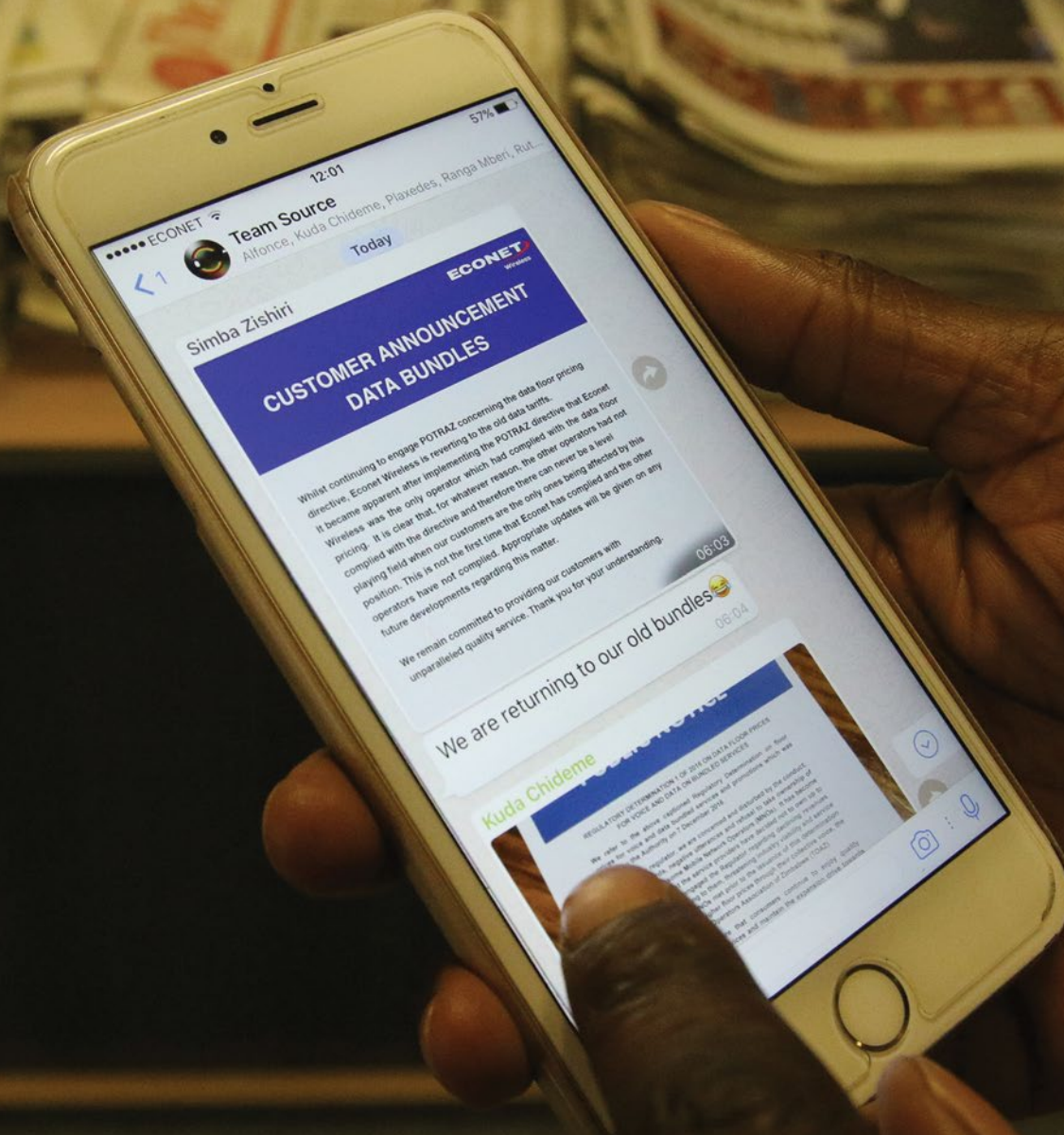


# Critical Connectivity: Reducing the Price of Data in African Markets

Aubrey Hruby





# Atlantic Council

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# **Critical Connectivity: Reducing the Price of Data in African Markets**

**Aubrey Hruby**

Cover: A man reads a message on data bundles from mobile telecoms operator Econet Wireless on his mobile phone in Harare, Zimbabwe, January 13, 2017. REUTERS/Philimon Bulawayo.

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# Introduction

**M**ore than one million Africans turn eighteen every month and enter the labor force. Job creation for these tens of millions of young people is a global development imperative. While some still see mass job creation coming from low-skilled manufacturing, others have pinned their hopes on the power of Web3 and the creator economy. The digital economy has grown impressively in recent years, contributing fifty million jobs globally in 2020, and is set to expand by 57 percent in Africa between 2020 and 2025.<sup>1</sup> This positive growth could be accelerated if the Internet became more accessible and affordable. Critically, the cost of broadband data remains a key constraint, with costs in Africa the highest in the world.

As the Joe Biden administration in the United States begins to implement its Digital Africa Initiative that was set out at the 2022 Africa Leaders Summit, emphasis should be placed on reducing data costs in Africa to spur growth and employment. Global institutions are already recognizing this need. The United Nations set up the Broadband Commission for Sustainable Development in 2010, which continues to advocate affordable access, and the European Union-African Union Digital Economy Task Force lists accelerating universal access to affordable broadband as a primary goal.<sup>2</sup>

The average cost of one gigabyte (GB) of mobile data in sub-Saharan African countries in 2022 is \$4.47, compared to \$4.09 in South America, \$2.72 in Western Europe, and \$1.47 in Asia.<sup>3</sup> When looking at this cost as a percentage of average monthly income, the Alliance for Affordable Internet (A4AI) finds Africans paid 3.3 percent on average for data in 2021, the highest among regions and above

the 2-percent figure the United Nations deems affordable.<sup>4</sup> Notably, only nine sub-Saharan African countries in A4AI's 2021 rankings meet this metric of affordability. The Central African Republic, Chad, Zimbabwe, Equatorial Guinea, Burundi, Togo, Liberia, and the Democratic Republic of the Congo are all still above 10 percent, with five of the ten most expensive countries in the world hailing from the sub-Saharan Africa region.<sup>5</sup>

A reduction in data prices should be considered a prime development indicator, as there is a clear case for Internet access supporting growth and employment. The United Nations International Telecommunication Union (ITU) has shown that increases in mobile-broadband usage are associated with higher incomes and national gross domestic product (GDP). Specifically, a 10-percent increase in mobile-broadband penetration is linked to a 2.5-percent rise in GDP, while a similar increase in digitization stands to boost GDP by 1.9 percent.<sup>6</sup> Digital platforms are already expected to support three million jobs in Africa by 2025, with the potential to absorb forty-four million if the continent's Internet penetration can hit 75 percent, from a rate of around 33 percent in 2021.<sup>7</sup>

These data points reflect a burgeoning digital and creative economy in African markets, with the continent's digital economy projected to grow six times over by 2050 to \$712 billion, with the global e-commerce market already valued at more than \$4 trillion.<sup>8</sup> African startups raised more than \$4 billion in venture capital in 2021, as investors see the potential of digitization to unlock efficiencies and create value.<sup>9</sup> Additionally, the creative economy could reach 10 percent of global GDP by 2030, with affordable Internet

- 1 "Creative Economy Outlook 2022," United Nations Conference on Trade and Development, September 2022, [https://unctad.org/system/files/official-document/ditctsc2022d1\\_overview\\_en.pdf](https://unctad.org/system/files/official-document/ditctsc2022d1_overview_en.pdf); "The Inflection Point: Africa's Digital Economy Is Poised to Take Off," Endeavor, June 2022, [https://endeavornigeria.org/wp-content/uploads/2022/06/Endeavor\\_The-Inflection\\_Point\\_June-2022.pdf](https://endeavornigeria.org/wp-content/uploads/2022/06/Endeavor_The-Inflection_Point_June-2022.pdf).
- 2 "About Us," Broadband Commission for Sustainable Development, last visited November 13, 2022, <https://www.broadbandcommission.org/about-us/>; "Connecting Africa Through Broadband," Broadband Commission for Sustainable Development, October 2019, [https://www.broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica\\_Report.pdf](https://www.broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica_Report.pdf).
- 3 "Worldwide Mobile Data Pricing 2022," Cable.co.uk, last visited November 13, 2022, <https://www.cable.co.uk/mobiles/worldwide-data-pricing/#pricing>.
- 4 Ana Maria Rodriguez and Teddy Woodhouse, "Mobile Data Costs Have Increased, Making Internet Connectivity Unaffordable for Many," Alliance for Affordable Internet, March 17, 2022, <https://a4ai.org/news/mobile-data-cost-have-increased-making-internet-connectivity-unaffordable-for-many/>; "2025 Targets: 'Connecting the Other Half,'" Broadband Commission for Sustainable Development, 2018, <https://www.broadbandcommission.org/Documents/publications/wef2018.pdf>.
- 5 "Data-Only Mobile-Broadband," Alliance for Affordable Internet, last visited November 13, 2022, <https://a4ai.org/a4ai-2021-mobile-broadband-pricing-gni/>; "Worldwide Mobile Data Pricing 2022."
- 6 Raul Katz and Fernando Callorda, "Economic Contribution of Broadband, Digitization and ICT Regulation: Econometric Modelling for Africa," International Telecommunication Union, 2019, [https://www.itu.int/hub/publication/d-pref-ef-bdt\\_afr-2019/](https://www.itu.int/hub/publication/d-pref-ef-bdt_afr-2019/).
- 7 "The Inflection Point"; "Measuring Digital Development: Facts and Figures 2021," International Telecommunication Union, 2021, <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2021.pdf>.
- 8 "The Inflection Point"; "Affordability Report 2021," Alliance for Affordable Internet, 2021, [https://a4ai.org/wp-content/uploads/2021/12/A4AI\\_2021\\_AR\\_AW.pdf](https://a4ai.org/wp-content/uploads/2021/12/A4AI_2021_AR_AW.pdf).
- 9 Taje Kene-Okafor, "Reports say African startups raised record-smashing \$4.3B to \$5B in 2021," Tech Crunch, February 8, 2022, <https://techcrunch.com/2022/02/08/reports-say-african-startups-raised-record-smashing-4-3b-to-5b-in-2021/>.





