



BACKGROUND PAPER 16 (PHASE II)

An Unsteady Course: Challenges to Growth in Africa's Air Transport Industry

SUMMARY (UNCORRECTED)

Heinrich C. Bofinger

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Africa's Infrastructure | A Time for Transformation

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1818 H Street, NW
Washington, DC 20433 USA
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: feedback@worldbank.org

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The World Bank
1818 H Street, NW
Washington, DC 20433 USA

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About AICD



This study is a product of the Africa Infrastructure Country Diagnostic (AICD), a project designed to expand the world's knowledge of physical infrastructure in Africa.

AICD will provide a baseline against which future improvements in infrastructure services can be measured, making it possible to monitor the results achieved from donor support. It should also provide a better empirical foundation for prioritizing investments and designing policy reforms in Africa's infrastructure sectors.



AICD is based on an unprecedented effort to collect detailed economic and technical data on African infrastructure. The project has produced a series of reports (such as this one) on public expenditure, spending needs, and sector performance in each of the main infrastructure sectors—energy, information and communication technologies, irrigation, transport, and water and sanitation. *Africa's Infrastructure—A Time for Transformation*, published by the World Bank in November 2009, synthesizes the most significant findings of those reports.

AICD was commissioned by the Infrastructure Consortium for Africa after the 2005 G-8 summit at Gleneagles, which recognized the importance of scaling up donor finance for infrastructure in support of Africa's development.



The first phase of AICD focused on 24 countries that together account for 85 percent of the gross domestic product, population, and infrastructure aid flows of Sub-Saharan Africa. The countries are: Benin, Burkina Faso, Cape Verde, Cameroon, Chad, Côte d'Ivoire, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Uganda, and Zambia. Under a second phase of the project, coverage is expanding to include as many other African countries as possible.



Consistent with the genesis of the project, the main focus is on the 48 countries south of the Sahara that face the most severe infrastructure challenges. Some components of the study also cover North African countries so as to provide a broader point of reference. Unless otherwise stated,



therefore, the term “Africa” will be used throughout this report as a shorthand for “Sub-Saharan Africa.”



The World Bank is implementing AICD with the guidance of a steering committee that represents the African Union, the New Partnership for Africa’s Development (NEPAD), Africa’s regional economic communities, the African Development Bank, the Development Bank of Southern Africa, and major infrastructure donors.



Financing for AICD is provided by a multilateral trust fund to which the main contributors are the U.K.’s Department for International Development, the Public Private Infrastructure Advisory Facility, Agence Française de Développement, the European Commission, and Germany’s KfW Entwicklungsbank. The Sub-Saharan Africa Transport Policy Program and the Water and Sanitation Program provided technical support on data collection and analysis pertaining to their respective sectors. A group of distinguished peer reviewers from policy-making and academic circles in Africa and beyond reviewed all of the major outputs of the study to ensure the technical quality of the work.



The data underlying AICD’s reports, as well as the reports themselves, are available to the public through an interactive Web site, www.infrastructureafrica.org, that allows users to download customized data reports and perform various simulations. Inquiries concerning the availability of data sets should be directed to the editors at the World Bank in Washington, DC.



Summary

The air transport market in Sub-Saharan Africa presents a strong dichotomy. In southern and East Africa the market is growing. Three strong hubs and three major African carriers dominate international and domestic markets, which are becoming increasingly concentrated. In contrast, in Central and West Africa the sector is stagnating due to the collapse of Côte d'Ivoire and the demise of several regional airlines, including Air Afrique. Throughout Africa, subsidies enable many small, otherwise unviable state-owned operations to have a monopoly over domestic markets. Although there have been some promising signs—air traffic is on the rise, the number of routes and the size of aircraft are being adapted to the market, and a number of large carriers are viable and expanding—overall connectivity has been declining. As oil prices rise, the role of air transportation will be looked at even more critically. Africa is a poor continent, and some countries face the potential of further isolation as the cost of flying increases.

