

In Focus

Africa Harnessing a Broadband Boom

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1. Introduction

Africa encompasses 53 countries with almost 1 billion people on a vast continent of 30 million square kilometers. In the last decade, Africa experienced a mobile telephone revolution. The continent “leapfrogged” fixed-line telephone systems with mobile telephony and is on the cusp of a broadband boom. As undersea cables are lit and terrestrial fiber networks expand, Africa is poised to experience an exponential increase in on-line capacity. The deployment of wireless technologies and an effective regulatory environment can harness the broadband boom for economic growth including employment diversification, cross-border trade, and more substantial engagement in the global services economy.

2. Mobile versus fixed-line telephony

The rapid growth of mobile telephony on the continent offers important lessons for broadband expansion. In Africa, mobile connections have grown at an exceptional rate while fixed line penetration remains stagnant. In a comparatively large economy such as South Africa, only 10% of the population has a working fixed-line phone. “Nigeria, South Africa, Egypt, Morocco, Algeria, and Kenya are the primary mobile markets,” with average penetration rates of 33%, according to Fitch Ratings.¹ Broadband development is

in a nascent stage in these economies. The chart below demonstrates the significant penetration of mobile telephony compared to fixed and broadband services in select economies.

The exceptional growth of mobile telephony is largely due to regulatory reform and technological advances. Across the continent mobile telephony was opened to competition while provision of fixed line services largely remained with incumbents. For example, Tanzania uses competition, private sector provision, and foreign investment as a means to develop its telecommunications market, “mobile telephony has enjoyed excellent growth since the introduction of competition in the subsector in 2000.”² In 2008, mobile subscribers topped 10 million in Tanzania and private providers introduced wireless broadband services as well as voice over Internet protocol telephony.³ Expanding online access will similarly depend on an effective regulatory environment that prevents abusive market practices by providers and promotes investment in a rules-based environment.

3. International connectivity

New undersea cables and satellite investment will dramatically increase international connectivity. Limited international connectivity via satellite and submarine cable coupled with monopoly pricing severe-

¹Apostolos Bantis, “Global Emerging Market Telecoms: Cautious on Capital Spending in 2009,” *Fitch Ratings*, April 15, 2009, <http://www.fitchratings.com>.

²Paul Budde Pty Ltd, “Tanzania – Telecoms Market Overview & Statistics, December, 18, 2008, <http://www.budde.com.au>.

³Budde (2008).

Table 1
Sample telecommunication statistics (2008E)

Country	Mobile subscribers (m)	Mobile penetration (%)	Fixed subscribers (m)	Fixed penetration (%)	Broadband subscribers (m)	Broadband penetration (%)
Morocco	22.3	72	2.8	9	0.7	11
Egypt	38.1	55	12.1	15	0.6	3
South Africa	48.1	100	4.6	10	0.9	1
Tunisia	4.3	91	1.3	12	0.2	11
Kenya	12.9	39	.3	1	n.a.	0

Note: penetration rates based on population.

Source: Fitch Ratings (2009)⁴.

Table 2
Undersea cables under construction

Cable system	Launch	Length	Capacity	Geographic linkages
<i>SEACOM:</i> Sea cable System	June 2009 on an open access basis	15,000 km	1.28 Tbps	South Africa, Mozambique, Madagascar, Tanzania, Kenya, Ethiopia to India and Europe ⁵
<i>TEAMS:</i> East Africa Marine System	June 2009 on an open access basis	5,000 km	1.2 Tbps	Kenya – United Arab Emirates ⁶
<i>EASSY:</i> East African Submarine Cable System <i>Main One</i>	2010 on an open access basis	10,800 km	1.4 Tbps	Djibouti, Somalia, Mozambique with links to Lesotho, Zimbabwe, Malawi, Botswana, Uganda and Rwanda ⁷
<i>WACS:</i> West Africa Cable System	May 2010 on an open access basis	7,000 km	1.28 Tbps	Portugal – South Africa with landings on West Coast ⁸
	2011 on an open access basis	14,000 km	3.84 Tbps	South Africa to UK with landings in Namibia, Angola, the Democratic Republic of Congo, Cameroon, Nigeria, Togo, Ghana, Côte d'Ivoire, Cape Verde, the Canary Islands, and Portugal ⁹