U.S. Secretary of Agriculture Tom Vilsack, Secretary of the Treasury Janet Yellen, President Joe Biden, Secretary of State Antony Blinken and Senegal President Macky Sall attend the U.S.-Africa Leaders Summit Closing Session on Promoting Food Security and Food Systems Resilience, at the Walter E. Washington Convention Center, in Washington, D.C., U.S. December 15, 2022. REUTERS/Ken Cedeno

reducing the “penalty of distance” experienced by many outside of major population centers.<sup>10</sup>

This issue brief explores the determinants of the cost of data, and provides context on why African data costs

are the highest in the world. It presents case studies on countries that have rapidly reduced data costs, and gives examples of progress in African markets. Drawing on this research, it provides recommendations for policymakers and other key stakeholders.

10 “The Creative Economy Takes Center Stage,” United Nations Conference on Trade and Development, December 10, 2021, <https://unctad.org/news/creative-economy-takes-center-stage>; Leanne Townsend, et al., “Broadband and the Creative Industries in Rural Scotland,” *Journal of Rural Studies* 54 (2017), 451–458, <https://doi.org/10.1016/j.jrurstud.2016.09.001>.

# Determinants of Cost

The cost of data is a product of complex factors spanning infrastructure, competition, policy, and consumption patterns. Cable.co.uk, an organization tracking telecom prices, helpfully frames this by breaking the world into four market types: countries with *excellent infrastructure*, where extensive broadband networks allow for large data packages and, thus, low unit costs; countries with *heavy reliance*, marked by high mobile usage in the absence of fixed broadband, leading to high mobile penetration and competition that drives lower prices; countries with *small consumption*, where mobile data are the main means of connection, but usage is lower and in smaller package sizes, leading to higher unit costs; and *wealthy countries*, in which higher wages translate to a greater ability to pay, even though there are higher input costs due to a lack of broadband infrastructure.<sup>11</sup> Many African markets fall into the *heavy reliance* or *small consumption* categories, though there is room to evolve, as is highlighted in the case studies on India, Cambodia, and Colombia found later in this issue brief.

This framework is useful for understanding the four main drivers of the cost of data: infrastructure, competition, policy, and consumption patterns.

## Infrastructure

Data travel through an established network of digital highways before reaching mobile phones. The first mile refers to access at the country level (e.g., fiber optic submarine cables), the middle mile is how the Internet travels through a country (e.g., terrestrial fiber networks), and the last mile is how data reach the user (e.g., cell towers, community Wi-Fi).<sup>12</sup> Digital infrastructure is the physical infrastructure at the crux of Internet access and cost, with better infrastructure allowing for higher volumes of data at lower unit costs.

Many African markets lag behind in building this infrastructure. According to the World Bank, 45 percent of Africans are more than ten kilometers from a fiber connection, a higher rate than anywhere else in the world.<sup>13</sup> As a result,

the United Nations Broadband Commission found in 2019 that it would take \$109 billion to achieve universal broadband access in Africa, with infrastructure accounting for 80 percent of the gap, including a need for the construction of two hundred and fifty thousand cell towers and two hundred and fifty thousand kilometers of fiber.<sup>14</sup> The needs are concentrated in the middle and last mile, as billions have been invested in submarine cables and thirty-seven of thirty-eight African countries with coastal access (all but Eritrea) now have direct submarine cable connections. However, eleven of these countries remain constrained by having only one connection, and another ten only have two connections.<sup>15</sup> Landlocked countries, of course, face more significant challenges in establishing connections. Intra-African data connections, such as Kigali-Mombasa, exhibit higher and more variable transmission rates than comparable international routes.

Beyond physical infrastructure, related challenges include electricity, data centers, and cross-connect fees. Africa retains the lowest rate of electricity penetration in the world, implicating which areas can get online. To put Africa's electricity deficit into context, Google's global electricity usage (mostly attributed to its data centers) is as much as the 2020 electricity generation of forty-four African countries. Data centers themselves are scarce on the continent, with most concentrated in Nigeria and South Africa. With many companies choosing to host their data outside the continent, this adds to bandwidth issues, as data must flow out and back over longer distances.<sup>16</sup> Finally, the routes that data take matter too, with cross-connect fees set where international cables connect. Variable rates set by regulators make certain routes much more expensive, creating chokepoints, such as Djibouti in the East African zone.

## Competition

A second cost factor is the level of competition in a country's telecom market, with global and African figures supporting higher competition leading to reduced

11 "Worldwide Mobile Data Pricing 2022."

12 "Connecting Africa Through Broadband."

13 Roku Fukui, Christopher James Arderne, and Tim Kelly, "Africa's Connectivity Gap: Can a Map Tell the Story?" Digital Development blog, World Bank, November 7, 2019, <https://blogs.worldbank.org/digital-development/africas-connectivity-gap-can-map-tell-story>.

14 "Connecting Africa Through Broadband."

15 Suvesh Chattopadhyaya, "How Is Digital Economy of Africa Enabled by Subsea Cable Connectivity," Submarine Cable Networks, March 30, 2018, <https://www.submarinenetworks.com/en/insights/how-is-digital-economy-of-africa-enabled-by-subsea-cable-connectivity>.

16 "Connecting Africa Through Broadband."



Poal Internet technicians prepare for an installation exercise in Kibera slum, Nairobi, Kenya, March 23, 2022. Picture taken March 23, 2022. REUTERS/Monica Mwangi

costs. In fact, A4AI estimates that one gigabyte of data is \$3.42 more expensive on average in consolidated markets, and that the differential in cost between monopoly and two-operator markets can be \$7.33 per gigabyte.<sup>17</sup> Ecobank data show the same to be true in African markets, finding that the average cost per gigabyte in two-operator markets (\$13.03) is higher than in three-operator markets (\$9.17) or markets with four or more operators (\$5.25).<sup>18</sup>

African markets, many of which are smaller markets, tend toward the less competitive end of the spectrum, contributing

to higher costs. Twenty-seven one- or two-operator markets are found in Africa, compared to thirty-eight in the rest of the world.<sup>19</sup> Very few operators outside the top three in a country are profitable across Africa, and consolidation pervades tower construction and ownership, too, with only three to four core players on the continent.<sup>20</sup> The chief executive officer (CEO) of MTN sees the trend of consolidation continuing, anticipating an African ecosystem with two to three main providers.<sup>21</sup> These trends, paired with the relatively small size of many African markets, contribute to the competitive environment representing a challenge to affordability that cannot be easily overcome.

17 "2019 Affordability Report: Lack of Competition in Broadband Markets Keeping Millions Offline," Alliance for Affordable Internet, October 22, 2019, <https://a4ai.org/news/2019-affordability-report-lack-of-competition-in-broadband-markets-keeping-millions-offline/>.

18 "The High Cost of Mobile Data in Sub-Saharan Africa," Ecobank, September 2018, <https://www.ecobank.com/upload/publication/20180910054643018QJEBKEVZKD/20180910054635730h.pdf>.

19 Yomi Kazeem, "Africans Pay More for Internet Access Due to a Lack of Competition in Local Markets," Quartz, October 22, 2019, <https://qz.com/africa/1732055/africans-pay-more-for-internet-access-due-to-lack-of-competition>.

20 "Consolidation on the Rise? M&A Trends in Africa," DAI Magister, last visited November 13, 2022, <https://www.daimagister.com/resources/consolidation-on-the-rise-ma-trends-in-africa/>.