Infrastructure is not at the heart of the sector's problems: the number of airports is stable, and there are enough runways to handle traffic; what is required is better scheduling and relatively modest investment in parallel taxiways and some terminal facilities. Safety continues to be a problem, however: while aircraft are generally not unsafe, pilot capabilities and safety administration are lacking and air traffic control facilities are poor. Revenues from airports and air traffic are probably high enough to finance the necessary improvements but are not currently captured by the sector.

In an effort to inform the ongoing debate over Africa's infrastructure requirements, this report seeks to provide a more complete inventory of air transport capabilities than was previously available. It focuses on industry organization within Africa, overall accessibility, and the quality of oversight and infrastructure installations countrywide and at selected airports with a range of capacities.

In addition to data collected from questionnaires sent directly to the civil aviation authorities (CAAs) in each country, this report relies on data collected through a variety of other sources—especially from the providers of flight schedules to global reservation systems—to ensure that its analysis of trends is independent and unbiased.

A continental divide in air traffic

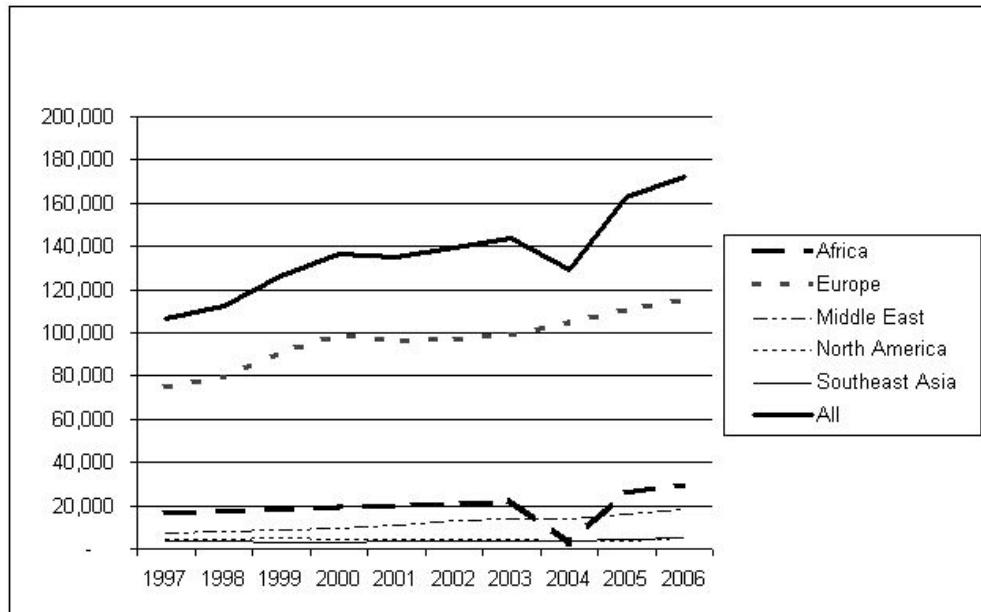
Following a significant global decline in 2001, Africa's air transport industry grew at a healthy 5.76 percent per year between 2001 and 2007. The decline is clearly visible in figure A, which shows traffic measured in seat kilometers between 1997 and 2006. Traffic rose 10.68 percent between 2004 and 2007 to roughly 123 million seats annually. The aggregated figures for Africa, as measured in seats offered, show growth in all types of scheduled air travel: intercontinental traffic, international traffic within Africa, and domestic travel (figure B).

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The countries' markets can be categorized by size: those with more than 4 million passengers are the largest, those with 1 million or more (but fewer than 4 million) are in the middle, and those with fewer than 1 million seats are at the low end.

