

A Global Broadband Plan for Refugees

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Executive Summary

This policy brief proposes a new effort: a framework for a global broadband plan for refugees. Such an effort would draw on the analytic work done around the world to more efficiently connect unserved or underserved populations, foster understanding of refugee hosting countries' broadband strategies and concerns, and bring together various philanthropic efforts—all with the aim of aligning host-country strategies and private-sector incentives with efforts to connect refugees. This brief draws on its authors' diverse experiences—working with refugee relief, analyzing the economics of broadband networks, and studying national broadband plans—to outline ways to improve broadband connectivity for the world's more than 21 million refugees.

I. Introduction

There is an increasing recognition that the world's growing refugee population requires investments in long-term solutions as well as the emergency responses that have dominated policymaker and humanitarian organization attention for the past several years. Investor and philanthropist George Soros recently announced a U.S. \$500 million commitment to invest in refugee and migrant businesses, and the World Bank launched a multibillion-dollar effort to help host countries improve their business climates and to mobilize the private sector as a driver of economic growth.¹ And at a United Nations meeting in September 2016, the Obama administration reported that its call to action to the private sector to offer assistance that addresses the long-term needs of refugees in addition to short-term relief had resulted in a multimillion-dollar response.²

In today's connected world, a sound investment strategy should include initiatives that increase refugee access to broadband. The United Nations High Commissioner for Refugees (UNHCR) has demonstrated many ways in which information technologies can aid refugees, such as keeping in touch with families and communities, helping them remain safe, providing health and educational services, and supporting livelihoods.³ In a leading report on refugee access to the Internet, UNHCR noted in reference to education: "Without connectivity, millions of displaced children won't get the education necessary to become the doctors, teachers and future leaders of their communities."⁴ Similarly, as to livelihoods, UNHCR observed: "Connectivity would make it much easier for refugees to create and sustain their own businesses, as well as make remote work possible, which will be particularly important in situations in which there are constraints on the right to work or limited opportunities in the local economy."⁵ In light of all the benefits that can now be accessed online, UNHCR found that "refugees deem connectivity to be a critical survival tool in their

daily lives” and that they “are willing to make large sacrifices to get and stay connected.”⁶ It is thus unsurprising that UNHCR has set a goal of ensuring that “all refugees, and the communities that host them, are connected to mobile networks and the Internet so that they can leverage these technologies to improve their lives.”⁷

Yet there is a large gap between this aspiration and today’s reality. Refugees find themselves in a variety of circumstances, but most are less connected than surrounding populations, even though these communities may themselves be far from universally connected. For example, refugees in rural areas are twice as likely as the general rural population worldwide to live in an area with no connectivity. And even if connectivity is available, refugees are 50 percent less likely than the general population to have an internet-enabled phone.⁸

So how can the universal connectivity goals set by UNHCR be achieved? There are many admirable examples of individual efforts to address the connectivity needs of refugees, but such responses are unlikely to meet the larger, long-term needs of refugee communities and their host countries. As UNHCR observed, while the private sector is supporting connectivity efforts, “There is a need to scale up and expand these partnerships.”⁹ Further, the basic connectivity of the last generation of technology must be enhanced to ensure sufficient bandwidth to enable the emerging tools that are particularly important for people who are forced to separate from their communities and families. In addition, refugee host countries all have their own digital deficiencies and either have, or are in the process of adopting, strategies and plans to improve access and adoption among their own populations. Such plans create opportunities for coordinated efforts to more effectively connect both refugees and host-country populations.

The time is right for a more systemic approach that takes into account opportuni-

ties created by technology developments, lessons learned in addressing connectivity needs around the world, and the priorities of countries that host refugee and migrant populations, including those expressed in national broadband plans. Moreover, for both economic and political reasons, the most likely path to success in connecting refugees is to do so in ways that connect others in host countries through the same process.