21 Emmanuel Abara Benson, "What's the Future of Africa's Telecoms Industry? This Industry Stakeholder Has Some Expert Opinions," *Business Insider Africa*, May 4, 2022, <https://africa.businessinsider.com/local/markets/ralph-mupita-discusses-the-future-of-telecommunication-in-africa/vs43zkg>.



## Policy

Government and regulatory policies also affect costs. The most direct impact is through tax policy, such as value-added taxes on information and communications technology (ICT) products and services, such as phones and data. Even small tax increases can have huge effects—in July 2019, Uganda levied a \$0.05 daily tax on social media, which led to a loss of 2.5 million Internet subscribers in the following three months.<sup>22</sup> In Mozambique, customs duties on mobile devices suppress GDP by more than \$100 million a year.<sup>23</sup>

ICT policy impacts affordability by shaping the incentives for infrastructure investment or competitive entry to the market. Developed countries spend an average of 3.2 percent of GDP on digital infrastructure, compared to 1.1 percent among African governments, reflecting a political-will challenge that exacerbates the region's infrastructure shortfall.<sup>24</sup> Forward-looking policies on market access and entry can incentivize both infrastructure and telecom players, and transparent licensing standards can make a market more attractive to operators.<sup>25</sup>

## Consumption Patterns

Consumption patterns can have a sizable impact on unit costs. While countries fitting the *excellent infrastructure* or *wealthy economy* criteria—such as Italy or the United States—support large or unlimited data packages, many Africans rely on small, pay-as-you-go plans. This can be a consequence of relatively low incomes and cash-flow constraints, keeping many users from signing longer-term contracts, but can also be a function of network quality and consistency. For these reasons, many Africans choose to own multiple SIM cards to use different operators when advantageous, reducing their likelihood of buying large packages through any one provider. These cash-flow-constrained users may prefer taking advantage of daily deals for smaller packages that include Facebook and WhatsApp, for example.<sup>26</sup> While these can be strategic, optimizing decisions at the individual level, reliance on smaller packages of data increases the unit cost, and limits the ability to scale usage and cost-effectiveness efficiently.

22 Rebecca Ratcliffe and Samuel Okiror, “Millions of Ugandans Quit Internet Services as Social Media Tax Takes Effect,” *Guardian*, February 27, 2019, <https://www.theguardian.com/global-development/2019/feb/27/millions-of-ugandans-quit-internet-after-introduction-of-social-media-tax-free-speech>.

23 “Connecting Africa Through Broadband.”

24 Ibid.

25 “Affordability Report 2019,” Alliance for Affordable Internet, 2019, [https://a4ai.org/wp-content/uploads/2019/10/A4AI\\_2019\\_AR\\_Screen\\_AW.pdf](https://a4ai.org/wp-content/uploads/2019/10/A4AI_2019_AR_Screen_AW.pdf).

26 Elo Umeh, “Three Reasons Why African Mobile Connectivity Is Misleading,” *Africa Report*, June 27, 2019, <https://www.theafricareport.com/14567/three-reasons-why-african-mobile-connectivity-is-misleading/>.

## Case Studies

Looking at case studies from South Asia, Southeast Asia, and Latin America reveals how changes in infrastructure, policy, competition, and consumption can impact data costs and access, and transform and create entire industries. Each country's telecommunications and development environment is unique, given distinctive geographic, demographic, and economic dynamics, but commonalities are relevant to the digital development of African markets. The following case studies feature countries that have had relatively rapid reductions in data prices, making them among the markets with the cheapest data costs by region.

### India

Between 2014 and 2018, mobile-data costs in India fell by a stunning 95 percent, and India today ranks fifth in the world in terms of lowest data costs, at \$0.17 per gigabyte in 2022.<sup>27</sup>

While the Indian case touches on each of the determinants of cost, infrastructure is undoubtedly at the core. The main player in India's remarkable digital transformation is Reliance Jio, an operator commercially launched in 2016 and owned by one of the richest men in India, Mukesh Ambani. Leveraging parent company Reliance's oil and gas profits, Jio went all in on leapfrogging to fourth-generation (4G) service and invested a staggering \$30 billion from 2014 to 2017 to overhaul and expand the nation's mobile-broadband network.<sup>28</sup> Forward-looking policy also encouraged this investment, as infrastructure-sharing provisions made it easier for new operators to enter the market, enabling firms to lower their capital costs by up to 35 percent.<sup>29</sup>

Launched to the public in September 2016, Jio then offered free mobile-Internet for seven months before beginning to charge users, bringing in more than one hundred million

subscribers during this period. This disruptive market-entry strategy triggered a price war in India's telecom sector, with other providers forced to lower prices and offer similar benefits to protect market share. Jio's entrance quickly transformed data consumption in India, increasing usage 1,000 percent by 2018 to ten gigabytes per month, comparable to usage patterns in the United States.<sup>30</sup> Jio's rise can also be viewed as a product of the company's success at tackling device affordability. The company introduced a low-cost smart-feature 4G-compatible phone in 2017, which cost about \$23 to produce, compared to the typical entry-level smartphone at the time of about \$55.<sup>31</sup> Plans for these JioPhones started at less than \$1 per month, opening up basic Internet services to a base of previously untapped consumers.<sup>32</sup>

While Jio's scale of investment and ability to subsidize customer acquisition are outliers, lessons can still be learned. First, a big push in digital infrastructure, however financed, can certainly be transformative. The Jio example effectively condenses what could be a generational investment elsewhere into a four-year period, shining a light on the gains that can be expected from a comprehensive infrastructure upgrade. Second, consumer behavior is malleable. In a way, Jio taught Indian consumers to demand data, and usage patterns have evolved accordingly, bringing Jio revenue per customer 30 percent higher than average.<sup>33</sup>

Entertainment is a key driver of the increased use of data, underscoring the outsized importance of the creative economy. As recently as 2019, Google estimated that video made up 75 percent of all Indian mobile traffic, which reflects the global estimate that 80 percent of data are used for video, gaming, and social networking.<sup>34</sup> Additionally, from 2016 to 2019, the number of Indian YouTubers with at least one million subscribers increased from twenty to six hundred, highlighting this astonishing shift in consumption.<sup>35</sup>

27 "Mobile Data Price Down 95%, Revenue Up 2.5 Times in 5 Years: Trai," Business Standard, August 22, 2019, [https://www.business-standard.com/article/pti-stories/mobile-data-price-down-by-95-but-revenue-up-2-5-times-in-5-yrs-trai-119082101291\\_1.html](https://www.business-standard.com/article/pti-stories/mobile-data-price-down-by-95-but-revenue-up-2-5-times-in-5-yrs-trai-119082101291_1.html); "Worldwide Mobile Data Pricing 2022."

28 Promit Mukherjee, "Reliance Lifts Jio Investment Above \$30 Billion after Record Year," Reuters, April 25, 2017, <https://www.reuters.com/article/reliance-industries-results-copy/reliance-lifts-jio-investment-above-30-billion-after-record-year-idINKBN17ROJ7>.

29 "India: Facilitating Shared Infrastructure for a Competitive Market," Good Practices Database, Alliance for Affordable Internet, July 29, 2020, <https://a4ai.org/research/facilitating-shared-infrastructure-for-a-competitive-market/>.

30 Prasanto K Roy, "Mobile Data: Why India Has the World's Cheapest," BBC, March 18, 2019, <https://www.bbc.com/news/world-asia-india-47537201>.

31 "Connecting Africa Through Broadband."

32 Roy, "Mobile Data."

33 Ibid.

34 "Digital Economy Report 2021," United Nations Conference on Trade and Development, 2021, [https://unctad.org/system/files/official-document/der2021\\_en.pdf](https://unctad.org/system/files/official-document/der2021_en.pdf).

35 "How the Pursuit of Leisure Drives Internet Use," *Economist*, June 8, 2019, <https://www.economist.com/briefing/2019/06/08/how-the-pursuit-of-leisure-drives-internet-use>.



A woman checks her mobile phone as she walks past a mobile store of Reliance Industries' Jio telecoms unit, in Mumbai, India, July 11, 2017. REUTERS/Shailish Andrade

Today, the Indian sector is more consolidated as firms merged to survive, but prices remain among the lowest in the world. Doubling down on infrastructure, Jio announced in August 2022 that it will spend \$25 billion to roll out 5G coverage across India, with nationwide reach expected by the end of 2023.<sup>36</sup>

## Cambodia

From 2013 to 2019, mobile-data costs in Cambodia fell by 97 percent, from \$4.56 to \$0.13 per gigabyte.<sup>37</sup> Cambodia had the cheapest data in the world in 2018, and placed

twenty-third (and second in Southeast Asia) in data affordability in 2022 at \$0.42 per gigabyte.<sup>38</sup>

Cambodia's low data costs stem mainly from robust competition in the market. In 2018, there were seven mobile-broadband operators, and thirty fixed-broadband providers.<sup>39</sup> By 2020, consolidation left three major mobile operators along with two smaller players—still comparable to or above the global average.<sup>40</sup> The country benefited for a long time from loose, almost nonexistent regulations that incentivized private investment. Specific business-friendly policies included no restrictions on foreign ownership or investment, plus allocating spectrum instead of auctioning

36 Manish Singh, "Reliance Jio to Spend \$25B on 5G Rollout, Debut in October and Reach Every Town by 2023 End," Tech Crunch, August 29, 2022, <https://techcrunch.com/2022/08/29/reliance-jio-to-debut-5g-in-october-reach-all-by-2023-end/>.