Figure C shows a graphic representation of

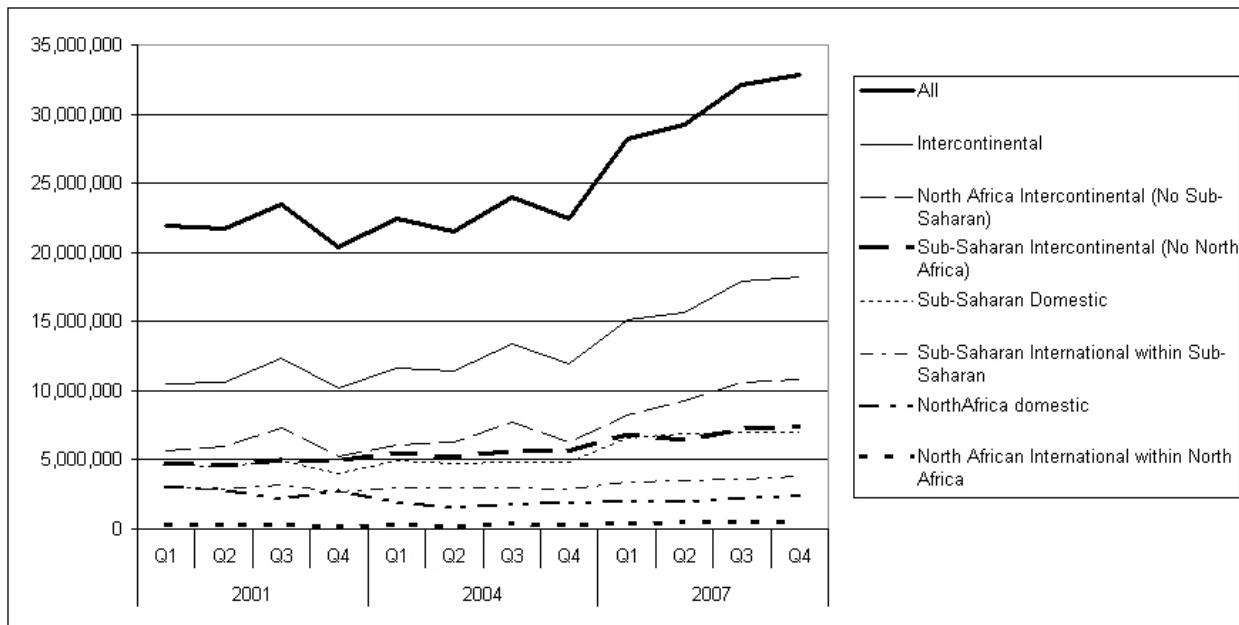
Figure A Overall traffic, measured in seat kilometers, in Africa



Source: Boeing Commercial Aircraft.

these markets. A clear swath of nations with small markets extends from Western Sahara in northwest Africa to the Democratic Republic of Congo (DRC). This pattern reappears on maps showing regional growth zones in international traffic and the quality of safety oversight and even somewhat in ones depicting the nature of airline ownership.

Figure B Overall traffic, measured in seat kilometers, in Africa



Source: Analysis on data provided by Seabury ADG.

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Intercontinental traffic in the region relies heavily on the three major hubs of Johannesburg, Nairobi, and Addis Ababa. It has grown at an annual average rate of 6.2 percent between 2001 and 2007. While the South African routes to the United Kingdom and Germany are still the most heavily trafficked, there has been a significant rise in services to the Middle East from all of the main hubs. North African intercontinental traffic grew 8.3 percent during the same period, with routes between France and Morocco, Algeria, and Tunisia being the most dominant. Egypt is another important entry point from Germany, the Russian Federation, and the Middle East.

International traffic within Sub-Saharan Africa grew more rapidly, at an average of 6.5 percent per year between 2001 and 2007; traffic between the region and North Africa increased by 25 percent per year. The same three major hubs handled 36 percent of this international traffic (figure D), with the inter-Sub-Saharan-African traffic dominated by national carriers: South African Airways, Kenya Airlines, and Ethiopian Airlines provided 33 percent, 70 percent, and 83 percent, respectively, of the international traffic through their hubs. Both Kenya Airways and Ethiopian Airlines have actively developed new routes on which they are the sole carrier, but South African Airways competes with one or more carrier on most of its international routes.

East Africa has a more developed air travel network than West and Central Africa, where only Nigeria has a significant number of connections, both intercontinentally and internationally. With the collapse of many national and regional carriers recently, West and Central Africa have suffered an absolute decline in service. North African international travel, meanwhile, showed gains of more than 9.5 percent per year between 2001 and 2007.

