

NOVEMBER 2024

# Inflection Point

*Selecting Trusted Technology for Digitalization  
and Connectivity*

AUTHOR

Erin Murphy

A Report of the CSIS Project on Prosperity and Development

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INTERNATIONAL STUDIES

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# Acknowledgments

The author would like to thank Noam Unger, a senior fellow with the Project on Prosperity and Development at CSIS, and Madeleine McLean, a program manager and research associate with the Project on Prosperity and Development at CSIS, for their support in the development of this report. This paper was also informed by a private roundtable hosted by the CSIS Project on Prosperity and Development in June 2024.

This report was made possible by the support of the Open RAN Policy Coalition.

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# Introduction

Developing countries across the globe are installing or upgrading their digital infrastructure. But choosing a telecommunications vendor involves weighing factors such as cost, efficiency, quality, and security. The Covid-19 pandemic drove home the importance of connectivity and secure networks, over which information on e-commerce, education, financial services, and health—as well as national security—must pass. China has initially taken the lead in this sector by providing telecommunications solutions and financing primarily to countries in the Indo-Pacific and Africa. Meanwhile, the United States has fallen behind in addressing this important infrastructure gap. The United States and its partners have the financial and technical tools to provide safer and cost-effective technology to help bridge the digital divide in the Global South, where competition for high-quality digital infrastructure plays into broader great power tensions.

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# A High-Risk Network

China's Belt and Road Initiative (BRI) features an initiative that is quickly becoming the country's most prolific and impactful infrastructure investment: the Digital Silk Road (DSR). The DSR encompasses investments in wireless networks, surveillance cameras, subsea cables, and satellites; it is primarily financed and constructed by state-owned banks and companies such as Huawei, Hengtong, HMN Technologies, Hikvision, Dahua, and BeiDou.<sup>1</sup> The bulk of China's DSR contracts are with Indo-Pacific and African countries, where companies like Huawei are providing affordable mobile phones, cloud computing, and other types of hardware. Huawei Marine Networks, now known as HMN Technologies, has spearheaded subsea cable network infrastructure. In the last decade, the company has completed 108 projects that have amounted to an estimated 60,000 kilometers of subsea cable; roughly 16 of those projects are in 27 countries in the Indo-Pacific.<sup>2</sup>

Chinese companies also have a significant stake in the 5G wireless networks around the world. Huawei and ZTE have engaged in nearly 160 projects in Africa, Asia, and Europe, providing network equipment and infrastructure. Recipient countries have so far welcomed these investments, namely for the speed at which the projects are implemented—but also for the price. Due to Chinese government subsidies, Huawei and ZTE can offer below-market rates, with Huawei offering as much as 30 percent below typical costs.<sup>3</sup>

According to a report by the European think tank MERICS, Chinese companies are also involved in providing products in the e-governance, online education, and telehealth sectors. Huawei and ZTE have implemented these projects—predominantly in Africa and Central Asia—with more financing

from the Chinese government than from local governments, multilateral development banks, and G7 countries combined.<sup>4</sup>

The United States has consistently raised security concerns about China's digital technology investments, citing questions of national security, cybersecurity, personal security, and intellectual property, as well as the potential for authoritarian nations to surveil their own citizens. Some countries have heeded this advice; telecom carriers in Belgium, Denmark, the Netherlands, Sweden, and the United Kingdom have replaced Chinese equipment with technology from low-risk vendors, or vendors that adhere to agreed-upon standards on privacy, data collection, surveillance, and intellectual property.<sup>5</sup> The United States and many countries in the European Union have signed onto the Prague Proposals, which call on countries to select carriers and providers that will prioritize safe and secure 5G networks and communication technologies.<sup>6</sup>



# Offering an Alternative

The countries that have signed onto China's BRI and the DSR are doing so for several reasons. A primary motivation is to address critical infrastructure gaps by providing digital connectivity. The Covid-19 pandemic emphasized this need, underscoring its importance to nearly all aspects of daily life for individuals, companies, and governments. The BRI and DSR have stepped into this gap to provide something the United States and its allies have not. Typically, information and communication technology (ICT) projects are approved, deployed, and financed much more quickly by China than they would be through a G7 development bank. Approvals by the latter institutions often are bogged down by long feasibility studies, risk assessments, and other considerations. China, by contrast, offers a more streamlined approach: loans, construction companies, and equipment, all from one source.