37 "World Development Report 2021: Data for Better Lives," World Bank, 2021, <https://www.worldbank.org/en/publication/wdr2021>.

38 "Leveraging Investments in Broadband for National Development: The Case of Cambodia," UN-OHRLS, 2018, <https://www.un.org/ohrlls/sites/www.un.org.ohrlls/files/cambodia-broadband-case-study-unohrlls-2018.pdf>; "Worldwide Mobile Data Pricing 2022."

39 "Leveraging Investments in Broadband for National Development: The Case of Cambodia."

40 "Cambodia: Fostering Market Competition for Affordability," Good Practices Database, Alliance for Affordable Internet, March 2, 2020, <https://a4ai.org/research/fostering-market-competition-for-affordability/>.



People walk using their mobiles phones in Phnom Penh, Cambodia, February 18, 2021. REUTERS/Cindy Liu

it, a more cost-efficient practice.<sup>41</sup> In fact, licenses were handed out “like confetti” in the 1990s and early 2000s, according to a Cambodian telecom executive, which allowed for an operable network to be built and contributed to high mobile penetration and demand for data.<sup>42</sup> Data consumption was 6.9 GB per user per month in 2019, highest among lower- and lower-middle-income countries, and third in the world in 2018.<sup>43</sup>

The Ministry of Posts and Telecommunications and the country’s regulators have become stricter in recent years, more stringently applying taxes and mandating that tangled fiber be stripped down in the capital. These are needed interventions in what was an unsustainably open operating environment, and consumer prices may rise as a result. This push and pull is summarized elegantly by a Cambodian telecom executive, who told Nikkei Asia that,

“We don’t like the mess of the wires and we don’t like the way these cheap towers are put up. However, everyone in Cambodia who wants to have a SIM card has got one and largely can afford to use it.”<sup>44</sup>

The Cambodia case shows large amounts of foreign investment can be attracted through a liberal, competitive operating environment and the challenges presented by rapid expansion of telecom operators competing fiercely for business.

## Colombia

Data prices have steadily declined in Colombia over the last decade, with prices falling 3.3 percent per year from 2012 to 2017, and a further 85 percent from 2019

41 Ibid.

42 Shaun Turton, “Cambodia Creates New Snarls as It Tries to Untangle Its Internet Mess,” Nikkei Asia, June 3, 2022, <https://asia.nikkei.com/Business/Business-Spotlight/Cambodia-creates-new-snarls-as-it-tries-to-untangle-its-internet-mess>.

43 “World Development Report 2021”; “Leveraging Investments in Broadband for National Development: The Case of Cambodia.”

44 Turton, “Cambodia Creates New Snarls as It Tries to Untangle Its Internet Mess.”



to 2022.<sup>45</sup> In 2022, Colombia boasts the second-lowest prices in South America, and the thirty-first-lowest prices in the world at \$0.49 per gigabyte.<sup>46</sup>

At the heart of Colombia's case is proactive national ICT policy. In 2010, Colombia introduced its Vive Digital plan under President Juan Manuel Santos, followed up by the Vive Digital para la Gente plan in 2014. These economic-modernization plans focused on investment in digital infrastructure—specifically, expanding connections to fiber and Internet for more municipalities, businesses, and citizens—to enable the growth of a digital economy. Colombia's baseline rate of fiberoptic connectivity in 2010 was low among peers, with less than 20 percent of municipalities connected to the country's fiberoptic network. Only one-third of citizens were using the Internet, with 40 percent attributing high costs to their non-usage. ICT's status as a presidential priority over these eight years contributed to enhanced coordination and implementation, leading to a doubling in at-home Internet access and 96 percent of municipalities connected to fiber by 2018.<sup>47</sup> On the infrastructure side, regulation starting in 2007 incentivized infrastructure sharing in the telecom space, which sped up 4G rollout and reduced capital costs, enabling lower prices to be passed on to consumers.<sup>48</sup>

Tax policy has also been impactful. In 2017, a 16-percent value-added tax (VAT) was eliminated, allowing for cheaper mobile-phone purchases, boosting phone sales in the

following year, and contributing to the country's largest-ever year-over-year growth in broadband usage.<sup>49</sup> During the peak of COVID-19 in 2020, Colombia also briefly eliminated a 19-percent VAT on mobile data, and, in 2021, the government declared Internet an essential service on par with water and electricity.<sup>50</sup> This declaration came with measures to reach underserved areas and keep data affordable.

Inclusive digital policy has undergirded the government's current emphasis on growing the creative industries, or "orange economy." The creative sector is highlighted in the country's 2018–2022 National Development Plan (which pairs with a standalone digital plan for the same period), and has been one of the economy's fastest-growing segments.<sup>51</sup> Specifically, mobile technology and digital services in Colombia accounted for \$10 billion, or 3.8 percent of GDP in 2016, plus sixty-four thousand jobs.<sup>52</sup> In 2018, the country also introduced a five-year tax exemption for creative-economy workers, as well as a tax-deduction scheme for certain creative-economy investments, both aimed at incentivizing growth in the sector.<sup>53</sup>

Across these policies, Colombia provides a case for national policy being worth more than the sum of its parts. Having specific digital policies and keeping relevant issues on the national agenda can maintain momentum, and sectoral policies can focus engagement and even investment, as exemplified by the United States' successful Power Africa initiative.

45 "Colombia: Encouraging Shared Infrastructure," Good Practices Database, Alliance for Affordable Internet, July 29, 2020, <https://a4ai.org/research/encouraging-shared-infrastructure/>.

46 "Worldwide Mobile Data Pricing 2022."

47 "Colombia: Planning for Inclusive, Affordable Connectivity," Good Practices Database, Alliance for Affordable Internet, March 2, 2020, <https://a4ai.org/research/planning-for-inclusive-affordable-connectivity/>.

48 "Colombia: Encouraging Shared Infrastructure."

49 "Colombia: Eliminating Luxury Taxation on ICT Essentials," Good Practices Database, Alliance for Affordable Internet, March 2, 2020, <https://a4ai.org/research/eliminating-luxury-taxation-on-ict-essentials/>.

50 "Colombia: Reducing Tax Burden on Essential Data," Good Practices Database, Alliance for Affordable Internet, October 26, 2021, <https://a4ai.org/research/reducing-tax-burden-on-essential-data/>; "Colombia Declares Internet an Essential Public Service," *Telecompaper*, August 2, 2021, <https://www.telecompaper.com/news/colombia-declares-internet-an-essential-public-service--1392281>.

51 "Colombia: Planning for Inclusive, Affordable Connectivity."

52 "Country Overview: Colombia," GSMA, 2017, <https://data.gsmaintelligence.com/api-web/v2/research-file-download?id=28999732&file=Country%20overview%20Colombia.pdf>.

53 "Culture and the Creative Economy in Colombia," Organisation for Economic Co-operation and Development, July 21, 2022, <https://www.oecd.org/employment/culture-and-the-creative-economy-in-colombia-184ffe07-en.htm>.

# Progress Being Made in African Markets

African countries are also encouraging innovation and making rapid progress toward data affordability by influencing the same core drivers of data cost.<sup>54</sup> As a result, the average African consumes 3.66 GB of mobile data per month in 2022, up from 0.72 GB in 2016 and projected to surpass 10 GB per month by 2027.<sup>55</sup> While competition remains an enduring challenge, notable advancements toward reducing the cost of data have been made across infrastructure, policy, and consumption patterns.

## Infrastructure

African countries have greatly expanded connectivity over the last decade, linking the continent with undersea fiber optic networks. In the crucial first mile, submarine cable connections increased nearly ten times since 2010.<sup>56</sup> Momentum on this front is being maintained, with at least eight major cables with connections to the continent currently in progress, and with major content providers Google and Meta among the major investors.<sup>57</sup> Recognizing the growth potential of the youngest continent, leading US tech firms have played an important role in recent years, investing in large infrastructure projects.