Figure C Markets segmented by size, as measured in seats available in 2007



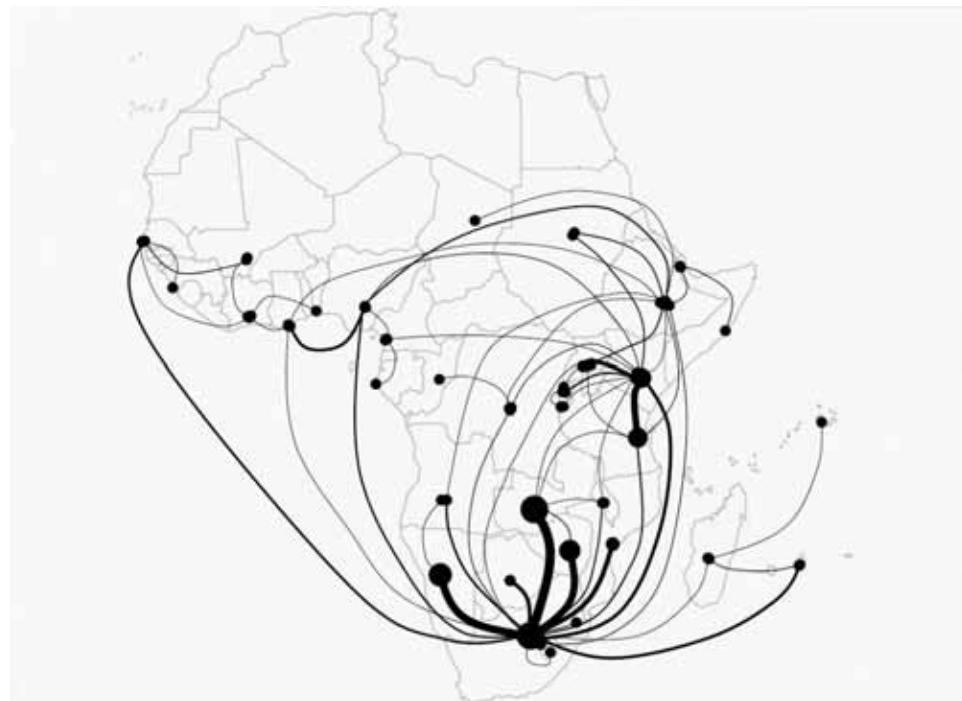
Source: Analysis on data provided by Seabury ADG.

Note: Cape Verde, not on the map, falls in the middle tier. Pronounced is the swath of countries with small markets visible from Western Sahara/Mauritania to the DRC.

Even though there has been an overall growth in air traffic, the number of city pairs served in Sub-Saharan Africa has dropped by 229 between 2001 and 2007. Excluding South Africa, Nigeria, and Mozambique, there has been an average annual decline of 1 percent per year and a loss of 137 routes between 2004 and 2007.

The impact of the Yamoussoukro Decision (YD) of 1999, an effort to liberalize international air travel within Africa, is best measured by the amount of fifth-freedom and beyond traffic within Africa. The percentage of international flights conducted by carriers not part of either country being served is highest in countries with the highest YD score (table A). Except for the Arab Maghreb Union (AMU), which is not a party to the YD, all countries have shown an increased market proportion of these airlines between 2004 and 2007.

Figure D Top 60 international routes in Sub-Saharan Africa



Source: Analysis on data provided by Seabury ADG.

Table A Percentage of flights between countries by airlines that are not based in either [

	AMU (%)	BAG (%)	CEMAC (%)	COMESA (%)	EAC (%)	SADC (%)	WAEMU (%)
Seats 2001	7.6	45.3	38.0	25.4	33.0	18.7	47.7
Seats 2004	8.3	36.3	11.8	9.9	12.2	2.3	43.7
Seats 2007	4.1	43.3	28.5	14.1	16.4	5.7	43.8
YD score	1	4	5	3	3	2	5

Source: Analysis on data provided by Seabury ADG.

Note: YD = Yamoussoukro Decision of 1999; AMU = Arab Maghreb Union; BAG = Banjul Accord Group; CEMAC = Economic and Monetary Community of Central Africa; COMESA = Common Market of Eastern and Southern Africa; EAC = East African Community; SADC = Southern African Development Community; WAEMU = West African Economic and Monetary Union.