II. National Broadband Plans as a Framework for Addressing Connectivity Gaps

There is a widespread consensus that universal access to broadband networks can provide paths to national economic growth and social progress.¹⁰ There is also a recognition that market forces alone, even in the most developed countries, will not result in affordable, abundant bandwidth everywhere, with everyone having a device, access to affordable service, and the digital skills necessary to make the most of both. For example, many governments subsidize network deployment in less densely populated, rural communities and subsidize broadband service for low-income individuals who otherwise could not afford it. Further, market forces will not, on their own, drive optimal use of the platform to better deliver public goods and services.

Recognizing that the market is unlikely to provide a platform that best serves public needs, more than 150 countries have developed national broadband plans. While they differ in detail, most set out to close three gaps: (1) an access gap, caused by lack of deployment of broadband networks to unserved or underserved areas; (2) an adoption gap, caused by the cost of devices and services as well as a lack of training; and (3) a usage gap, generally caused by a lack of services and content targeted to

low-adoption populations. As many plans have recognized, closing any one gap helps close others. Deployment drives adoption and usage; adoption creates demand for deployment and usage; and usage drives deployment and adoption.

Countries differ on the size and nature of the gaps and strategies for addressing them, but all propose some use of governmental powers, such as by auctioning spectrum¹¹ and using the proceeds to fund universal service programs, or by providing tax breaks and incentives for broadband providers to expand their networks. Perhaps the most significant strategy is to place universal service obligations on telecommunications companies. This type of policy aims to have users in areas where market forces are sufficient to fund network deployment and operations subsidize construction and service in other, often rural and low-income areas. This is generally accomplished by introducing fees for all users and requiring carriers to put a set percentage of their revenue into a fund that is then used to subsidize solutions to both access and adoption gaps. To further address the access gap, many national broadband plans call for government investments in network deployment through mechanisms such as direct investments, tax breaks, and loan guarantees. Some of these investments are directed toward networks that cover broad areas. Others are used to subsidize connections to anchor institutions, such as schools, libraries, health-care facilities, and community centers. Another tactic is to encourage infrastructure sharing among carriers to lower the cost of deployment. A study of national broadband plans found that implementing a framework for sharing network infrastructure increased the share of homes covered by 10 percent within three years.¹²

Yet increased broadband availability can only be part of the answer. National plans also focus on fostering adoption—for example by establishing subsidies for low-income individuals and by promoting different types of government-supported digital training, often in partnership with nonprofits and community-based

organizations. Such efforts are also closely related to closing the usage gap, as communities with low adoption rates—generally characterized by low income and low education levels—are significant users of government services. Improving how government delivers safety-net programs and social services, as well as such broader services as education, job training, health care, and public safety through modern communications technology both renders those services more effective and closes the adoption gap.

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The exercise of governmental powers recommended by national broadband plans is regularly combined with market mechanisms. Thus, while a government subsidy is often necessary, policymakers can use market forces, such as through auctions, to create incentives for carriers to be the low-cost provider of a service instead of a high-cost recipient of a government subsidy. Further, national broadband plans have identified a variety of ways that new or revised government policies can help reduce the cost of deployment and operations; these include adopting “dig-once” policies that eliminate costly future retrenching and allow future providers to benefit from the original investment in network deployment.

No national broadband plan relies primarily on philanthropic efforts. Such a model is generally viewed as neither scalable nor sustainable, and hence not likely to be cost-effective. Thus, philanthropic initiatives (often from private enterprises) can play a role, but are usually at the margin rather than the core of a national strategy. For example, with the U.S. National Broadband Plan, the discussion of adoption issues with Comcast led to the company developing its Internet Essentials program, now by far the largest private effort to help low-income Americans bring broadband into their homes.¹³

Still, the plan's core strategy was to reform the Lifeline Program, which is supported by government-mandated universal service fees to promote broadband adoption.

III. In Search of an Analogous Plan to Close Connectivity Gaps for Refugees

If the 21.3 million people who were refugees as of the end of 2015 were a country, they would rank larger than many countries that have already created a national broadband plan.¹⁴ As UNHCR has noted, because of the potential for Internet access to dramatically enhance protection, education, self-reliance, security, and delivery of assistance and services for displaced people, the benefits of closing connectivity gaps for refugees may even be greater than they are for nonrefugee communities.¹⁵ Yet there is no plan analogous to a national broadband plan for refugees.