### ***Expanding cable and fiber access with game-changing investments***

Equiano is Google's landmark cable project connecting Togo, Nigeria, Namibia, and South Africa to Europe, as part of the company's 2021 pledge to invest \$1

billion in Africa's digital transformation.<sup>58</sup> The cable has twenty times the capacity of its predecessor cables and the potential to increase data speeds by up to 500 percent.<sup>59</sup> The cable made its first landing in March 2022 in Togo, and an economic-impact assessment estimates that the cable will reduce consumer data costs by 14 percent, while adding \$351 million in GDP and thirty-seven thousand jobs by 2025.<sup>60</sup>

A Meta-led consortium—which also includes China Mobile, among others—is developing the 2Africa cable, which will connect nineteen African countries by 2023 or 2024.<sup>61</sup> Upon completion, the cable will be the longest subsea cable in the world, with a reported investment of around \$1 billion.<sup>62</sup> Meta has also facilitated partnerships in Nigeria and Uganda to develop terrestrial connections, and hopes 2Africa will catalyze governments to make complementary investments.<sup>63</sup>

The US government has also helped US firm SubCom win a \$600-million contract to build the Southeast Asia–Middle East–Western Europe 6 cable, which will connect the Horn of Africa to Europe and Asia. This comes as part of the Group of Seven (G7)-initiated Partnership for Global Infrastructure and Investment (PGII), to which the United States has pledged a mobilization of \$200 billion by 2027 to support quality infrastructure projects in developing countries.<sup>64</sup>

### ***Investing in towers and data centers***

In August 2022, the US Development Finance Corporation (DFC) announced its first disbursement of a \$300-million loan to Africa Data Centres, a South

54 Rodriguez and Woodhouse, "Mobile Data Costs Have Increased, Making Internet Connectivity Unaffordable for Many."

55 "Mobile Data Traffic per Device per Month," Ericsson, June 2022, <https://www.ericsson.com/en/reports-and-papers/mobility-report/mobility-visualizer?f=11&ft=1&r=13&t=8&s=1&u=5&y=2016,2027&c=2>.

56 "Connecting Africa Through Broadband."

57 Patrick Christian, "New Cables Are Coming to Africa," TeleGeography, June 30, 2022, <https://blog.telegeography.com/new-cables-are-coming-to-africa>.

58 "Submarine Cable Map: Equiano," TeleGeography, last visited November 13, 2022, <https://www.submarinecablemap.com/submarine-cable/equiano>.

59 Tom Page, "Google Equiano: Internet Giant Bets Big on Africa with Latest Megaproject," CNN, August 8, 2022, <https://www.cnn.com/2022/08/07/africa/google-equiano-subsea-internet-cable-west-africa-spc-intl/index.html>.

60 Alexander Onukwue, "How Will Togo Make the Most of Managing Google's Equiano Cable?" Quartz, March 25, 2022, <https://qz.com/africa/2146886/how-will-togo-maximize-the-value-of-googles-equiano-cable>.

61 "Submarine Cable Map: 2Africa," TeleGeography, last visited November 13, 2022, <https://www.submarinecablemap.com/submarine-cable/2africa>.

62 Tage Kene-Okafor, "Facebook-Backed 2Africa Set to Be the Longest Subsea Cable upon Completion," Tech Crunch, September 29, 2021, <https://techcrunch.com/2021/09/29/facebook-backed-2africa-set-to-be-the-longest-subsea-cable-upon-completion/>; Angelina Rascoquet, Loni Prinsloo, and Thomas Seal, "Faster Internet Coming to Africa With Facebook's \$1 Billion Cable," Bloomberg, May 14, 2020, <https://www.bloomberg.com/news/articles/2020-05-14/facebook-china-mobile-to-build-1-billion-sub-sea-africa-cable>.

63 "Facebook's Subsea Cable Promises Cheaper, Faster Internet," *African Business*, July 3, 2020, <https://african.business/2020/07/technology-information/facebook-subsea-cable-promises-cheaper-faster-internet/>.

64 "President Biden and G7 Leaders Formally Launch the Partnership for Global Infrastructure and Investment," White House, press release, June 26, 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/26/fact-sheet-president-biden-and-g7-leaders-formally-launch-the-partnership-for-global-infrastructure-and-investment/>.

Africa-based subsidiary of Liquid Intelligent Technologies. This investment—which also supports PGI—aims to support data-center growth and expansion in key regional markets, boosting Africa’s data-center market, which currently contributes less than 1 percent of global capacity.<sup>65</sup> Liquid has been a key Microsoft partner in the region, and Microsoft has invested \$100 million in development centers in Kenya and Nigeria to support the growth of developer communities.<sup>66</sup>

Towers have been a subsector of investor interest for nearly two decades in African markets. In October 2022, American Tower Corporation (ATC) and Airtel announced a strategic partnership, which will support the expansion of Airtel’s network across Kenya, Niger, Nigeria, and Uganda, enhancing connectivity across these markets. ATC already operates twenty-three thousand sites on the continent, and this partnership includes new site development, with specifications for energy-efficient operation.<sup>67</sup>

These investments reflect US companies’ recognition of the demographic and digital potential of African markets—a region with more than nine hundred million SIM connections, 49-percent smartphone adoption, and 42 percent of the global youth population by 2030.<sup>68</sup> The US government—both the administration and Congress—has emphasized the importance of staying competitive vis-a-vis China in ICT and the digital economy. Accordingly, programs that encourage US investment in digital infrastructure and services have spanned the Barack Obama, Donald Trump, and now Joe Biden administrations.

## Policy

Marking the growing recognition of the importance of the digital economy, forty-three of forty-six sub-Saharan African governments now have ICT ministries, with most

producing digital strategies.<sup>69</sup> Still, actual policy governing ICT and the digital economy varies widely across African countries, and it is unclear how many track the cost of data and make reduction a key definition of success. Many countries’ policies still do not focus on creating a digital economy, or lack specificity on timetables or progress indicators.<sup>70</sup> Countries also take a range of approaches to regulation, from tight state control in places like Ethiopia—where state-owned telecoms are dominant—to more open-market approaches like that of Kenya, where the state-owned telecom accounts for less than 10 percent of the mobile market, and where data costs remain 16 percent lower than in Ethiopia.<sup>71</sup> Specific examples of country-level pro-digitization policy reform include the following.

### ***Reduction of right-of-way fees in Nigeria***

Telecom companies pay right-of-way fees in order to build infrastructure such as fiberoptic cables. Fees in Nigeria rose to a level that was deemed prohibitive, leading the country’s National Economic Council to mandate a cap on fees. In response, several states have dropped fees to zero, asserting that this will best incentivize meaningful telecom investments.<sup>72</sup>

### ***Reduction of VAT on mobile phones in Kenya***

The elimination of a 16-percent VAT on mobile handsets in Kenya in 2009 led to a 200-percent rise in sales, contributing to a surge in mobile-phone penetration. This consumer growth, in turn, encouraged Kenyan providers to expand coverage and lower prices to attract customers.<sup>73</sup>

### ***Rwandan Universal Service and Access Fund (USAF)***

USAFs are public funds designated to support universal coverage, often by investing in service expansion to areas that may be less commercially viable. The

65 Tawanda Karombo, “The US Development Corp Is Betting \$300 Million on Africa’s Rising Demand for Data Storage,” Quartz, December 11, 2020, <https://qz.com/africa/1945156/us-dfc-bets-300m-on-africas-demand-for-data-storage-centers>.

66 Toby Shapshak, “Microsoft Launches \$100m Development Centres In Nairobi And Lagos,” *Forbes*, May 13, 2019, <https://www.forbes.com/sites/tobyshapshak/2019/05/13/microsoft-launches-100m-development-centres-in-nairobi-and-lagos/>.

67 “American Tower and Airtel Africa Announce Strategic Partnership,” *Business Wire*, October 10, 2022, <https://www.businesswire.com/news/home/20221009005035/en/American-Tower-and-Airtel-Africa-Announce-Strategic-Partnership>.

68 “The Mobile Economy: Sub-Saharan Africa 2022,” GSMA, 2022, <https://www.gsma.com/mobileeconomy/wp-content/uploads/2022/10/The-Mobile-Economy-Sub-Saharan-Africa-2022.pdf>; “Africa’s Future: Youth and the Data Defining Their Lives,” Population Reference Bureau, September 2019, <https://www.prb.org/wp-content/uploads/2019/10/Status-of-African-Youth-SPEC.pdf>.

69 Hilda Barasa, “Digital Government in Sub-Saharan Africa: Evolving Fast, Lacking Frameworks,” Tony Blair Institute for Global Change, March 14, 2022, <https://institute.global/policy/digital-government-sub-saharan-africa-evolving-fast-lacking-frameworks>.

70 “Unlocking the Digital Economy in Africa: Benchmarking the Digital Transformation Journey,” Digital Impact Alliance and Smart Africa, August 2020, [https://dial.global/wp-content/uploads/2020/10/SmartAfrica-DIAL\\_DigitalEconomyInAfrica2020-v7\\_ENG.pdf](https://dial.global/wp-content/uploads/2020/10/SmartAfrica-DIAL_DigitalEconomyInAfrica2020-v7_ENG.pdf).