The United States and its partners have struggled to provide an alternative to the DSR; however, in recent years, Washington has established agencies, initiatives, and partnerships to prioritize ICT projects overseas, including investments in wireless networks, Open Radio Access Network (ORAN) technology, surveillance cameras, subsea cables, mobile handsets, and satellites, as well as systems upgrades from 2G and 3G to 5G and beyond. But there are multiple avenues available for additional policies to increase export and development finance of these technologies by trusted suppliers.

## Case Study: Mexico

Over a decade ago, Mexico reached an inflection point in the development of its digital strategy and connectivity policies. Its experience offers both an example of best practices and a cautionary tale.

In 2013, Mexico implemented a constitutional reform that created the Federal Institute of Telecommunications (IFT) and the Federal Economic Commission for Competition (COFECE). Both are independent regulators and antitrust authorities with very broad powers. This was born out of a larger reform process in the telecommunication and broadcasting sectors that took place in Mexico and in Latin America more broadly. The reforms reviewed and updated the legislative frameworks and institutions created in the 1990s to boost competition after market liberalization during that decade. As in many Latin American markets, fixed-line telephony in Mexico was provided by the state-owned operator, Teléfonos de México (Telmex), until the early 1990s, when the government gradually divested its assets to national and foreign investors. In 1995, the Mexican government passed the landmark Federal Telecommunications Law (LFT), opening all market segments for competition and removing geographic limitations for fixed and mobile telephony networks.<sup>7</sup>

The IFT promotes and regulates competition and the efficient development of telecommunications and broadcasting, in accordance with its constitutional mandate and the 2014 Federal Law for Telecommunications and Broadcasting, LFTR, as well as the 2014 Federal Law for Economic Competition.<sup>8</sup> The COFECE is responsible for overseeing, promoting, and guaranteeing competition and free market access in Mexico. The COFECE has a board that consists of seven commissioners; a Technical Secretariat that analyzes the market and its competitiveness; a strategic planning and institutional evaluation coordinator; and an internal comptroller that oversees COFECE officials.<sup>9</sup>

Upon the creation of the IFT, Mexico licensed new national broadcasting networks, designated officials to evaluate carriers and operators, introduced rules for unbundling Telmex, and created a public registry of licenses. Since its creation, IFT has been viewed as a credible authority; as a result, prices have decreased and competition has increased.<sup>10</sup> There are now dozens of new local broadcasting licenses in radio and television, including for indigenous communities. Mexico's internet penetration rate stood at 83.2 percent of the total population at the start of 2024, up from 44 percent in 2013.<sup>11</sup> In 2015, AT&T undertook a series of local acquisitions, and the U.S.-headquartered company now comprises 16 percent of the market for mobile telephone operators. In December 2021, AT&T Mexico announced it intended to launch a 5G network using its 2.5 GHz spectrum, making it the first mobile network operator in the country to build such a network.<sup>12</sup>

Despite a more competitive ICT market, domestic politics have hindered and threatened progress. Most concerning has been the chipping away of IFT's independence and operational ability. When former president Andrés Manuel López Obrador entered office in 2018, he sought to undermine the independent IFT. Since February 2022, the agency has

operated with only four of its seven presiding commissioners, as President López Obrador refused to nominate any more. This has left the agency without enough commissioners to operate effectively; losing another would render it completely inoperable. The IFT's budget has also decreased by roughly 41.1 percent since 2014, hampering its ability to implement its mandate. Additionally, the government has set high spectrum fees, which has undercut telecommunications operators' ability to expand broadband connectivity, particularly in rural areas, and undermined IFT's efforts to license more spectrum. The country also remains plagued by anticompetitive tendencies, despite the efforts of the IFT and COFECE.<sup>13</sup>

Mexico has stood apart from its Latin American peers in creating and implementing one of the most sophisticated telecommunications regulations. But, before concluding his term, former president López Obrador sent to Congress an initiative for constitutional reform that would disappear IFT and COFECE and assign their responsibilities to different ministries within the executive branch. This initiative is waiting to be analyzed in Congress. In order to build on the progress of the 1990s, Mexico's new president, Claudia Sheinbaum, will have to undo Obrador's efforts and reinstitute the authority of these bodies, while also ensuring they are protected from political winds. Mexico is an excellent case study of how a country can succeed in building an effective and laudable regulatory infrastructure and have it subsequently come apart due to politics.

## **U.S. RESOURCES**

The United States has established new agencies and tools in recent years to help promote and support U.S. technology—particularly ICT—abroad. These efforts can be further honed to more effectively support U.S. and partner initiatives in the developing world, as well as private company engagement in this sector.