ly constrained broadband international connectivity to the continent. For example, maps of global undersea fiber optic cables demonstrate the severe capacity constraints Africa faced compared to transatlantic, transpacific, intra-Asia, and US Latin America routes in 2006. In that year, Europe-Africa-Asia routes provided only 87.5 gigabytes per second (Gbps) of lit submarine cable capacity compared to 2,982.7 Gbps for the transatlantic.¹⁰ The price of international bandwidth capacity remains high, “for example, in the fourth quar-

ter of 2008 a 155 Mbps STM-1 line from London to Johannesburg cost 50 to 60 times as much as a comparable circuit between London and New York.¹¹ New infrastructure coupled with an effective regulatory environment will transform the reach and cost of broadband services.

3.1. Undersea cables

Pent-up demand for voice and value-added services is driving investment in undersea and terrestrial infrastructure. Five undersea cables are under construction with two coming online in 2009. For example, “Seacom” will link South Africa, Mozambique, Madagascar, Tanzania, Kenya, and Ethiopia to India and Europe at 1.28 terabits per second (Tbps). The business model for this private venture extends beyond the shoreline with the acquisition of national and regional licenses. The chart below offers a snapshot of the new undersea cable landscape. The lighting of undersea cables

⁴Bantis (2009).

⁵<http://www.southafrica.info>.

⁶*Balancing Act*, “TEAMS begins laying cable as deadline looms,” May 4, 2009, <http://www.balancingact-africa.com/news/current1.html>.

⁷Michael Malakata, “Africa’s EASSY project delayed by a year,” *Computerworld Zambia*, March 30, 2009, <http://www.computerworld.co.ke>.

⁸<http://www.mainonecable.com>.

⁹*Balancing Act*, “WACS consortium, Alcatel Lucent sign contract to deploy new 14,000 km submarine cable network in West Africa,” April 27, 2009, <http://www.balancingact-africa.com/news/current1.html>.

¹⁰Telegeography, Lit Submarine Cable Capacity Trends by Route, 1999–2006, <http://www.telegeography.com>.

¹¹Telegeography, “Global Bandwidth Research Service,” June 2009, <http://www.telegeography.com>.

will dramatically increase fiber-optic capacity to the continent.

3.2. Open access

A broad range of national, regional and foreign investors are financing these undersea cables. For example, the WACs consortium includes, "Angola Telecom, Broadband Infracore, Cable & Wireless, MTN, Portugal Telecom, Sotelco, Tata Communications, Telecom Namibia, Telekom SA, Togo Telecom and Vodacom."¹² All the undersea cables will launch on an open access basis allowing interconnection at commercial rates. For example, Seacom "will provide African retail carriers with equal and open access to inexpensive bandwidth, removing the international infrastructure bottleneck."¹³ The widely accepted strategy for open access to undersea cables is a progressive benchmark in communications investment and regulation.

New undersea cables will also reduce dependence on relatively expensive satellite connections. "In countries without access to international fiber capacity, over 95% of international traffic is carried by satellite."¹⁴ At the same time, new satellites will be put into orbit in preparation for the World Cup in 2010. Investment in undersea cables and new satellites will expand international connectivity and accelerate access to the World Wide Web.