Domestic Sub-Saharan African traffic had the fastest growth rate of all Sub-Saharan African traffic—more than 12 percent per year between 2001 and 2007—but this growth was not evenly distributed. Nigeria experienced annual growth in domestic traffic as high as 67 percent, while about half of the

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countries studied saw an absolute decline. This discrepancy may be explained by the fact that domestic air transport depends on many factors, including topology, income per capita, and types of services available. Ethiopia, home to one of the most important airlines in Africa, has relatively little domestic air transport, whereas domestic travel in Nigeria has skyrocketed. North African domestic traffic, meanwhile, has declined nearly 4 percent. With some notable exceptions, domestic travel in most countries is serviced by the country's flag carrier and features high market concentration.

Overall, a striking dichotomy emerges between the eastern and western sides of the continent. East and southern Africa, on the one hand, have developed major hubs and are home to the three most important airlines in Sub-Saharan Africa. These airlines spur economic growth throughout the region, which is served by a dense network of routes. Air service in West and Central Africa experienced steep declines shortly after 2001, followed by modest growth or further decline, and the hub system there remains less developed.

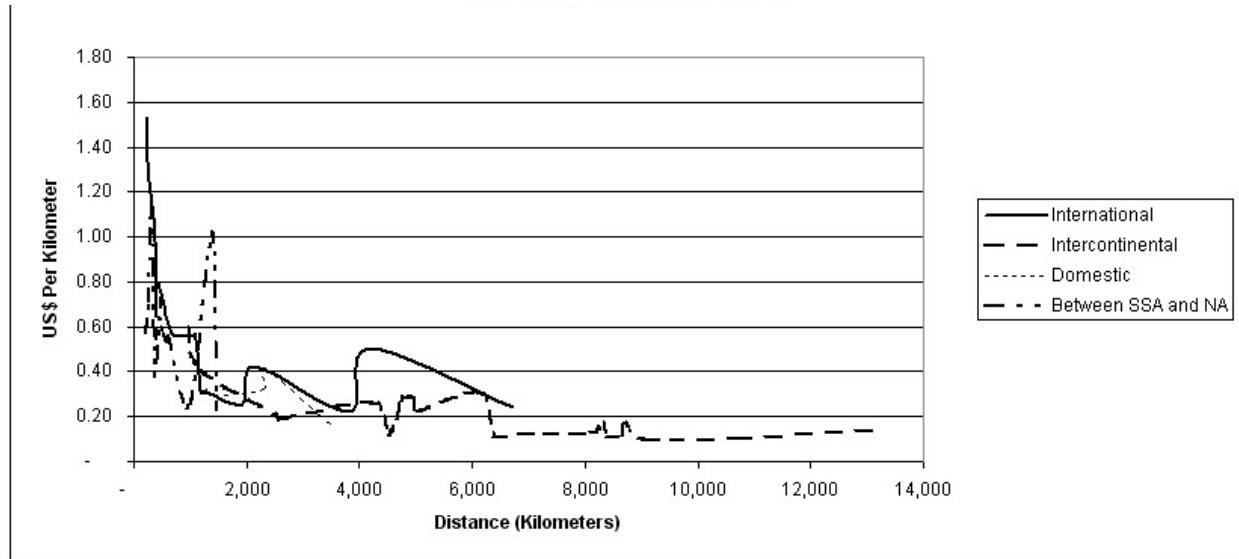
The uneven growth patterns in Sub-Saharan Africa were caused in part by the collapse of major carriers in the western portion of the continent, most notably Air Afrique, Air Gabon, Ghana Airways, and Nigerian Airways. While these collapses brought about a short-term drop in capacity, they have also spurred a much-needed consolidation of the industry in Sub-Saharan Africa. Major carriers in the south and the east are gradually expanding into western markets. Ethiopian Airlines, South African Airways, and Kenya Airways are taking over some of the discontinued routes, and east-west traffic is slowly growing.

Contrary to media reports, Africa's fleet of aircraft used for advertised scheduled services is being renewed and adjusted for the types of markets served. In nearly all regions, wide-bodied aircraft have been replaced with newer, smaller jets, such as the Boeing 737. These aircraft are more efficient for short to medium distances. Though the accident rates involving older, often Russian-built, aircraft are the highest in the world, the number of seat kilometers flown in these aircraft on regularly scheduled services is now very small.