### *U.S. International Development Finance Corporation (DFC)*

In October 2018, the U.S. Congress passed the bipartisan Better Utilization of Investment Leading to Development (BUILD) Act to support and finance investments in emerging economies and to boost national security and foreign policy priorities in critical markets. The BUILD Act combined the Overseas Private Investment Corporation (OPIC) and the U.S. Agency for International Development (USAID)'s Development Credit Authority (DCA) to form the U.S. International Development Finance Corporation (DFC).<sup>14</sup> The DFC has stated that encouraging ICT investments in low and lower-middle-income countries is a key priority for the agency. The agency can provide loans, loan guarantees, equity financing, political risk insurance, and technical assistance to support investments in the telecom industry; it can only work on private sector projects, not ones supported by the public sector. However, the DFC is limited in working in networks that include high-risk vendor equipment. According to the 2019 National Defense Authorization Act, U.S. financing agencies investing in networks with this type of equipment must get a waiver from the head of the relevant executive agency or from the Director of National Intelligence and must have a phase-out plan to “rip and replace” the high-risk vendor equipment.<sup>15</sup>

The DFC and its predecessor OPIC have undertaken several ICT investments in the past two decades, including a network acquisition in the Pacific Islands; renewable power for cell phone towers in Nigeria and the Central African Republic; telecommunications infrastructure in Myanmar; and, in Jordan, infrastructure to provide a critical interconnection point for an internet cable system connecting Europe and Asia.<sup>16</sup> In 2018, the DFC also provided \$100 million in financing to Africell for the expansion of affordable mobile voice and data services in The Gambia, Sierra Leone, Uganda, and the Democratic Republic of the Congo, as well as upgrades to network equipment in these countries to accommodate increased traffic.<sup>17</sup>

#### *The Export-Import Bank of the U.S. (EXIM)*

EXIM has been mandated by Congress to enact its China and Transformational Exports Program (CTEP) to help U.S. exporters facing competition from China, particularly in the fields of AI, wireless communications, and fintech. Established in 2019, CTEP is expected to counter export subsidies and finance provided by China, advance U.S. leadership, and support U.S. innovation, employment, and technological standards. Exporters can take advantage of EXIM's reduced fees, extended repayment tenors, and exceptions from other EXIM policies to get financing on transactions with at least 51 percent U.S. content.<sup>18</sup> However, to date there have been no ICT deals financed through CTEP.

Additionally, EXIM can also provide loans, loan guarantees, and insurance for the purchase of goods and services shipped or invoiced from any country to facilitate U.S. exports for 5G-related transactions. EXIM has lowered its U.S. content threshold. But the creditworthiness of potential in-country private sector partners has remained a key challenge in many instances, particularly in countering opaque Chinese lending practices.<sup>19</sup>

#### *Department of Commerce*

The Creating Helpful Incentives to Produce Semiconductors and Science Act (CHIPS Act) of 2022 authorized billions of dollars for funding to the Departments of Commerce, Defense, and State to develop onshore domestic manufacturing of semiconductors. It also included appropriations to fund the USA Telecommunications Act to support the global telecom supply chain and counter the expansion of Chinese companies such as Huawei and ZTE. Provisions from the CHIPS Act are meant to further U.S. software advantages and to develop the Open Radio Access Network (ORAN), which would allow for a more interoperable telecommunications model and enable alternative vendors to enter markets for specific network components, rather than competing with end-to-end packages offered by companies like Huawei.<sup>20</sup>

The CHIPS Act provides \$1.5 billion through a Public Wireless Supply Chain Innovation Fund to the Department of Commerce's National Telecommunications and Information Administration (NTIA), in coordination with other agencies, to support investments in ORAN, developments of software-based wireless technologies, and funding for "leap-ahead" innovations in the U.S. mobile broadband market.<sup>21</sup>

### *Department of State*

The CHIPS Act allocates \$500 million over five years to a new International Technology Security and Innovation (ITSI) Fund, which gives money to the Department of State to provide for international information and communications technology security and semiconductor supply chain activities, including to support the development and adoption of secure and trusted telecommunications technologies, secure semiconductor supply chains, and other emerging technologies.<sup>22</sup> The State Department can use the fund for its own programming but can also allocate money to USAID, EXIM, and the DFC.