71 “A Study on Kenya’s Mobile Market,” *Africa Telecom Review*, April 22, 2021, <https://www.telecomreviewafrica.com/en/articles/features/2268-a-study-on-kenya-s-mobile-market>; “Worldwide Mobile Data Pricing 2022.”

72 “Nigeria: Reducing the Cost to Build New Networks,” Good Practices Database, Alliance for Affordable Internet, October 26, 2021, <https://a4ai.org/research/reducing-the-cost-to-build-new-networks/>.

73 “Kenya: Treating Mobile Phones as Essential for All,” Good Practices Database, Alliance for Affordable Internet, September 18, 2019, <https://a4ai.org/research/good-practices/treating-mobile-phones-as-essential-for-all/>.

## Chinese Telecom Investment in African Markets

Over the past two decades, Chinese firms Huawei and ZTE have been key players in the development of Africa's core information-technology infrastructure. Huawei has built 70 percent of Africa's 4G networks, and Huawei and ZTE have combined to build 70 to 80 percent of the continent's 3G networks.<sup>1</sup> These infrastructure projects have generally been funded through government-to-government loans, often conditioned on the use of Chinese companies.<sup>2</sup> The Chinese reputation for rapid mobilization, ability to work in emerging markets, and view of the continent as a region of opportunity have led to success in digital infrastructure, particularly in the middle mile.

It is in the area of affordable smartphones, however, that Chinese investment has proven transformative. Chinese handset manufacturer Transsion, which produces the low-cost Tecno, Infinix, and Itel brands, holds a 42.7-percent market share in African markets.<sup>3</sup> Uniquely, Tecno's strategic focus has been Africa since day one, and Transsion attributes its success to designing phones with the African consumer in mind, innovating models with dual SIMs, longer battery life, and cameras designed for darker skin tones.<sup>4</sup> Transsion's price point also caters to the African consumer, coming in hundreds of dollars cheaper on average than Samsung or Apple competition, driving a general reduction in prices over the past decade

and affording access to more users. Transsion loads Chinese apps onto its phones, providing a ready market for Chinese media, entertainment, and finance companies to tap.<sup>5</sup>

TikTok—owned by China-based ByteDance—is an example of a Chinese app that grew impressively during the pandemic across Africa, becoming a global platform. By 2021, TikTok had more than 30-percent market share in Nigeria and had nearly doubled its user base in South Africa to nine million users, nearly on par with WhatsApp's user base in the country. Of particular interest is TikTok's active-engagement strategy. The firm signed music-rights deals with two major South African licensing organizations; set up designated teams in the major markets of Kenya, Nigeria, and South Africa to cultivate creators; launched a TikTok for Business campaign to support advertisers and corporations using the platform in South Africa; and offered paid grants and mentorship to twenty African influencers.<sup>6</sup> Mobile phones have truly become the window to the world for an entire generation, and integration between Chinese handsets and apps offers China a competitive edge in reaching Africans. That being said, affordable smartphones—regardless of the manufacturer—allow hundreds of millions of Africans to access YouTube, Facebook, and Instagram as well.

- 1 Bianca Wright, "Made in China: Africa's ICT Infrastructure Backbone," *CIO*, March 22, 2020, <https://www.cio.com/article/193170/made-in-china-africas-ict-infrastructure-backbone.html>.
- 2 Jie Xi, "Analysts: China Expanding Influence in Africa Via Telecom Network Deals," *Voice of America*, August 14, 2021, [https://www.voanews.com/a/economy-business\\_analysts-china-expanding-influence-africa-telecom-network-deals/6209516.html](https://www.voanews.com/a/economy-business_analysts-china-expanding-influence-africa-telecom-network-deals/6209516.html).
- 3 "Africa's Smartphone Market Declines for Third Successive Quarter as Supply Chain Constraints Continue to Bite," International Data Corporation, June 1, 2022, <https://www.idc.com/getdoc.jsp?containerId=prMETA49220122>.
- 4 Omar Ben Yedder, "TECNO Provides Innovations in Line with Africa's Needs," *African Business*, November 27, 2020, <https://african.business/2020/11/technology-information/tecnos-success-is-built-on-providing-innovations-in-line-with-africas-needs/>.
- 5 Jenni Marsh, "The Chinese Phone Giant that Beat Apple to Africa," *CNN*, October 10, 2018, <https://www.cnn.com/2018/10/10/tech/tecno-phones-africa>.
- 6 Will McBain, "TikTok Wins over Africa's Youth," *African Business*, October 11, 2021, <https://african.business/2021/10/finance-services/tiktok-wins-over-africas-youth/>.

United States has one, called the Universal Service Fund, which is paid into by telecom providers.<sup>74</sup> USAFs are less prevalent in African markets, but Rwanda has used one effectively. The country set up a USAF in 2004 managed by the Rwanda Utilities Regulatory

Authority, and supported by a 2-percent levy on operator revenues. Funds are used, in coordination with other government agencies, to support telecom access and affordability for vulnerable populations, as well as to promote gender equity in ICT.<sup>75</sup>

74 "Contribution Factor & Quarterly Filings—Universal Service Fund (USF) Management Support," Federal Communications Commission, 2022, <https://www.fcc.gov/general/contribution-factor-quarterly-filings-universal-service-fund-usf-management-support>.

75 "Spurring Rural Development with USAF Investment," Good Practices Database, Alliance for Affordable Internet, March 2, 2020, <https://a4ai.org/research/spurring-rural-development-with-usaf-investment/>.



## Digital Leadership in Morocco

Morocco has prioritized digital development at the national level since 2005, with a sequence of plans—namely, e-Morocco 2010, Digital Morocco 2013, Digital Morocco 2020, and Horizon 2025.<sup>1</sup> As a result of this national prioritization, the country boasts the highest Internet penetration in Africa at 84 percent, and a cost of just \$0.69 per gigabyte of mobile data.<sup>2</sup>

Morocco took a step further in January 2022 by announcing MoroccoTech: an initiative to cement Morocco's status as a digital leader both regionally and globally. The initiative emphasizes public-private partnerships to expand the digital economy, including both digital-focused government arms (such as the Digital Development Agency (ADD)) and financial and private-sector groupings (such as the General Confederation of Moroccan Enterprises (CGEM) and

the Moroccan Investment and Export Development Agency (AMDIE)). Specific aims include increasing the ICT contribution to GDP from 3 to 11 percent and creating one hundred and twenty-five thousand new jobs.<sup>3</sup>

Other goals include providing affordable mobile-broadband access to the whole country, completely digitizing administrative services, and adding a Moroccan tech unicorn (a company worth more than \$1 billion) over the next three to five years.<sup>4</sup> The Ministry of Youth, Culture, and Communication also signed an agreement in January 2022 to bolster public-private cooperation around the creative industries, aiming to incentivize investment in film, culture, and the arts.<sup>5</sup> Morocco's national prioritization of digital progress, alongside strategic involvement of the private sector, provides a model of study for peers.

- 1 "Morocco Accelerates Its Digital Transition with AI," KAWA News, January 26, 2022, <https://kawa-news.com/en/morocco-accelerates-digital-transition-with-ai/>.
- 2 "Individuals Using the Internet (% of Population)—Morocco," World Bank, 2020, <https://data.worldbank.org/indicator/IT.NET.USER.ZS?locations=MA>; "Worldwide Mobile Data Pricing 2022."
- 3 "MoroccoTech, Showcase of a Digital Morocco," Resilient Digital Africa, January 28, 2022, <https://resilient.digital-africa.co/en/blog/2022/01/28/moroccotech-showcase-of-a-digital-morocco/>.
- 4 "Morocco Accelerates Its Digital Transition with AI."
- 5 Issam Toutate, "Moroccan Government Takes Measures to Professionalize the Cultural Sector," Morocco World News, January 28, 2022, <https://www.morocoworldnews.com/2022/01/346774/moroccan-government-takes-measures-to-professionalize-the-cultural-sector>.

## Consumption Patterns

Growth in mobile subscriptions and Internet usage in Africa has been explosive over the past decade, and growth remains fastest there relative to other regions.<sup>76</sup> As of 2021, sub-Saharan Africa had 515 million unique mobile subscribers, and the number of mobile-Internet users is projected to be 474 million by 2025.<sup>77</sup> Internet usage has grown by more than a factor of five since 2010, with the amount of users expected to grow by a compound annual growth rate of 9.3 percent through 2025.<sup>78</sup> African usage remains mobile first, meaning that many users access the Internet only through their smartphone, with accessibility heavily

influenced by a reduction in the price of smartphones and feature phones.<sup>79</sup> Interventions of interest that have impacted consumption patterns include the following.

