The Undersea Cable Boom in Sub-Saharan Africa

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During 2009–12, seven fiber-optic undersea cable systems were installed on the seabed around the east and west coasts of sub-Saharan Africa (SSA). Although many observers hope these cables' telecommunications transmission capacity will stimulate demand for Internet services (and promote economic growth) in the region, in the near term several factors will likely restrain demand for these services among the general population, including low per capita income, low levels of computer/smartphone ownership, and poor-quality domestic networks. Instead, during this period, the main beneficiaries of SSA's cables will likely be large domestic companies and multinational corporations operating in Africa.

What are undersea cables? Undersea cables, which consist of several strands of fiber optic cable surrounded by a protective covering, are a critical part of the global telecommunications infrastructure. Used to connect the land-based telecommunications networks of different countries that are separated by large bodies of water, these cables are laid on the seabed, stretching between the countries' coastal landing stations. Undersea cables—which offer very high levels of data transmission capacity ("bandwidth")—transport 95 percent of international telecommunications traffic.

Africa was left out of earlier undersea cable building booms around the world. Although the emergence and growth of the Internet in the late 1990s stimulated the large-scale construction of undersea cables in many parts of the world, SSA was largely ignored.

- Until 2009, the west coast of Africa was served by a single, older-generation undersea cable (called SAT-3). During this period, satellite services, which are slow, unreliable, and expensive, were SSA's only other source of international telecommunications connectivity.
- SSA accounted for only 0.2 percent of global telecommunications bandwidth during 2004–09.

More than $3 billion flowed into the construction of undersea cable networks around Africa during 2007–12. Several factors spurred this large-scale construction effort:

- Rapid growth in the number of mobile phone subscriptions over the previous decade spurred demand for telecommunications services and increased telecom carriers' revenues, making more funding available for network expansion.
- Large-scale financing became more widely available as private investors and international financial institutions (mainly the World Bank and the African Development Bank) increased lending for African telecom projects, particularly fiber optic networks.
- Builders and suppliers of fiber optic networks shifted their focus to Africa to maintain revenue growth as undersea cable construction projects in other parts of the world neared completion.

SEACOM—SSA's first new-generation undersea cable—began service in 2009. Following several years of planning, installation, and testing, Africa's first new-generation cable in Africa, SEACOM, was activated in 2009. Running from France through the Mediterranean and Red Seas to South Africa, SEACOM provided data transmission capacity to connected countries that was more than 10 times greater than that offered by existing communications satellites. Over the next three years, another six undersea cables were activated around Africa (see table).

The arrival of new undersea cables to SSA fueled high expectations. The activation of seven new high-bandwidth undersea cables on the east and west coasts of Africa was heralded as a historic achievement, with many commentators stating that undersea cable access would bring reliable international communications, faster Internet access, and lower prices, which would, in turn, stimulate increased commercial and entrepreneurial activity and, ultimately, economic growth. In addition, many

analysts have estimated that Africa's demand for international bandwidth since 2009 has been robust, and is likely to continue. For example:

- A 2013 study conducted by Terabit Consulting found that demand for international bandwidth in many African markets had grown at an annual rate of more than 100 percent during 2009-12.
- TeleGeography, a telecom industry consulting firm, estimates that Africa's demand for international bandwidth will grow at a compound annual rate of 51 percent during 2012-19.

Table: African submarine cables

System	Route	Countries	Ownership	Cost, $ m	In-service	Capacity[1]
ACE	France-S. Africa	18	Consortium	700	2012	5.12 tbps
WACS	U.K.-S. Africa	10	Consortium	600	2011	5.12 tbps
EASSy	Sudan-S. Africa	7	Consortium	265	2010	4.72 tbps
Main One	Portugal-Nigeria	2	Private	240	2010	1.92 tbps
GLO-1	U.K.-Nigeria	5	Private	800	2010	2.50 tbps
TEAMS	Kenya-UAE	1	Public partnership	130	2009	1.28 tbps
SEACOM	France-S. Africa	5	Private	650	2009	1.28 tbps
SAT-3	Portugal-S. Africa	11	Consortium	N/A	2002	340.00 gbps

Source: Submarine cable websites.
[1]Capacity abbreviations: terabits per second (tbps) and gigabits per second (gbps)

New undersea cables have spurred intercity network construction in many countries. The vast majority of SSA countries have, at a minimum, constructed a fiber-optic link between undersea cable landing stations and the capital city, and many are in the process of building, or have completed, a national fiber-optic network connecting major towns and cities. In Tanzania, for example, the government launched a national network in 2012 connecting 34 cities to adjacent countries and the EASSy undersea cable system. Liquid Telecom—a private company—is in the process of building a 17,000 km pan-African network across 12 countries via a combination of new construction, acquisitions, and leases.

Practical obstacles remain. Although SSA's new undersea cables will likely benefit the general population over the longer term, several near-term challenges will likely restrain demand for high-bandwidth Internet services in this market segment.

- Low levels of personal computer/smartphone ownership, due to low per capita incomes in most SSA countries, will likely restrain demand for Internet services.
- Most mobile networks in SSA operate on 2G technologies, which are adequate only for low-bandwidth phone calls and text messages, dampening mobile traffic volumes.
- Domestic networks, which are often unreliable due to poor installation/maintenance practices, typically suffer from a lack of connections to individual consumers, particularly in rural areas.

Outlook: International bandwidth demand in SSA will likely grow at a rapid rate over the next few years, albeit from a very low base. In the near term, however, such demand will likely not derive from SSA's general population, but instead from large domestic companies and multinational corporations. The chief reason is that large companies have a strong demand for international services and are located in major cities, which typically have more extensive local networks. Large companies also have sufficient funds to lease local network facilities, which are typically expensive due to a lack of competition.

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