Air travel within Africa is considerably more expensive (per mile flown) than intercontinental travel, especially on routes of fewer than 4,000 kilometers (figure E). This is because intercontinental routes serve larger markets than international or domestic ones and thus have more competition among carriers. Domestic fares are kept artificially low by subsidized or fixed pricing on some routes, and a recent study by Intervistas for the International Air Transport Association (IATA) concluded that the price elasticity of air transport within Africa is relatively high.

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Figure E Airfares on African routes



Source: Analysis on data collected by the World Bank.

Note: Includes North Africa.

Airside versus landside infrastructure

As of November 2007, 280 out of an estimated 2,900 airports in Africa were receiving regularly scheduled services. There were two massive gateways (Egypt and South Africa) and six additional important entry points (Morocco, Algeria, Tunisia, Senegal, Ethiopia, and Kenya). The number of available runways and their general condition did not seem to be a constraint, although the condition of the airport infrastructure varied widely. An informal analysis of runway conditions using commonly available satellite images (table B) revealed, among other things, that the 27 percent of runways in marginal or poor condition handle only an estimated 4 percent of Sub-Saharan traffic.

Runway capacity in Africa is not a limiting factor for traffic. Limiting factors for traffic include the ability to enter or leave the runway via taxiways, the amount of apron space for parking, and the amount of terminal space for processing passengers. North African countries have planned and developed their airports for expected increases in passenger traffic and are now capable of handling current and future numbers of travelers. Sub-Saharan airports, however, show clear constraints even at major airports, such as John Kenyatta International Airport in Nairobi, Kenya, and the landside infrastructure needs large capital investments.

Evidence suggests that larger airports in Africa are, in general, financially sustainable, with excess revenues going either to the airports in the system that are not self-sufficient or to uses other than airports.

Table B Runway quality in Africa

Rating	North Africa		Sub-Saharan Africa	
	Airports	%	Airports	%
Excellent	28	60	31	17
Very good	17	36	51	28
Fair	2	4	52	29
Marginal	-	-	8	4
Poor	-	-	37	21
Totals	47	100	179	100

Source: Analysis based on data collected by the World Bank.
Totals include double counting for in-region travel.

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The revenue stream for airports in Africa is somewhat different from those found in the West. Car rental booths and other concessions supply a larger portion of the revenues in the United States than in Africa, where airports rely heavily on passenger charges. Overall the airport charges are by necessity higher in Africa than in the West, but they vary considerably. In some cases excessive charges may be levied to finance construction of a new airport rather than upgrading existing facilities at a much lower overall cost.

Private sector participation in airports is limited throughout Africa, although some interesting examples, such as the airports company in South Africa, do exist. In most cases, private sector involvement has been limited to some concessions and management contracts, usually involving small investments.

Air navigation services and air traffic control throughout Sub-Saharan Africa is spotty and concentrated in a few centers. South Africa and Kenya have several radar installations and are able to actively monitor traffic. Ethiopia, the third most important airport in Sub-Saharan Africa, has no air traffic surveillance technology.

The most important airports feature instrument landing systems (ILSs) and basic traditional navigation aids. Away from the centers, navigation aids and communication stations are rare. African airports may not need to invest in radio-based navigation and surveillance infrastructure, such as very high frequency omni-directional radio range (VOR) or radar technology, but they will need to obtain less costly, satellite-based replacements such as the global navigation satellite system (GNSS) and the automatic dependent *surveillance*-broadcast (ADS-B) technologies.

Institutions and oversight

Sub-Saharan Africa's CAAs are generally underfunded. The safety inspectors, especially, lack the capacity to fulfill their duty as safety regulators. Anecdotal evidence has shown that political influence hampers authorities who are not autonomous. In many cases, revenues received by the CAAs, such as overflight charges, are handed to the state treasury, making the CAAs dependent on state allocations for financing.