3.3. Terrestrial infrastructure

Making broadband a reality requires terrestrial infrastructure. "Ghana, Uganda, Nigeria, Rwanda are undertaking internal fiber optic network rollouts at the national level."¹⁵ Kenya built a national terrestrial fiber optic network.¹⁶ Mobile telephone companies are also investing in terrestrial backbone to provide "backhaul" operations. For example, one of Africa's largest mobile operators, MTN will, "improve capacity of its existing networks, strengthen its [second-generation] 2G and [third-generation] 3G sites and . . . roll out fiber optic networks."¹⁷ Substantial investment in terrestrial infrastructure will boost online access.

¹²Balancing Act (2009).

¹³SouthAfrica.info, "Seacom cable constructions begins," December 13, 2007, <http://www.southafrica.info>.

¹⁴Paul Budde Communications Pty Ltd., "Africa-telecommunications market, regulatory & infrastructure overview," September 9, 2008, <http://www.budde.com.au>.

¹⁵Patrick Boateng, FCC, Interview by Author, Washington DC, May 19, 2009.

¹⁶Balancing Act (2009).

¹⁷Bantis (2009).

3.4. Mobile Internet connectivity

Wireless advances can help improve online access. The trajectory of the mobile market and the continued weakness of fixed-line infrastructure suggest that expanding online access will depend heavily on the availability of mobile Internet connectivity. The chart below identifies technologies that are being deployed on the continent to provide mobile Internet connectivity. "MTN Uganda, UTL and Zain have already embarked on a rapid deployment of mobile Internet with a major shift to higher speeds to develop mobile content that specifically targets the rural consumer."¹⁸ Improving transmission from the handset to the mobile operator's network is a priority.

Table 3
Sample of wireless technologies

Technology	Description
WiMax: Worldwide interoperability for microwave access	WiMax broadband technology provides portable or fully mobile wireless broadband Internet access as well as backhaul capabilities. ¹⁹
LTE Long term evolution	LTE is a fourth-generation (4G) wireless networking technology that enables download speeds of 100 Mbps and can act as alternatives to DSL, cable, satellite, and other traditional broadband offerings ²⁰ .
EVDO evolution data only/ evolution data optimized	EVDO enables wireless connection to the Internet and "relies on a signal from a wireless tower rather than a physical connection." ²¹

4. Why does it matter? Benefits of communications growth

The success of mobile telephony has attracted the attention of policymakers to the social and commercial value of effective communications. Telecommunications represent as much as 2.5% of gross domestic product (GDP) in many economies in Africa and generate substantial tax revenues in sub-Saharan Africa.²²

¹⁸David Kezio Musoke, "M-content boosts profit for Uganda's telecom industry," *Uganda Monitor*, April 29, 2009, <http://www.monitor.co.ug>.

¹⁹Financial Mail (South Africa), "What is WiMAX?," June 5, 2009, <http://free.financialmail.co.za>.

²⁰<http://www.alcatel-lucent.com>.

²¹<http://www.evdoinfo.com>.

²²*African Business*, The Telecommunication Sector, January 2009, 349, p. 27, <http://www.africasia.com/africanbusiness>.

The industry is an important source of employment, an incentive for students to study science and technology, and a source of funding for philanthropic activities.

4.1. Employment diversification

The telecommunications industry is contributing to employment diversification. For example, Kenya Safaricom established a “customer call centre as competition in the mobile telephone sector shifts from pricing to quality of service.”²³ The call center can employ 1000 staff per shift. The chart below identifies common employment positions in the communications industry.

Table 4
Telecommunications occupations

Professional, management, business, and financial	<ul style="list-style-type: none"> – accountants and auditors – computer software engineers – electrical and electronic engineering technicians
Installation, maintenance, and repair	<ul style="list-style-type: none"> – managers of mechanics, installers, repairs – equipment installers and repairs – electrical and electronics repairs
Office and administrative support	<ul style="list-style-type: none"> – bill and account collectors – marketing and retail sale representatives – customer service representatives – secretaries and administrative assistants

Source: USBLS (2009)²⁴.