In approaching this issue, it is important to remember that, as with the general population in any given country, the living situation of refugees is not monolithic. Some are in urban areas, others in rural locations. Some are in temporary housing while others enjoy more permanent quarters. Many live in dense clusters even while being remote. Some live largely with other refugees in camps while others live among nonrefugee populations. Thus, no single connectivity solution will work for all.

While refugee communities are diverse, they face the same kinds of connectivity gaps that cause nations to develop broadband plans. More than 80 percent of the world's refugee population lives in developing countries, in which connectivity is an issue for the general population as well. While 93 percent of refugees live where there is at least 2G coverage, a smaller share (62 percent) reside in an area with 3G coverage¹⁶—the newer generation of mobile network that is needed for uses

that include browsing the Internet, using most apps, and conducting video calls. This, in effect, means an access gap for more than one-third of all refugees. Even in countries where coverage is growing—often as a result of national broadband plans—refugees “risk being overlooked in these expansion plans,” according to UNHCR.¹⁷

When living within 3G coverage, refugees are significantly less likely to adopt broadband than the general population. The leading cause of this adoption gap is device affordability, followed by limited literacy, service plan affordability, and poor network quality.¹⁸ Other issues include a lack of understanding of service plans, no content in the relevant language, and difficulty charging phones.

A combination of political and economic forces in refugee-hosting countries makes it unlikely that these countries, on their own, will act to close the connectivity gaps refugees face. Refugees typically do not have the requisite political influence, and the political and economic actors that advocate for the use of government power to achieve universal access for the general public are unlikely to use their capital to adjust those policies to also connect refugees. Indeed, many may view refugees as competition for government services and support.

It is possible, however, that the international community could shift political and economic dynamics in hosting states through smart and targeted efforts that both assist refugees and serve national broadband goals. This insight is behind the World Bank, Soros, and other commitments noted above. It also fits into the economics of broadband. If designed correctly, resources used to connect one community, such as refugees, can help lower costs to connect the general public. In a way analogous to the “dig-once” policies that are gaining traction in numerous areas, a “connect-once” policy for refugees and their host communities has the potential to improve broadband access for all at a lower price.

What, then, might be the elements of a global strategy for refugee connectivity? And how could a global approach learn from the efforts that have been launched in many states around the world that combine government action with private market mechanisms?

The Basics of a Global Broadband Strategy for Refugees

A global broadband strategy for refugees would be guided by the same vision as national plans—that is, it would be based on strategies for closing the three connectivity gaps of access, adoption, and usage. This would require a detailed mapping and segmentation of refugee communities, and devising different solutions for different types of refugee communities. Crucial to this effort would be a rigorous assessment of the cost of deploying solutions, with close attention to scalability as a way to significantly reduce those costs. As with the development of national plans, a global process should create a rich forum for data-driven analysis and creative thinking.

But while a plan for refugees would be structurally similar to national plans, the tactics used to create and implement it would have to be different. Instead of focusing largely on making recommendations for government actions, a global strategy would have to develop ideas that reflect the interests and incentives that would encourage host countries and local carriers to participate. Critically, it would have to build on the national broadband plans of the host countries and propose ways that closing the connectivity gaps for refugees would accelerate the achievement of the countries' own broadband goals.

Further, the refugee strategy would need to develop effective routes for tying into and enhancing current and future philanthropic and private-sector initiatives, as well as the efforts

of multilateral development banks and other international development institutions. There are a number of existing efforts upon which a global strategy might build. UNHCR has noted the existence of a number of private initiatives to bring connectivity to refugees in certain areas, but also that in many countries where there are significant numbers of refugees, no connectivity initiatives are as yet underway.¹⁹ Part of the global strategy's plan should therefore be designed to expand the reach of such private efforts by, for example, capturing synergies between donor pledges of support and specific broadband-related investments and policies in host countries.