The focus of the fund has been less on ICT and more on semiconductors. Funding has gone to new hires at the State Department and to partnerships with Costa Rica, Indonesia, Mexico, Panama, the Philippines, and Vietnam to explore opportunities to grow and diversify the global semiconductor ecosystem.<sup>23</sup> In a March 2023 press release, the State Department communicated that \$40.7 million in fiscal year 2023 ITSI funding would be used in the ICT space to provide capacity building training as well as technical advice on policy formulation and regulatory frameworks, cybersecurity tools, financing, project preparation support, and other investment de-risking measures to catalyze private sector investments in secure ICT networks, including field testing and pilot deployments of ORAN networks.<sup>24</sup> The full scope and scale of these investments are not yet clear.

### *U.S. Trade and Development Agency (USTDA)*

USTDA provides financial tools to support the export of U.S. goods and services for priority infrastructure projects in emerging economies. USTDA funds project preparation, feasibility studies, and partnership-building activities. Though it is typically involved on the front end of projects, USTDA has also financed ICT-related initiatives in the Indo-Pacific and Africa.

In 2023, the agency awarded a grant to NOW Telecom Company to conduct a feasibility study and pilot project to support the development of a nationwide 5G mobile and fixed-wireless network in the Philippines. The company chose New Jersey-based Bell Labs Consulting, part of the research arm of Nokia, to conduct the study.<sup>25</sup> The USTDA also awarded a grant to Malawian internet service provider Converged Technology Networks Limited (CTN) to conduct a feasibility study on the expansion of digital connectivity to underserved communities in the country. CTN selected California-based Connectivity Capital LLC to conduct the study.<sup>26</sup>

### *U.S. Agency for International Development (USAID)*

USAID provides grants and technical assistance for an array of programs across the digital sector. In June 2022, the agency launched its Asia ORAN Academy as part of the Biden administration's Indo-Pacific Strategy. The academy brings together officials and representatives from the private and public sectors, as well as academia, with an expectation to expand its initial work in the Philippines to the rest of the region.<sup>27</sup> As of June 2024, USAID was in final negotiations to open an ORAN Lab at the University of the Philippines' Electrical and Electronics Engineering Institute. USAID's Better Access and Connectivity (BEACON) Activity is also engaging the Philippine government and industry leaders in the country through a series of workshops and trainings on field testing and through the adoption of legislation and regulations that facilitate ORAN deployment.<sup>28</sup>

USAID is additionally engaged in the Digital Invest initiative, also launched in 2022, which works with investment partners to increase the ability of companies to qualify for commercial funding. Digital Invest provides an average of \$500,000 per partner for investments related to resilient digital infrastructure, increased digital inclusion, and stronger economic development. Digital Invest partners have backed over 60 technology companies across 38 countries, with projects ranging from the expansion of broadband connectivity infrastructure in Liberia to a digital payment platform in Uzbekistan to a fund supporting female investors and tech founders across South and Southeast Asia.<sup>29</sup>

#### *Office of Strategic Capital (OSC)*

The newly created OSC, established in 2022 within the Department of Defense, is mandated to mobilize and scale private sector capital. Its Fiscal Year 2024 Investment Strategy outlined its initial target priorities, which include ORAN as both a part of the DoD's FutureG and 5G critical technology area and a mandated field in the FY 2024 National Defense Authorization Act.<sup>30</sup> The OSC's complete suite of financial tools is still under development, but at this time, it can provide direct loans for capital investment and equipment finance. These loans range from \$10 million to \$150 million, with long repayment tenor.<sup>31</sup> The OSC announced its first Notice of Funding Availability in September 2024 and will be considering applications through the rest of the fiscal year.<sup>32</sup>

### **GLOBAL PARTNERSHIPS**

U.S. partners and allies have established several initiatives through the G7 to address critical infrastructure needs. In each of these, digital connectivity—particularly in the Indo-Pacific, sub-Saharan Africa, and Latin America—is a core part of cooperative engagement.

#### *Partnership for Global Infrastructure and Investment (PGI)*

The G7 partners announced PGI, known then as Build Back Better World, at the Carbis Bay summit in June 2021. This effort was intended to counter BRI and target critical infrastructure to support health care, gender, climate, and ICT. The United States has set the goal of mobilizing \$200 billion in investments over the next three years as part of the larger \$600 billion target made by the G7. Much of PGI's focus has been on developing economic corridors in the Democratic Republic of the Congo (DRC), Angola, and the Philippines' Luzon Corridor. Yet there have been few announcements on digital connectivity, which suggests that there is more to be done in this sector through this initiative.