4.2. Establishment of technology institutes

The demand for communication professionals prompted the establishment of technology institutes on the continent. For example, Ghana Telecom University College (GTUC) and Zhong Xing Telecommunications (ZTE) are “establishing a training center with a practice laboratory... for students and lecturers.”²⁵ The expanding communications industry offers educational opportunities at technical training institutes.

²³ *ISI Emerging Markets*, “Safaricom unveils customer care centre,” April 29, 2009, <http://www.securities.com>.

²⁴ US Bureau of Labor Statistics, “Career Guide to Industries Telecommunications,” 2006, <http://www.data.bls.gov>.

²⁵ *Africa Middle East Telecom Week*, “Tee-off for telecoms training initiative,” April 2, 2009, issue 366, Volume 8, <http://www.africantelecomsnews.com>.

4.3. Impact on commerce

Mobile telephony has helped to transform the economy in many countries. For example, price information is more readily available to farmers and small merchants. “In Malawi, small entrepreneurs are engaging in cross-border financial transactions that heretofore would have been impossible.”²⁶ Many governments are also using electronic systems to facilitate civil registration procedures and business licensing requirements.

The expansion of mobile telephony has brought unique services to consumers who may not have had access to a bank, computer, or fixed-line telephone previously. For example, the “non-banked” can use mobile money transfer services to manage financial transactions without using a traditional bank. In Kenya, the mobile provider “Zane is set to offer its new service, Zap, and enter the mobile money transfer market.”²⁷ The chart below illustrates the type of transactions and practical applications low-cost handsets and pre-paid services allow.

Table 5
Mobile service for the “non-banked”

Mobile service	Transaction	Purpose
Mobile money transfer	<ul style="list-style-type: none"> – cash to mobile – mobile to cash – mobile to mobile 	<ul style="list-style-type: none"> – pay bills and pay for goods and services – receive money and send money to friends and family – send and receive money to bank accounts – withdraw cash – increase air time on account²⁸

Source: Middle East North Africa financial network (2009).

Mobile telephone operators provide “pay-as-you-go” platforms to consumers with an appetite for communications and a wide variety of other services supplied electronically. Mobile telecom companies have built subscriptions on voice services over the last 10 years and have begun to offer interactive voice recognition and mobile content such as games, news, and

²⁶ Scott Eisner, US Chamber of Commerce, Interview by Author, Washington DC, May 29, 2009.

²⁷ Intelli News African Telecom & IT Review, “Zain set to zap the mobile money transfer market in Kenya,” February 9, 2009, <http://www.securities.com>.

²⁸ *Middle East North Africa Financial Network*, “Zain launches mobile commerce service in East Africa,” 17 February 2009, <http://www.menafn.com>.

sports.²⁹ Broadband growth will also support exchange of the rich cultural and social media on the continent.

4.4. Conduit for data heavy research and development services (R&D)

Broadband build-out will help grow research and development services across the continent. As an example, the EC financed *GeANT2 network*³⁰ links “30 million research and education users in 34 countries”³¹ and recently established a high-speed link with the *UbuntuNet Alliance*,³² in sub-Saharan Africa. The Alliance includes traditional educational groups such as:

- Kenya Education Network (KENET)
- Malawi Research and Education Network (MAREN)
- Mozambique Research and Education Network (MoRENet)
- Tertiary Education Network of South Africa (TENET)
- Tanzania Education and Research Network (TERNET)
- Research and Education Network of Uganda (RENU)

Expanded online capacity will enable these networks to interact and exchange data in real time and engage in public and commercial R&D services. For example, South Africa has a global footprint in R&D services with 23% of R&D funds originating from abroad.³³ R&D offers employment for scientists and engineers and advances innovation in agricultural production, manufacturing, and health services.

4.5. Corporate philanthropy

Telecommunications firms reinvest in the continent via direct and philanthropic activities. In addition to providing mobile services, firms are joining other corporate partners such as airlines and banks to become formidable supporters of sports and the arts. The chart below illustrates examples of corporate support to advance public health, promote education, and raise standards in media.