In addition, the strategy should address opportunities to incorporate connectivity objectives and solutions directly into existing aid programs. In many refugee camps, international aid programs are large consumers of broadband and Internet connectivity, and these programs could use their market position and purchasing power for broadband solutions that serve the camp and host-country population as a whole. In developed states, community anchor institutions could aggregate demand and purchase connectivity in consortia and thereby both drive down the cost of access and lower the risk of network investment—actions that strengthen the business case for network upgrades. A global strategy for refugee connectivity could recommend that international aid programs and donor countries employ similar tools when delivering services to refugees.

1. *The Phases for Writing the Global Strategy*

While a global connectivity strategy could be developed in a number of ways, based on extensive experience working with national broadband plans and refugee relief the authors believe the best way to proceed would be to create a project team that would work over a one- to two-year period in a way that invites feedback and builds both an analytic and political foundation for the plan. In this

regard, it would be useful to build the strategy in distinct phases, as discussed below, and to issue interim reports after each phase. Such reports invite comments and allow course corrections from all stakeholders and communities, including donor and host countries, development institutions, technical experts, policy experts, nongovernmental organizations (NGOs), and civil society. Interim reports, by encouraging participation, also invite all in the ecosystem to have some sense of ownership of the process. The strategy could receive additional input at existing international digital development fora hosted by groups such as the Internet Governance Forum (IGF), the World Economic Forum, and the Institute of Electrical and Electronic Engineers (IEEE).

Phase One: Pilot Projects

As an initial matter, the project should start with a “deep dive” to build an understanding of country-specific issues, to be conducted in not more than three countries identified by UNHCR. The purpose of this work would be to document current coverage, the location of refugees, the needs of refugee hosting communities, national and local regulatory structures, and other relevant information. The analysis would lead to a series of meetings with the host-country government to determine whether there are “low-hanging fruit” actions that would demonstrate how the country could more effectively serve the needs of its own population while also improving the connectivity of refugees. This would serve as an initial proof of concept before moving on to further, more global steps.

Phase Two: Mapping and Sizing the Problem

Building on the analysis and actions of the pilot projects, the team would then develop a detailed map, assessment, and initial financial sizing of the connectivity gaps in other countries where there is a significant number of refugees. UNHCR has already laid the groundwork for this phase with its 2016 *Connecting Refugees* study, but the strategy itself would require a deeper dive. For example, in analyzing

the number of refugees without access to any network capable of offering broadband, the project team would need to break aggregate data into subcategories, such as the numbers of refugees in areas:

- adjacent to areas with broadband and/or backbone networks (where network extensions, rather than new networks, are a possible solution);
- with nonbroadband communications networks (where network upgrades are a possible solution);
- with an adjacent host-country population without broadband (where deployments to serve both refugees and the general public are a possible solution); and
- where certain technologies are more difficult or easier to implement and use than others (for example, due to geographic conditions such as mountains).

In the same vein, in analyzing the number of refugees in areas served by broadband, but who have not adopted, the analysis would construct subcategories, such as the number of refugees living in areas:

- served by one provider (where it will be difficult to set the right level of government subsidies through a competitive process), or
- served by two or more providers (where a reverse auction can be used to reduce the amount of subsidy needed by having the providers compete to determine which can offer service with the least subsidy).

Similarly, the initial mapping would build on the UNHCR study and other country-specific data to analyze what usage types are most valued and most likely to drive adoption. Mapped against the access and adoption gaps, this anal-

ysis can help prioritize efforts for developing specific applications in certain languages or by certain governments. At the end of this phase, the project team should be able to identify the countries the strategy should target and to drill down into the different kinds of barriers and opportunities that refugees face in each target country.

Phase Three: Technical and Engineering Approaches

The strategy should invite stakeholders to propose technical and engineering approaches to solving the connectivity gaps in a number of different situations. The situations would be described in the interim report produced at the end of Phase One. Responses would include, for example, solutions based on:

- cellular;
- fiber with wireless extenders, such as Wi-Fi;
- alternative spectrum-based technologies such as white spaces, microwave, and millimeter wave;²⁰ and
- satellite.