### *Phone financing in Kenya*

In 2020, Kenyan operator Safaricom launched the Lipa Mdogo Mdogo campaign, meaning "pay a small amount" in Swahili. The program introduced payment plans for Google smartphones, starting at \$0.20 per day.<sup>80</sup> Google also helped create an app that locked users out after continuously failing to pay, though users were also rewarded for a week's worth of consecutive

- 76 Sara Lebow, "There Will Be 4.55 Billion Internet Users Worldwide This Year, but Growth Is Slowing," Insider Intelligence, April 21, 2022, <https://www.insiderintelligence.com/content/internet-use-worldwide>.
- 77 "The Mobile Economy: Sub-Saharan Africa 2022"; "The Mobile Economy: Sub-Saharan Africa 2021," GSMA, 2021, [https://www.gsma.com/mobileeconomy/wp-content/uploads/2021/09/GSMA\\_ME\\_SSA\\_2021\\_English\\_Web\\_Singles.pdf](https://www.gsma.com/mobileeconomy/wp-content/uploads/2021/09/GSMA_ME_SSA_2021_English_Web_Singles.pdf).
- 78 "Individuals Using the Internet (% of Population)—Sub-Saharan Africa," World Bank, 2020, <https://data.worldbank.org/indicator/IT.NET.USER.ZS?locations=ZG>; "The Mobile Economy: Sub-Saharan Africa 2021."
- 79 Abdi Latif Dahir, "Smartphone Use Has Doubled in Africa in Two Years," Quartz, August 3, 2016, <https://qz.com/africa/748354/smartphone-use-has-more-than-doubled-in-africa-in-two-years>.
- 80 "Kenya: Financing Greater Access to Smartphones," Good Practices Database, Alliance for Affordable Internet, October 26, 2021, <https://a4ai.org/research/financing-greater-access-to-smartphones/>.

payments with a free data bundle.<sup>81</sup> The campaign led to more than two hundred and fifty thousand phone purchases over eight months, catering to a previously priced-out user base.<sup>82</sup>

### ***Sponsored data in Ghana***

Ghanaian firm Viotech allows companies to sponsor free data for consumers. For example, free usage of a certain app could be sponsored in order to promote uptake, with users rewarded for hitting usage targets with a package of free general-use data.<sup>83</sup> By building a user base for the advertiser, this innovation can support a routinization of general consumption as well.

### ***Data bundle pricing in South Africa***

In South Africa, regulators imposed a price ceiling, making it so providers could no longer upcharge small data bundles by more than 25 percent per megabyte, supporting lower unit costs. This was, in part, precipitated by public pressure from the #DataMustFall campaign. Started by a DJ in 2016, this affordability

protest, which led to highly publicized social media campaigns and boycotts, eventually received political-party support and influenced regulatory guidance, with major providers forced to adapt their pricing schemes. Vodacom, for instance, agreed to reduce data prices by 30 percent.<sup>84</sup>

African data consumption has been subject to the push and pull of global trends. Like the rest of the world, the pandemic has pushed many Africans to e-commerce and digital platforms, accelerating the larger trends of young, urban Africans increasingly accessing the Internet. This is clearest in Nigeria and South Africa, where Internet access jumped more than ten points between 2019 and 2021.<sup>85</sup> On the other hand, inflation over the past year has led telecoms in countries such as Malawi and Zimbabwe to raise prices, and even steady rates price out the poorest users as their cost of living increases.<sup>86</sup> Vodacom, for example, reported a loss of four hundred thousand subscribers between April and June 2022, attributing this to the rising price of food and fuel. Even still, Vodacom reported increased revenue over this period, with increased data consumption fueling its general growth trajectory.<sup>87</sup>

81 “Connected Women Case Study: Safaricom’s Maisha Ni Digital Campaign,” GSMA, 2021, <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/Safaricom-Maisha-Ni-Digital-Case-Study.pdf>.

82 Dickson Otieno, “Over 250,000 Kenyans Have Acquired Phones through Safaricom ‘Lipa Mdogo Mdogo,’” Techish, July 12, 2021, <https://tech-ish.com/2021/07/12/safaricom-lipa-mdogo-mdogo/>.

83 “The High Cost of Mobile Data in Sub-Saharan Africa,” Ecobank, September 2018, <https://www.ecobank.com/upload/publication/20180910054643018QJEBKEVZKD/20180910054635730h.pdf>.

84 “South Africa: Leveraging Competition to Lower Prices,” Good Practices Database, Alliance for Affordable Internet, July 29, 2020, <https://a4ai.org/research/leveraging-competition-to-lower-prices/>.

85 Magali Rheault and RJ Reinhart, “Africa Online: Internet Access Spreads During the Pandemic,” Gallup, July 14, 2022, <https://news.gallup.com/poll/394811/africa-online-internet-access-spreads-during-pandemic.aspx>.

86 Matshepo Sehloho, “Malawi Telco TNM Increases Tariffs by 20%,” Connecting Africa, August 19, 2022, [https://www.connectingafrica.com/author.asp?section\\_id=816&doc\\_id=779809](https://www.connectingafrica.com/author.asp?section_id=816&doc_id=779809).

87 Ephraim Modise, “South African Mobile Network Operator Vodacom Loses Almost 400,000 Subscribers in 3 Months,” TechCabal, July 22, 2022, <https://techcabal.com/2022/07/22/vodacom-loses-almost-400000-subscribers-in-3-months/>.

## Recommendations

Africa's working-age population will grow by 70 percent, or four hundred and fifty million people, by 2035.<sup>88</sup> Massive job creation in the twenty-first century will depend on unlocking efficiency and enhancing productivity through digitization in all sectors on the African continent. The decentralized nature of the digital economy also allows for African creators to reach global audiences and monetize their influence. Therefore, the cost of data is central to all aspects of economic activity and human well-being—education, health-care, business, governance, leisure, etc.—and should become a core development indicator that is tracked by African governments, their development partners, industry groups, and business associations. The case of India is particularly compelling in terms of the impact of affordable data on the expansion of the creative industries.

### For the US Biden Administration

The Obama, Trump, and Biden administrations have been right to emphasize digital programs as part of the US Africa strategy. From Connect Africa to Access Africa, from the Blue Dot Network to Digital Invest, the US government has been working to encourage and support investment in digital infrastructure in emerging markets.<sup>89</sup> The launch of Digital Africa should provide overarching focus across these various programs as Power Africa did, and make tracking and reducing the cost of data core to digital Africa policy. Operationally, this could be a shared reporting mechanism across US government agencies—the Millennium Challenge Corporation could add the policies that drive down the cost of data as a key indicator, the US Development Finance Corporation could report on how its investments in infrastructure contribute to data affordability and access, etc. The Biden administration should also leverage synergies between Digital Africa and Power Africa, since energy and digital access go hand in hand, and large projects such as data centers are energy intensive.

Digital Africa should continue to enhance and advance US competitiveness in telecom infrastructure, especially when it comes to space and satellite technologies such as Starlink, and in the creative industries supported by mobile-Internet access.<sup>90</sup> The need to compete with China in African markets, which has bipartisan support in Washington, will continue to be the primary frame of reference for US foreign policymakers, regardless of the outcome of the 2022 midterms and 2024 elections. Despite the slowdown in the Belt and Road initiative, China continues to evolve its commercial footprint in African markets, having started in transport infrastructure, moved to telecom infrastructure, found adjacencies in electronics manufacturing, and now made forays into new sectors such as media and venture capital.<sup>91</sup> Clarity around what the United States can and cannot offer to its African partners should be paired with speed of action in engaging with leading US technology firms and investors.

### For African Governments

Because of the importance of the digital economy to future growth and prosperity, African governments should align policy—from taxes and tariffs to right-of-way regulation, from incentives for innovation in rural accessibility to competition policy—around reducing the cost of overall connectivity. They can continue to learn from regional leaders such as India, Estonia, and the United Arab Emirates (UAE), as well as countries making rapid progress, such as Cambodia.

Building a robust digital economy, by definition, involves many government agencies, far beyond the remit of just the ministry of ICT. Accordingly, countries such as the UAE and China have operationalized intergovernmental cooperation through digital-economy councils. The Chinese joint-conference system cuts across twenty departments and is led by the National Development and Reform Commission.<sup>92</sup> President Muhammadu Buhari of Nigeria inaugurated a Council on Digital Economy and

88 “The Africa Competitiveness Report 2017—Addressing Africa’s Demographic Dividend,” World Bank, May 1, 2017, <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/733321493793700840/the-africa-competitiveness-report-2017-addressing-africa-s-demographic-dividend>.