Table 6
Philanthropic activities

Company	Sector	Example
MTN	Foundations	Established charitable foundations in 11 countries
	Environmental initiatives	MTN offers recycling facilities for used mobile phones and batteries
	Health activities	Malaria Legacy Initiative for 2010 is intended to ensure 100% coverage and use of anti-malaria mosquito bed nets in affected African countries
Vodacom	Support to the media	Vodacom Journalist of the Year Awards reward excellence in journalism across all media fields
	Scholarships in ICT related fields	Established to address skills shortage in science and technology
	Health activities	Financing for hospital renovation, as well as pediatric, and optometry procedures.

Sources: MTN website³⁴ and Vodacom annual report (2007)³⁵.

5. Regulatory challenges

Governments have worked to build regulatory competence to ensure continued communications investment and important social and economic returns. At the same time, consumers in African countries spend a much greater proportion of their income on communications than consumers in OECD countries: in Kenya consumers spend 17% of income, in Tanzania 15.4%, in Senegal 14.2%, in South Africa 7.4%; by comparison, in the OECD, consumers only spend 2.5% of income.³⁶ National regulators must work adeptly to improve the functioning of the market to reduce costs and improve the quality and scope of communication services.

Regulatory authorities must grapple with several challenges to ensure that national and regional communications networks operate seamlessly. Regulatory authorities must ensure institutional sustainability while they face a rapidly evolving market and the need for regional regulatory cooperation. Furthermore, regulators are relatively new to the business. “In 1990, Mauritius was the only African nation with an independent regulatory authority.” The chart below identifies those countries with independent regulators as of 2007.

²⁹David Kezio Musoke, “M-content boosts profit for Uganda’s telecom industry,” *Uganda Monitor*, April 29, 2009, <http://www.monitor.co.ug>.

³⁰<http://www.geant2.net>.

³¹*M2 Press wire*, “Global Research Community Bridges Digital Divide between Africa and Europe Through High-Speed Network Link,” January 31, 2008, <http://www.presswire.net>.

³²<http://www.ubuntunet.net>.

³³*R&D Magazine*, “Global R&D Report,” September 2007, p. 11, <http://www.rdmag.com>.

³⁴<http://www.mtn.com>.

³⁵Vodacom group annual report, 2007, <http://www.vodacom.com/>.

³⁶Allison Gillwald, Christoph Stork, “Towards Evidence-based ICT Policy and Regulation: ICT Access and Usage in Africa,” 2008, <http://www.researchictafrica.net>.

Table 7
African countries with independent regulators 2007

Algeria	Côte D'Ivoire	Madagascar	Senegal
Angola	Egypt	Malawi	Seychelles
Benin	Ethiopia	Mali	Sierra Leone
Botswana	Eritrea	Mauritania	South Africa
Burkina Faso	Gabon	Mauritius	Sudan
Burundi	Ghana	Mozambique	Tanzania
Cameroon	Guinea	Morocco	Togo
Cape Verde	Guinea-Bissau	Namibia	Tunisia
Central African Republic	Kenya	Niger	Uganda
Chad	Lesotho	Nigeria	Zambia
Congo	Liberia	Rwanda	Zimbabwe

Source: Paul Budde Communications Pty Ltd (2008)³⁷.

5.1. Institutional sustainability

Regulatory activities require sustained technical expertise, secure financial support, and institutional independence. Effective regulatory oversight is a universal challenge with regulatory responsibilities covering fundamental issues such as cost and quality of service as well as more complex matters including adjudication of interconnection disputes, enforcement of interconnection agreements, licensure, and frequency management.³⁸ With adequate skills and enforcement capabilities, regulators can improve the market. For example, the communications Authority of Zambia found that carriers were not providing adequate services or "value for money," consequently firms responded with increased infrastructure investment.³⁹ Stakeholders interested in a vibrant communications infrastructure such as government, business, academia, consumers, as well as the press can recognize the importance of effective and high quality regulatory authorities.