Current accident rates in Africa reflect this lack of capacity. Africa has the highest accident rate of Eastern-built aircraft; it also has the highest accident rate of Western jets outside the former Soviet Union (figure F [[to come]]). The accidents are due to poor training and the failure (whether unknowing or willful) to follow procedures; they rarely can be chalked up to equipment failure alone. A recent accident involved a plane that was less than a year old.¹

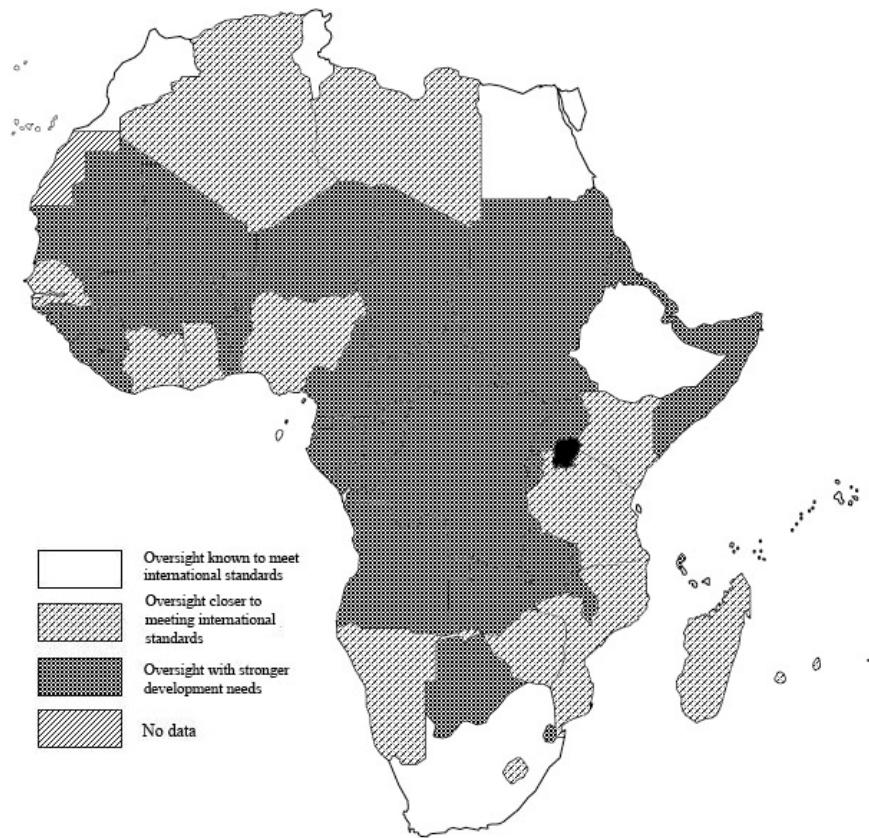
¹ The validity of the calculations behind the rate for the former Soviet Union is a matter of controversy, but it is commonly accepted that Africa is the least safe continent for air travel.

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Figure G shows how African countries rate in terms of their quality of safety oversight. Only a handful of countries are rated as having good oversight—Egypt, Ethiopia, Morocco, South Africa, and Tunisia—while as many as 24 countries are rated as having poor oversight.

To improve oversight, programs such as the Cooperative Development of Operational Safety and Continuing Airworthiness Projects (COSCAPs) are being proposed and implemented. In some cases, regional organizations pool resources from individual countries and oversight agencies to train and share qualified technical personnel, such as flight inspectors. Because these efforts are in the early stages, their effectiveness is not known. Similar programs have been highly effective in other regions, such as Latin America.

Figure G Quality of African safety oversight



Note: Since this map was produced, Gabon has been added to the list of countries with serious oversight problems. Cape Verde (not shown) carries the U.S. Federal Aviation Administration (FAA) category 1 rating for good oversight and adherence to international standards.

Policy recommendations

Based on available evidence, we have several general policy recommendations:

- Increase safety oversight by pooling resources and sharing them regionally.
- Invest in existing airport infrastructure, not new airports.
- Move away from state-owned, nonsustainable carriers.
- Develop new technology based on air traffic control systems and optimize airspace design for improved fuel efficiency and a smaller environmental footprint.
- Continue the process of liberalization as set forth in the YD.
- Develop and strengthen capacity in data collection for the air transport sector.