89 “OPIC Launches Connect Africa Initiative to Invest More Than \$1 Billion Supporting Infrastructure, Communications, and Value Chain Connectivity,” Overseas Private Investment Corporation, press release, July 2, 2018, <https://www.dfc.gov/media/opic-press-releases/opic-launches-connect-africa-initiative-invest-more-1-billion-supporting>; “Access Africa,” US Trade and Development Agency, last visited November 20, 2022, <https://ustda.gov/initiatives/access-africa/>; “Blue Dot Network,” US Department of State, last visited November 20, 2022, <https://www.state.gov/blue-dot-network/>; “Digital Invest,” US Agency for International Development, last visited November 20, 2022, <https://www.usaid.gov/digital-development/digital-invest>.

90 Aubrey Hruby, *The Digital Infrastructure Imperative in African Markets*, *Atlantic Council*, April 8, 2021, <https://www.atlanticcouncil.org/blogs/africasource/the-digital-infrastructure-imperative-in-african-markets/>.

91 Lingling Wei, “China Reins In Its Belt and Road Program, \$1 Trillion Later,” *Wall Street Journal*, September 26, 2022, <https://www.wsj.com/articles/china-belt-road-debt-11663961638>.

92 “Inter-Ministerial System Established for Development of Digital Economy,” State Council, People’s Republic of China, July 25, 2022, [https://english.www.gov.cn/policies/latestreleases/202207/25/content\\_WS62de5c69c6d02e533532e72e.html](https://english.www.gov.cn/policies/latestreleases/202207/25/content_WS62de5c69c6d02e533532e72e.html).

e-Government in June 2022, though it is too early to see how well the council will operate in a large, federal democracy (as opposed to the centralized nature of UAE and China) and whether it will be carried over past the February 2023 Nigerian elections.<sup>93</sup> Tracking the cost of data and regularly publishing results will help these councils define and measure success over time.

The most immediate area for early success is the digitalization of governmental operations and services. Moving data—not paper or people—between ministries can unlock productivity, provide transparency, and deter corruption. Estonia, long seen as a global leader in digital transformation, focused first on e-government, which delivered immediate efficiencies in a small country of less than two million people. African governments have lagged behind the rest of the world in e-government implementation, although the regional average is improving and Mauritius, Seychelles, South Africa, and Tunisia rank among the top one hundred countries in terms of the 2022 UN E-Government Development Index.<sup>94</sup>

Younger leaders—those who are digital natives—will help accelerate pro-digital change, and should be encouraged to serve in government. In Sierra Leone, David Sengeh was appointed chief innovation officer for the country’s Directorate of Science, Technology, and Innovation at the age of thirty-one in 2018, and also serves as the minister of basic and senior secondary education. He has pushed aggressively for e-government solutions, and regularly connects with young Sierra Leoneans through rap and other music.<sup>95</sup> On a continental level, Secretary General Wamkele Mene of the African Continental Free Trade Area (AfCFTA) is also bringing a focus on digital trade. The young secretary general has emphasized the need for engagement with Africa’s youth on implementation of the AfCFTA, and is pushing for the completion of negotiations on the Protocol on Digital Trade that will address cross-border data flows, removing customs duties on digital trade, ensuring non-discrimination of foreign e-commerce firms, etc.<sup>96</sup>

## For Global Development Finance Institutions (DFIs)

Global DFIs have long played a central role in financing infrastructure in African markets. They can use concessionary finance—both debt and equity—and insurance products to buy down the risk on large projects. DFIs such as British International Investment (BII), FMO (the Dutch DFI), the US DFC, and others have backed infrastructure private-equity (PE) funds, including the African Infrastructure Investment Managers’ most recent African Infrastructure Investment Fund 4.<sup>97</sup> These investment mandates have long included digital infrastructure, as development is now inherently digital.

As a result of the decades of investment by DFIs, much of the business case for investing in African digital infrastructure has been established and accepted by the market. Private funds have flowed into supply-side investments in digital infrastructure, such as telecom towers, data centers, and undersea cables.<sup>98</sup> DFIs should now focus on reducing the risk of investing in more demand-focused subsectors, including last-mile satellite solutions, e-education, and creative industries. African creative entrepreneurs have long struggled to access development capital, and completion bonds for the film industry are almost nonexistent in the market. DFIs can work with African banks and investors to encourage innovation in creative-industry financing.

Where DFIs can be even more impactful is by helping encourage the broader impact-investment community to see digital-economy investments as core to their mission. The Global Impact Investing Network estimated that only 3 percent of the impact assets under management target ICT investments.<sup>99</sup> DFIs can shape these views by showing how modern economic development is fundamentally digitally enabled, and thus increase the global resources available for digital transformation in African markets.

93 “Buhari Names Uzodimma, Others, Council Members of e-Government, Digital Economy,” *Vanguard*, June 10, 2022, <https://www.vanguardngr.com/2022/06/buhari-names-uzodimma-others-council-members-of-e-government-digital-economy/>.

94 “2022 UN E-Government Survey,” United Nations, 2022, <https://desapublications.un.org/sites/default/files/publications/2022-11/Chapter%202.pdf>.

95 Jason Beaubien, “The Quantum Hi-Tech Dreams of A Rapping African Education Minister,” NPR, July 10, 2021, <https://www.npr.org/sections/goatsandsoda/2021/07/10/1014217259/this-education-minister-is-a-renaissance-man-and-hes-got-a-music-video-to-prove->.

96 Kingsley Ighobor, “Digital Trade Is the Next Big Thing in Africa,” *Africa Renewal*, July 14, 2020, <https://www.un.org/africarenewal/magazine/july-2020/digital-trade-next-big-thing-africa>.

97 “African Infrastructure Investment Fund 4 (AIIF4),” African Infrastructure Investment Managers, last visited November 20, 2022, [https://aiifafrica.com/our-funds/funds\\_aiif4/](https://aiifafrica.com/our-funds/funds_aiif4/).

98 Liza Rose Cirolia and Andrea Pollio, “Financing ICT and Digitalisation in Urban Africa,” Alfred Herrhausen Gesellschaft and the African Centre for Cities, 2022, [https://www.africancentreforcities.net/wp-content/uploads/2022/05/220519\\_Paper2\\_ICT\\_Digitalisation\\_final.pdf](https://www.africancentreforcities.net/wp-content/uploads/2022/05/220519_Paper2_ICT_Digitalisation_final.pdf).

99 Dean Hand, et al., “Annual Impact Investor Survey 2020,” Global Impact Investing Network, June 2020, <https://theigiin.org/assets/GIIN%20Annual%20Impact%20Investor%20Survey%202020.pdf>.



## Conclusion

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The digital economy as a share of global GDP ranges from 15 to 25 percent, yet is growing very rapidly. In 2021, the digital economy in the United States grew seven times the rate of the overall economy, and more than 60 percent of global GDP depends on digital communications technologies.<sup>100</sup> As productivity grows, jobs are created, and the COVID-19 pandemic experience has shown that digital infrastructure

is core to economic resiliency.<sup>101</sup> Africans today are young, urban, and increasingly connected. The data flowing to their phones are being used for education, entertainment, and generating income. This is no longer a luxury, but a daily necessity. African governments and their development partners must make the cost of data a central measurement of progress, and work collaboratively to advance affordability and access.

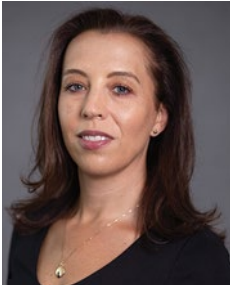
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100 “Study Finds Internet Economy Grew Seven Times Faster Than Total U.S. Economy, Created Over 7 Million Jobs in the Last Four Years,” Interactive Advertising Bureau, October 19, 2021, <https://www.iab.com/news/study-finds-internet-economy-grew-seven-times-faster/>; “Digital Development,” World Bank, October 6, 2022, <https://www.worldbank.org/en/topic/digitaldevelopment/overview>.

101 “What Can History Teach Us About Technology and Jobs?” McKinsey & Company, February 16, 2018, <https://www.mckinsey.com/featured-insights/future-of-work/what-can-history-teach-us-about-technology-and-jobs>.

## About the Author

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**Aubrey Hruby** is a nonresident senior fellow with the Africa Center, co-founder of Insider and the Africa Expert Network (AXN), and an active investor in African start-ups. In her role at Insider, Hruby works with global entrepreneurs to generate positive public relations and to connect them with investors, while at AXN, she has helped build Africa's leading information brokerage and expert connection service.

Hruby has consulted extensively in over twenty-five African markets and regularly advises senior policymakers and *Fortune 500* companies on doing business in Africa. She is the former managing director of the Whitaker Group, an Africa-focused advisory firm that has helped facilitate well over \$2 billion in capital flows to the continent. Prior to that, she was an International Trade Specialist at the Barnett Group LLC, where she worked with corporate clients to resolve trade problems in the Middle East and Africa.

Hruby has led CEO-level delegations to African countries, coordinated presidential visits to the United States, and consistently works to ensure Africa is kept on the US foreign policy agenda. She has advised the US Chamber of Commerce's Africa Division and has worked on the Congressional renewal of the African Growth and Opportunity Act four times.

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