5.2. Grappling with evolving communication issues

Broadband deployment raises new policy issues for regulatory authorities across the continent. Regulatory authorities work to effectively address transit issues, international gateway licensing, unified licenses, and im-

³⁷Paul Budde Communications Pty Ltd, "Africa – Telecommunications Market, Regulatory and Infrastructure Overview," September 9, 2008, <http://www.budde.com.au>.

³⁸Paul Budde Communications Pty Ltd, "Tanzania – Telecoms Market Overview & Statistics," December 18, 2008, <http://www.budde.com.au>.

³⁹*Africa & Middle East Telecom Week*, "Celtel to invest USD 200 million for network expansion and enhancement," June 12, 2008, issue 324, volume 7, <http://www.africantelecomsnews.com>.

provements in radio spectral efficiency.⁴⁰ For example, landlocked countries such as Mali, Niger, Chad, the Central African Republic, Zaire, Zambia, Zimbabwe, and Botswana require cross-border fiber optic build-out and Internet connection agreements with fiber network providers on commercially reasonable terms. Regulatory intervention to make sure that cross-border interconnection is on a commercially reasonable basis is a primary concern in expanding online access. Regulatory cooperation on a bilateral and regional basis can help authorities grapple with evolving issues through information sharing and consultation.

5.3. Using regional regulatory cooperation to improve the market

Regulatory cooperation can help create a positive environment for cross-border broadband deployment. For example, regulatory authorities can exchange experts, compare regulatory review processes, and specific rules and regulations to reduce friction due to different practices. Regulatory authorities can work cooperatively to provide a transparent, rules-based, environment for cross-border operators.

5.4. Balancing regulatory incentives with punitive measures

Regulatory agencies use incentives and punitive measures to achieve national communication objectives. For example, some regulatory agencies have stepped up disciplinary actions. The "Information and Communication Technologies Authority (ICTA) of Mauritius asked the country's telecom carriers to reduce their mobile and international calling tariffs," when carriers failed to respond to ICTA inquiries regarding interconnection charges.⁴¹ National regulators play an important role in ensuring that network providers offer interconnection arrangements on commercially reasonable terms. Regulators can become adept at balancing incentives with disciplinary measures by working with counterparts abroad.

⁴⁰Janine Erasmus, "Broadband in Africa set to soar," February 12, 2009, <http://www.mediaclubsouthafrica.com>.

⁴¹*Africa & Middle East Telecom Week*, "ICTA directs telcos to reduce call tariffs," June 12, 2008, issue 324, volume 7., <http://www.africantelecomsnews.com>.

Urban versus rural connectivity

Many countries have faced the challenge of ensuring that communications infrastructure reaches rural populations. This is a particularly daunting challenge in a region with extreme geography, weak transportation infrastructure, and in many cases majority rural populations. Getting the policy mix right for rural connectivity has substantial consequences for health services, educational services, and individual engagement in the economy. Fortunately many models exist such as universal service provisions that provide sustainable financing. For example, the Communications Authority of Zambia established a rural ICT development fund for the provision of mobile and Internet services.⁴²

Special programs do promote infrastructure build-out beyond urban centers where commercial incentives for investment are weak. For example, special donor financing and public-private partnerships can promote investment in rural areas. Digital villages and communication media centers also bring users together to create concentrated demand. For example, in Tanzania, a Multipurpose Community Telecenter was established in the Mwanza region to provide “telephone, fax, Internet, e-mail and computer facilities. . . to individuals and businesses” for training, telemedicine, and distance learning.⁴³

To advance rural communications, governments can also work to address the reliability of energy supplies with investment in the decentralization of electricity generation as well as alternative energy sources such as wind, solar, biomass, wave, and tidal systems. At the same time, utility providers with substantial infrastructure are expanding their services to include broadband.