There are a number of other issues relevant to this phase. The project team would invite commentators to provide information on what governments could do to reduce the cost and time of deployment. Building on the deployment data from Phase Two, commentators should be invited to discuss other barriers, such as those created by electricity supply issues. And drawing on the adoption data, commentators could also discuss potential approaches to device acquisition and distribution.

Phase Four: Economic and Governmental Solutions

Once the project team has mapped and sized the problem, and has a variety of proposed technical solutions, they would evaluate how to incentivize actions to overcome the connectivi-

ty gaps refugees currently face and create models for future situations. The strategy should explore a variety of options that combine different government powers, market forces, and philanthropic efforts.

During this phase, the project team should evaluate how best to work in coordination with the efforts of host countries to accelerate the closing of connectivity gaps for both native and refugee populations. As an economic matter, coordination and scale can lower the costs of deployment, adoption, and utilization. For example, infrastructure shared among a larger population will result in lower costs for all. Similarly, volume discounts for device acquisition will increase if done for both refugees and others. As a political matter, a host country is more likely to cooperate in a variety of ways if its own citizens see tangible benefits—like affordable broadband connectivity—accrue from hosting refugees. Finally, host countries are likely to have specific concerns that will need to be addressed, such as cybersecurity and the ability to regulate certain kinds of online content.

Coordination and scale can lower the costs of deployment, adoption, and utilization.

At the end of this phase, the project team could further prioritize targets for intervention by identifying, for example, where the greatest number of refugees could be connected at the lowest per capita cost, or where there is the most potential synergy between plans by the host countries to serve their own residents and potential interventions on behalf of refugees.

2. Funding Refugee and Host-Community Connectivity Initiatives

Accomplishing the goal of connecting all refugees and their host communities would require two different funds. First, it would require an initial amount of approximately U.S. \$250,000 to support the project team as it designs, de-

loys, and analyzes the pilot projects (Phase One). If that proves successful, a planning fund would be needed to pay for the development of the broader strategy in all other relevant countries (Phases Two, Three, and Four). This funding would need to be raised before the effort can begin, and would be in the range of U.S. \$3 million to U.S. \$5 million—depending on the degree of volunteer third-party analytic help and the detail of the analysis.

In addition, a connectivity fund should be created that would—as recommended by the strategy—provide incentives to build networks, offer devices and services at the lowest possible price, and in other ways induce interest on the part of governments and industry to participate in closing connectivity gaps. While the connectivity fund can be raised during the planning period, it would be preferable to raise a contingent connectivity fund prior to or early on in the planning process. That is, funds could be raised contingent on the strategy showing a reasonable likelihood of achieving certain agreed upon metrics. There are a variety of ways to raise such funds, such as creating social impact bonds, which are funds to be paid to achieve a specific social outcome. The funds could come from a number of sources, including but not limited to technology and telecommunications companies that have supported digital development efforts, foundations, NGOs that support connectivity efforts, and governments. The earlier the funds are raised, and the greater the amount of the funds, the more economic and political leverage the strategy would have as it seeks to influence host governments and private parties, such as carriers, to take the desired actions.

As noted above, philanthropy cannot be expected to carry the entire financial burden of connecting the world's population of displaced persons. Rather, the connectivity fund should provide the bridge between what refugees and host communities can pay for access, adoption, and use (with government subsidies) and what carriers will need to charge in order to deploy networks at a price refugees will be able to afford.

The connectivity fund should be aligned with other large-scale investment efforts designed to assist refugees or host countries. Of course, the larger the fund, the more effective it will be in providing incentives to connect refugees. The initial connectivity fund, however, must be sufficiently large to induce governments and industry to act to close a significant number of the gaps identified by the project team as priority targets. It may then be necessary to raise further tranches to achieve the mission of connecting all of the world's refugees.

