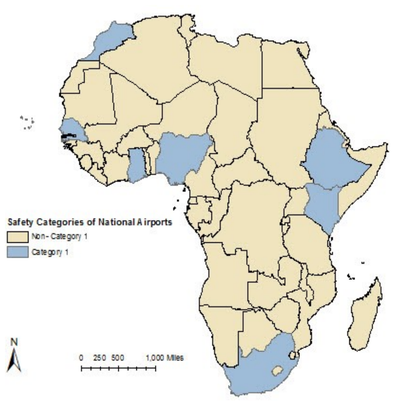
Finally, internet penetration and population within 75 miles were given ranks between 1 and 5 for each nation. These numbers were then added together to form a composite score. Most of the dots are in countries where one might expect it – but there were some surprises as well.

Qualitative Analysis

Safety is vital, and the aviation industry understands this. For an international airport to have direct flights to/from the US, it must be certified as a "Category 1 Airport". This means it has passed certain safety inspections and the US approved direct traffic. This is crucial for economic reasons as it not only bestows credibility but also opens the gates for huge amounts of passenger and freight traffic. As of 2018, only 7 nations in Africa have achieved "Cat 1" status.

The purpose of this analysis is to uncover potential airport hub host countries that one would not automatically think of. Therefore, nations that fell within the Top 10 for GDP were deselected from the results. The table shows the Top 10 GDP African nations.

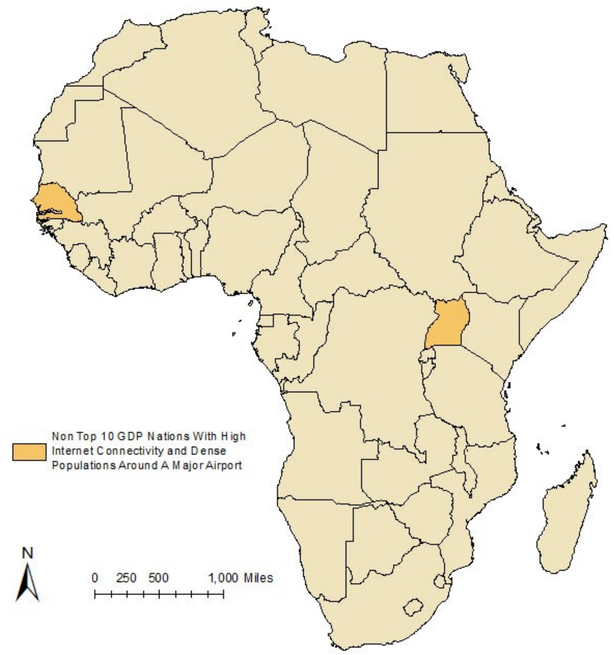
Nations with Cat 1 Airports 2018



Top 10 GDP in Africa

Rank	Country	($ USD Bn)
1	Nigeria	$406.0
2	Egypt	$332.3
3	South Africa	$294.1
4	Algeria	$160.8
5	Morocco	$100.6
6	Angola	$95.8
7	Sudan	$94.4
8	Ethiopia	$72.5
9	Kenya	$68.9
10	Tanzania	$47.2

Senegal & Uganda: Africa's Next Airport Hubs



Results

Each map corroborates the story of the other maps. The nations with the highest internet penetration tend to be the nations with the most people clustered around airports and also the same nations that have Category 1 airports. These same nations are also generally the ones found in the Top 10 GDP table. However, there are a few nations that do not show up in the Top 10 GDP table that are present in most of the maps: Senegal and Uganda. Senegal has the 17th highest GDP in Africa and Uganda comes in at 21st. These are exactly the types of nations that this analysis attempted to uncover: smaller, overlooked, stable, up and coming nations that are strategically located along the west and east coasts.

Senegal completed a new $500 million international airport in its capital city, Dakar, in 2017 and is the US's closest ally in West Africa, having recently signed a multitude of trade and military agreements. Uganda's economy has been growing at greater than 5% per annum and it is investing heavily in public infrastructure. Uganda has not qualified for Cat 1 status like Senegal, but it can easily import the lessons from its neighbor to the north, Kenya, to construct airports and safety standards to earn Cat 1 recognition.

Coupling their locations and commitments to public infrastructure with such tangible data as internet penetration, and population density around major airports, Senegal and Uganda appear to be in prime position to become hubs and capitalize on the growing African aviation industry.

Sources

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Projection: Africa Albers Equal Area Conic, WGS 1984
Sources: ESRI, World Population, Open Flights, World Bank, World Stats, Transportation Research Journal