5.5. Foreign investment

Foreign investors remain an important source of communications investment. Active trade facilitation that creates dialogue between businesses and governments can help address commercial issues that impede trade. For example, discriminatory regulatory policies or regulatory fragmentation can inhibit investment. Theft is also a concern when building cell towers or laying copper cables. Investors are looking for pro-competitive market policies, including technology neutrality, nondiscrimination, as well as rational investment requirements.⁴⁴ Governments can also reduce or eliminate tariffs at the border on communications equipment to reduce the cost of infrastructure investment and maintenance.

6. Harnessing broadband

With wireless technologies and an effective regulatory environment, broadband expansion will create substantial economic growth and access to important services. Broadband expansion in Africa will have a substantial impact across the economy. First and foremost communication costs will decrease. High-speed communication networks will provide real-time access to data and important services such as telemedicine and tele-education on a large scale.

⁴²*Africa & Middle East Telecom Week*, “Zambia calls for private sector participation for rural development,” June 12, 2008, issue 324, volume 7., <http://www.africantelecomsnews.com>.

⁴³Paul Budde Communications Pty Ltd, “Tanzania – Telecoms Market Overview & Statistics,” December 18, 2008, <http://www.budde.com.au>.

⁴⁴Nick Fetcho, TIA, Interview by Author, Washington DC, May 18, 2009

A high-speed communications infrastructure will propel access to the regional and global services economy. The chart below highlights the benefits of a few service industries that are traded globally over communications systems. Broadband services will help to localize provision of important services. With broadband access, an exponential increase in access to telemedicine, tele-education and other important services will take place.

Table 8
Benefits of service industries

Sectors	Examples of Benefits
Education	– Higher education and adult education services available online enable individuals to obtain important educational credentials to effectively participate in the evolving, knowledge-based economy.
Health	– Online health services can help sustain the well-being of a nation’s people. Online health information can help dampen the severe HIV/AIDS epidemic striking the continent.
Environment	– Remote environmental services can help reduce the contamination of air, water, and soil and enable state-of-the-art waste reduction and treatment processes as well as waste-to-energy systems. – Environmental services are also uniquely tied to tourism and a factor in sustaining the tourism industry.
Tourism	– Online access will improve marketing and direct contact with tourists. – Tourism is a primary export for many developing countries. “In 2007, travel receipts for developing countries reached \$285 billion, around 33% of their total exports of commercial services.” ⁴⁵

⁴⁵World Trade Organization, *International Trade Statistics*, November, 2008, p. 118, <http://www.wto.org>.

Table 8, continued

Sectors	Examples of Benefits
Business	<ul style="list-style-type: none"> – Least-developed countries experienced 13% annual growth in tourism since 2000.⁴⁶ – Accounting services provided online can enable a clear assessment of corporate health and public sector finances. – Computer & related services provided online can improve productivity across the economy and represent an important source of job creation. – Legal services provided online can facilitate engagement in commercial contracts and mitigate investment risk.

7. Conclusion

The exceptional communications growth in Africa albeit from a very low starting point reflects a confluence of factors. Technological innovation combined with investment and a basic level of political cooperation has enabled the continent to leapfrog stages of telecommunications development. "African mobile markets are currently growing by about 50% in value every year, as handset costs continue to fall and 3G technology becomes more common."⁴⁷ Effective regulatory authorities will play a critical role in harnessing the broadband boom by ensuring a high quality and reasonable cost of service, prioritizing interconnection arrangements on commercially reasonable terms, and adeptly managing and enforcing universal service programs and provisions.

Note: Linda Schmid is a contributing author to *Managing the Challenges of WTO Participation*, Cambridge University Press, 2005.

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⁴⁶World Trade Organization (2008).

⁴⁷Neil Ford, "Jumping the technology gap," *African Business*, London: November 2008, Iss. 347; p. 62.

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