3. *Potential Models for Addressing Connectivity Gaps*

Once the project team has collected data, it can then develop tactics designed to serve a number of purposes, such as identifying the fastest, most efficient path to universal connectivity; encouraging countries and regions to organize resources in a way that lowers the cost of network deployment and operations; creating incentives for companies to serve refugee and host communities; and revealing the lowest cost path to overcome the gap between the cost of providing services and the ability or willingness to pay. If successful, the savings generated by those government and private-sector actions, combined with additional resources from the connectivity fund, should prove the most efficient way to close connectivity gaps.

The data gathered by the project team would also likely identify new strategic options that are not yet obvious. Still, one can speculate about a variety of experiments and models that the right mapping, technology expertise, and economic leverage would enable.

For example, it might make sense to hold a competition in which the project offers an incentive package to the regions and enterprises that commit to connecting the greatest number of people at the lowest cost per capita. The criteria for the award could also include preferences for governments or institutions that incorporate commitments to offer applications

that improve, for example, the health care, education, public safety, or job training available to refugee communities.

Alternately, the initial analysis might suggest first focusing on providing devices at the lowest possible price. Here, the plan might recommend using the power of volume discounts to reduce the price of adoption and use. A portion of the connectivity fund could be targeted to reducing the price of connectivity by buying devices on behalf of refugees and potentially others. Then, as the device gap is closed, the project could run a reverse auction in which service providers compete to be selected for a large-scale contract. The contract would be awarded to the entity that agrees to provide the service at the lowest overall price for the community. Thus, the funds could be used to lower the cost of both devices and service.

Similarly, data analysis might show that in some areas it makes sense to focus resources on network deployment. To do so, the strategy could use a reverse auction model to fund capital expenses for providers to deploy networks that serve the greatest number of people at the lowest per capita cost.

The lessons learned in this process would also be useful for other efforts that target connectivity issues.

The strategy might also recommend a series of further experiments to test how best to achieve the goals of closing connectivity gaps. Part of the value added by the strategy-development process comes from having a group of experts skilled at translating lessons from such initial efforts to scaled-up programs that address the gaps in greater depth and across a broader range of geographic areas. It should be noted that the lessons learned in this process would also be useful for other efforts that target connectivity issues, such as the Global Connect Initiative.²¹

The strategy would also be complementary to the current UNHCR strategy, as described in the report *Connecting Refugees*. In that study, UNHCR calls for public-private partnerships and advocacy targeted to host-country governments to encourage them to pursue connectivity for refugees within their borders. The global strategy would provide a process and a methodology for aligning efforts to connect refugees with host-countries' own actions and for efficiently creating incentives for host countries and carriers to serve refugees.

4. Who Would Create a Global Broadband Strategy for Refugees?

National broadband plans have been written by different kinds of teams, including those composed of persons with backgrounds in economic analysis, broadband technologies, law, and international telecommunications regulation. In the case of a global strategy for refugee connectivity, it would be best to create a special purpose group to construct and perform the initial implementation of the plan.

The global strategy should not displace nor distract from existing efforts by organizations currently assisting refugees. It does, however, require a focused effort and a project team that has clear ownership of the initiative and expertise in the relevant substantive fields. Team members need to be technology and carrier agnostic, serving without conflicts of interest and acting as a resource to both host governments and refugee communities. The team can be small, with its efforts augmented by a variety of resources, including current international connectivity projects (such as the Global Connect Initiative), pro bono assistance from consulting firms, and government agencies from around the world that have a long history of analyzing such issues.

Of course, a number of institutions and stakeholders should have oversight and input into the team's planning process. UNHCR should

play a key organizing and oversight role, as well as providing significant insight into the situation facing refugees and the politics and policies of host countries. Further, UNHCR should take an active role in the funding strategy to assure that funds are additive to existing efforts, not competitive.