In 2023, as part of PGI, Africa Data Centers received a \$300 million loan from the Development Finance Corporation to construct data centers throughout the continent. The DFC, EXIM, USAID, and USTDA also announced they would build on DFC's existing financing for Africell in Angola, the DRC, The Gambia, and Sierra Leone (all part of the Lobito economic corridor) to support the expansion of wireless services and a digital payments initiative. Additionally, in the DRC, USTDA and USAID announced the provision of programming and financial support for last-mile connectivity and ORAN equipment for the piloting of U.S. firm Parallel Wireless with Vodacom DRC in five villages.<sup>33</sup>

### *Trilateral Infrastructure Partnership (TIP)*

The TIP is a partnership between the DFC, the Japan Bank for International Cooperation (JBIC), Australia's Department of Foreign Affairs and Trade (DFAT), and Export Finance Australia (EFA). TIP partners are looking to cofinance infrastructure projects mainly in the Pacific Islands and Southeast Asia. Though there are few projects under the TIP banner, two are in ICT.

TIP's first project has been the Palau spur, an approximately \$30 million construction project for a subsea fiber optic cable to the Republic of Palau. The project is to connect to a DFC-financed subsea cable, the world's longest, which stretches from Singapore to the United States.<sup>34</sup> In May 2023, the TIP partners announced their support for the Australian telecom company, Telstra, in its acquisition of Digicel Pacific. The JBIC and DFC provided \$50 million each in credit guarantees for EFA's \$1.33 billion financing package to support the acquisition. Telstra's move is expected to further Digicel's delivery of high-quality telecommunication services to more than 2.5 million subscribers in Papua New Guinea, Fiji, Vanuatu, Samoa, Tonga, and Nauru.<sup>35</sup>

### *Quad*

The Quad—Australia, India, Japan, and the United States—is also engaged on the ICT front and has announced ICT projects in the Pacific Islands, including on subsea cables and ORAN technology. At the Quad Leaders' Summit in May 2023, the partners announced the establishment of the Quad Partnership for Cable Connectivity and Resilience, with the aim of bringing together public and private sector actors to address gaps in this type of infrastructure.

Under this partnership, Australia is to establish a new Indo-Pacific Cable Connectivity and Resilience Program to share best practices and provide technical assistance to Indo-Pacific governments. The United States is providing technical assistance and capacity building on subsea cable system security through its \$5 million CABLES program.

The partners also announced a cooperation with the government of Palau and the Palau National Communications Corporation (PNCC) to design, implement, and operationalize the deployment of ORAN capabilities. The USTDA is expected to fund a technical assistance grant to scope the size and scale of the project. This announcement marked the first planned deployment of ORAN technology in the region.<sup>36</sup>

### *Global Coalition on Telecommunications (GCOT)*

GCOT was launched in October 2023 by the United States, the United Kingdom, Australia, Canada, and Japan to increase cooperation and coordination on shared priorities such as telecommunications supply chain diversification and open network architectures, as well as the building of a broader international consensus on key areas of telecommunications policy and the promotion of innovation and growth opportunities in the sector. The U.S. Departments of State and Commerce are the key agencies involved in this initiative. There have been few details or updates since its launch nearly a year ago.<sup>37</sup>

## **PRIVATE SECTOR**

A major player in the promotion of diversity in digital equipment is the private sector. Private companies can both benefit from government support and mobilize their own capital and resources

to be more competitive. One key argument from host countries is the lack of alternatives to Chinese or other high-risk providers for affordable and speedy installation of technology. However, the European Union, United States, Japan, and South Korea have a host of companies available for partnership that share similar values on information security, intellectual property, and high-quality standards.

The United States and its allies are identifying tools to de-risk markets and promote private sector mobilization and have worked with local governments in the developing world to create enabling environments for high standards of investment, but these efforts still lack the speed and the push for U.S.-based companies to invest.<sup>38</sup> More engagement between the U.S. government and private sector is needed in order to implement tools to support U.S. companies and meet host government needs in faster and more transparent ways.

## Case Study: India

India is at its own inflection point as it pushes to further its already impressive digital public infrastructure (DPI) efforts, attempting to expand resources and connectivity to more than a billion people. There are opportunities in the market, including in ORAN, but preference for competitive local telecom and ICT companies, as well as some skepticism around ORAN, may hamper major headway.

A part of India's success so far is its regulator, the Telecom Regulatory Authority of India (TRAI). TRAI was established in 1997 with the objective of creating a fair and transparent market and pushing the country toward more connectivity. India now has the second-largest wireless and wireline subscriber base in the world: 1.72 billion, as of March 2023. India's teledensity—the number of telephones per 100 population—stood at 84.15 percent as of March 2023, an increase of 10 percent in a decade. The prices of SIM cards and cellular data have also fallen significantly, allowing many more people to access mobile phone technologies<sup>39</sup>

Within India, local talent and capable companies have enabled the country to create a strong foundation in data systems. Since India's DPI endeavor, the country has created a data technology structure known as the "India Stack," which consists of three different layers: unique identity (Aadhaar); complimentary payments systems (Unified Payments Interface, Aadhaar Payments Bridge, Aadhaar Enabled Payment Service); and data exchange (DigiLocker and Account Aggregator). The layered system enables secure online, paperless, and cashless digital access for a variety of public and private services.<sup>40</sup>

The usage and benefits speak for themselves. Unified Payments Interface accounts for 68 percent of all payment transactions in the country. As of February 2024, more than 12 billion transactions are completed every month through UPI. In 2020, with this system in place, the Indian government was able to provide pandemic assistance and a platform for vaccinations.<sup>41</sup> Government reports note that the use of digital payments has expanded the



customer base of smaller merchants, which in turn has built a record of credit and cash flow, improving access to finance. In 2009, nearly 400 million Indians lacked a unique identity record, but Aadhaar's campaign to bring about a national ID succeeded in covering roughly 95 percent of the population by 2022. Japan's NEC, a company with extensive experience in biometric identification, laid the groundwork for Aadhaar with technologies such as facial and fingerprint recognition. DPI has also benefited government coffers: an estimated 8.8 million new taxpayers were registered between July 2017 and March 2022. Citizens can access documents issued by the central and state governments through one platform, which has streamlined bureaucratic procedures and services. The stack has digitized and simplified Know Your Customer (KYC) procedures, lowering the compliance costs to banks using e-KYC from \$12 to \$0.06. The biometric system ensures that people cannot assume fake identities and that banks have access to reliable and secure data, both of which contribute to the lowering of compliance costs.<sup>42</sup>

Even with a strong foundation, India is looking to expand its digital infrastructure to more users in rural and unconnected areas. It is considering ORAN offerings to see if that approach would be cost effective, high quality, scalable, and secure. Official bilateral and multilateral exchanges on this topic are ongoing; Indian national security advisor Ajit Doval and his U.S. counterpart, Jake Sullivan, have discussed engagement in the ORAN space, and the topic has been included in Quad summits. India and the United States have also launched the Critical and Emerging Technologies (iCET) initiative, which promotes cooperation between the private sector and research and scientific institutions in both countries to advance next-gen technologies such as AI, telecom, ORAN, quantum computing, semiconductors, and space innovation.<sup>43</sup>

India has already taken steps toward using ORAN technology in its own industries. In 2023, Tata Consulting Services and Tejas Networks formed a consortium to upgrade 4G and 5G networks; TCS will be the system integrator for the entire telecom network, while Tejas will be responsible for equipment and radio access network (RAN). Indian prime minister Narendra Modi has also traveled to the United States to pitch U.S. companies on partnerships with Indian companies that have investment and implementation experience in 4G, 5G, and ORAN, as well as 5G core, mobile edge cloud solutions, base stations, Internet of Things (IoT) sensors, and 5G smartphones.<sup>44</sup> Indian telecom companies Airtel and Reliance Jio have supported ORAN; Airtel has reportedly conducted a trial of the technology and has signed a deal with U.S.-based Mavenir for its deployment to 4G and 5G sites in low-revenue-generating rural areas, with an initial target of 2,500 sites (to be scaled up to 10,000). Reliance Jio is also developing its own ORAN stack.<sup>45</sup>

Questions remain around costs and scalability. Indian telecom market watchers have queried whether ORAN works for the higher configurations used for 5G networks by Indian telecom companies, noting that they find the technology neither cost effective nor mature. Scalability and feasibility are issues as well. The country head of Mavenir for India has said that he initially expected ORAN deployments to surge, but that the Indian

market has proven to be one of the most complex in the world for ORAN rollouts due to a large user base, high population density in cities, and diverse terrain and temperature conditions.<sup>46</sup> India's more challenging geographic areas may be a better fit for basic 3G, 4G, or 5G infrastructure. Additionally, there are concerns around technology fragmentation; India has benefited from a global standard in which the whole country is integrated. Issues around equipment "super cycles" are also a concern, as each new technological upgrade—from networks to smartphones—comes with its own specialized equipment. With the advent of AI and the likelihood of related technologies emerging, there will need to be significant public and private investment in managing super cycles; most governments, particularly those in developing countries, will need to attract or support that investment in order to both manage the demand for new devices and technologies and build workforce capacity. Finally, questions remain around the viability of ORAN. Some experts would like to see a larger country like the United States pilot and deploy ORAN on a large scale before India undertakes such an effort. To skeptics, ORAN's unproven elements seem risky for a billion-person country that is looking to keep costs down, integrate systems seamlessly, and ensure safe and secure connectivity.<sup>47</sup>

# Recommendations for the United States, Partners, and the Private Sector

Communications technology, including ORAN, is a strategic asset that can enable not only innovation and dynamism through competitive markets (including but not limited to ORAN), but also control, surveillance, and repression (including through closed systems with predatory vendor lock-in). As the United States and its partners work to build out telecommunications networks in the developing world, both the technologies themselves and the regulatory frameworks must be centered around principles of interoperability, security, and openness. Each stakeholder has a role to play to create an enabling environment for good governance and standards, creating the conditions for mobilizing private sector capital and providing safe and reliable access to connectivity.

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*As the United States and its partners work to build out telecommunications networks in the developing world, both the technologies themselves and the regulatory frameworks must be centered around principles of interoperability, security, and openness.*

- **Use Guiding Principles for Secure Networks:** Governing frameworks and values are as important as technology itself. Governments are working to shape these frameworks

as innovations emerge and new security concerns manifest alongside them. The Prague Proposals, PGI, the Indo-Pacific Economic Framework, the Digital Economy Partnership Agreement, and others offer guidelines for trusted, safe, and secure networks. Development and export finance institutions of the United States and its allies should embed these principles in their financing operations. CSIS's own criteria, the CSIS Criteria for Security and Trust in Telecommunications Networks and Services, also provides a foundation for shared principles and could complement the work of the Prague Proposals and the European Union's 5G Toolbox. The criteria are designed to help governments and network owners and operators to determine trustworthiness and security. They provide a framework to assess potential suppliers and to implement domestic policies to safeguard telecommunications networks.<sup>48</sup>

- **Maximize Coordination and Financial Resources among U.S. Agencies and Development Partners:** With the infrastructure finance gap widening and need soaring, DFC, EXIM, and partner development finance and export credit agencies need to work through existing mechanisms such as IPEF, TIP, and the Quad to maximize funds and extend reach. Cofinancing is notoriously difficult, but examples exist in which partners have seen more success when making specific contributions amid a broader project lifecycle, rather than trying to provide general support. Agencies and countries have different strengths that can be applied at various stages. Pooling funds to target specific and focused investments are another way for partners to utilize capital on shared objectives and in regions of shared interest. For example, at the recent Indo-Pacific Business Forum (IPBF) in Singapore, member countries announced the IPEF Catalytic Capital Fund to support the expansion of a clean economy infrastructure project pipeline in the forum's emerging and upper-middle-income economies. Australia, Japan, Korea, and the United States contributed \$33 million in grant funding, with a goal to generate up to \$3.3 billion in private investment.<sup>49</sup>
- **Reform or Expand EXIM's CTEP to Support Partner Telecoms:** As CSIS recommended in the report, "The U.S. EXIM Bank in an Age of Great Power Competition," released this year, CTEP should be more flexible and should include companies interested in participating to be exempt from the EXIM policies that can limit investor competitiveness.<sup>50</sup> EXIM so far has come up short in maximizing CTEP, hampered in part by its requirement to ensure that loans will have a "reasonable assurance of repayment" and its 2 percent loss default ratio cap. To prevent EXIM from self-selecting out of deals and to allow it to take on greater risk (and thus be more competitive), the default cap should be raised in critical industries or on projects that fall under the CTEP umbrella. In line with this, EXIM should lower content requirements for financing. This would allow more U.S. and partner-country companies working in complex supply chains to get more involved in building trusted networks. Some U.S. companies have no choice but to source from abroad, which limits their ability to qualify for EXIM financing. Reasonable conditions for dropping content requirements, particularly for the sake of competitiveness and the promotion of trusted vendors, would almost certainly help the CTEP pipeline and U.S. businesses. The world has changed dramatically in the last 40 years: most supply chains are now global, and competitive manufacturing

is a worldwide enterprise. In the same report, CSIS highlighted the U.S. Government Accountability Office's 2012 report stating that EXIM's domestic content requirements were too stringent compared to those of other G7 export credit agencies.<sup>51</sup>

- **Focus Resources on Key Strategic Markets:** The ITSI fund and other pledged financial commitments are too small given the necessary financing needed to address the digital infrastructure gap. Focusing these funds in geographies and on technologies in which markets and offerings such as ORAN can be piloted and tested would be a better way to provide proof of concept and could later attract further public funding and mobilize private sector capital. Simultaneously targeting a large market such as India or Indonesia, a medium-sized market such as Kenya or Brazil, and a smaller market such as the Pacific or the Caribbean would offer a way to test different geographies, legal and regulatory systems, and population needs. This would provide lessons on successes and obstacles, as well as a road map for scaling up or moving to similar markets.
- **Create Matchmaking Opportunities and Promote Alternatives:** Host countries and local businesses should work through organized business forums and initiatives to solicit public and private sector funding. Initiatives like PGI and relevant government departments and agencies—such as the Department of Commerce, the Department of State, DFC, and EXIM—should work with local chambers of commerce and other business and trade organizations to establish such forums where they do not exist or strengthen those that do. An example to emulate is the recent IPBF that kicked off the Singapore IPEF Clean Economy Investor Forum. The forum acted as a matchmaker between investors and projects as well as a platform for sharing expertise and best practices in climate-related investments. The forum showcased \$23 billion in sustainable infrastructure initiatives in IPEF-member economies—\$6 billion of which belong to reportedly shovel-ready projects—to investors and interested governments.<sup>52</sup>
- **Maintain Leadership on R&D and Deployment:** Nearly all initiatives and funds, including ITSI, have capacity building and technical assistance components. U.S. departments and agencies should offer training opportunities and foster an ecosystem of players involved in testing and integrating their interfaces and equipment, thus ensuring the openness and interoperability of ORAN solutions and other digital infrastructure efforts from trusted providers. This could build on some of the announced projects from the ITSI Fund, PGI, and IPEF, which include funding testing and integration centers, publishing reports and hosting conferences on proofs of concept, organizing workshops to develop and exchange ideas on new technologies, and helping operators test and verify the interoperability of ORAN equipment from different providers. This would be the first step in bringing down the costs of implementing ORAN and helping telecom companies scale their operations in this area.
- **Foster Accountability in Major Initiatives:** The Quad, PGI, IPEF, and other initiatives have all announced major projects and deliverables at summits, conferences, and leader visits. While announcements are relatively easy, implementing projects and maintaining them amid changing political leadership is harder. An accountability tracker that measures the status of announcements and the impact of such initiatives should be put in place to ensure these

projects get off the ground and that there is some way to measure if they are viable. This tracker will provide valuable data on government commitments, lessons learned, and the impact of projects on host communities.

- **Promote Good Governance and Transparent Regulatory Regimes:** Businesses often cite corruption and the lack of regulatory transparency as major hindrances to investment in developing economies. Much of this governance work has been done in capacity building programs through USAID and in initiatives like IPEF. The Fair Economy pillar has made significant progress; in a June 2024 IPEF ministerial meeting in Singapore, members announced measures to provide technical assistance and capacity building for fighting financial crimes like money laundering and terrorism financing, promote inclusivity in law enforcement on anticorruption efforts, and develop and implement anticorruption policies and measures. Ongoing efforts at the government-to-government level, as well as engagement with the private sector, will build on this foundation to establish a better environment for high-quality projects.

# Conclusion

Countries across the globe are at an inflection point in deciding the course of digital infrastructure plans. Some are looking to emerging technologies, ensuring their digitalization plans take into account future developments and anticipate the necessary equipment, providers, and workforce. Others are working to ensure that rural communities are connected and can receive important services that foster economic and social development.

Regardless, any digital infrastructure plan must consider the importance of having a safe, secure, and trusted network. Short-term price and deployment considerations are important, but there are real long-term consequences to hosting personal, business, and government digital traffic on high-risk vendor equipment. The United States and its partners and allies must recognize the need for speed and affordability in host country decisionmaking and make the case that their provisions are a viable alternative. The foundation for doing so exists, but the road map calls for more focus and consistency, as well as further monitoring of results to track accountability and proof of concept.

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