In addition, three other stakeholder types should be represented in a group overseeing the effort. First, it should include nonprofits that already provide the kind of assistance this effort would seek to scale and make sustainable. Organizations such as NetHope can provide valuable lessons for the planning team. Second, international aid programs, such as the U.S. Agency for International Development (USAID) and the UK Department for International Development (DFID), as well as other potential funders should be invited to help guide the effort. And third, multilateral development institutions, such as the World Bank, can contribute to discussions of how current development activities can be leveraged to make infrastructure deployment easier and less expensive.²²

Input should be welcomed from other stakeholders as well. This would include key governments, supporting institution, and companies with a stake in broadband networks, devices, applications, and systems.

IV. Conclusion: Putting the Puzzle Pieces Together

Closing connectivity gaps will not solve all the myriad issues facing refugee communities, their host countries, and others impacted by historic levels of migration. No single solution will.

Still, as UNHCR has noted, many of the problems refugees and their host countries face can be mitigated and made easier to solve if connectivity gaps are closed. Moreover, overcoming broadband connectivity gaps, unlike other challenges facing displaced populations, is a solvable problem. Many countries have made great progress in doing so for the general public with modest resources. The same can be done for refugees and the communities that host them.

The key is a systemic approach leading to a series of targeted actions that create economic advantages for host countries, that lower the cost of deployment and access, and that take advantage of new technologies to provide essential services. In light of the work that has already been done on national broadband plans, many of the necessary pieces of the puzzle are already on the table. Now is the time to put them together.

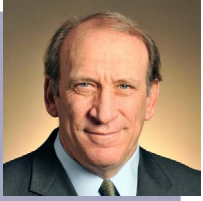
Many of the problems refugees and their host countries face can be mitigated and made easier to solve if connectivity gaps are closed.

Endnotes

- 1 George Soros, “Why I’m Investing \$500 Million in Migrants,” *The Wall Street Journal*, September 20, 2016, www.wsj.com/articles/why-im-investing-500-million-in-migrants-1474344001.
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- 5 Ibid.
- 6 UNHCR, *Connecting Refugees*, 15.
- 7 Ibid., 8.
- 8 Ibid., 8.
- 9 Ibid., 19.
- 10 See, for example, Broadband Commission for Digital Development, *The State of Broadband 2015: Broadband as a Foundation for Sustainable Development* (Geneva: International Telecommunication Union and United Nations Educational, Scientific and Cultural Organization, 2015), www.broadbandcommission.org/Documents/reports/bb-annualreport2015.pdf. This study, which laid out the growing relationship between connectivity and development, reviewed the 148 national broadband plans completed by that date to make a series of recommendations related to universal access and adoption.
- 11 Governments use an auction system to sell the rights to transmit signals over specific bands of the electromagnetic spectrum and to assign scarce spectrum resources.
- 12 Nokia and Diffraction Analysis, “Government Broadband Plan: 5 Key Policy Measures that Proved to Make a Difference” (strategic white paper, Nokia, Espoo, Finland, 2016), 17, <http://resources.alcatel-lucent.com/asset/193176>.
- 13 Comcast, “Bridging the Opportunity Divide,” accessed February 20, 2017, www.internetessentials.com/about.
- 14 UNHCR, *Global Trends: Forced Displacement in 2015* (Geneva: UNHCR, 2016), www.unhcr.org/576408cd7.pdf.
- 15 UNHCR, *Connecting Refugees*; UNHCR, *Global Trends*.
- 16 UNHCR, *Connecting Refugees*.
- 17 Ibid., 12.
- 18 Ibid., 14.
- 19 Ibid.

- 20 “White spaces” refers to spectrum that sits between broadcast channels and is available for use on an unlicensed basis. Microsoft, among others, is using white spaces in Africa to deliver low cost broadband to rural areas. Other actors have used unlicensed spectrum for microwave broadband transmissions, though this “point-to-point” technology requires a clean line of sight. Millimeter wave technology uses very high frequency spectrum to deliver very high-speed bandwidth at costs significantly below fiber; it has been used in some urban areas to connect multiple dwelling units in low-income areas. See Teo Kermeliotis, “Microsoft Beams Internet into Africa—Using TV ‘White Spaces,’” CNN, August 28, 2015, www.cnn.com/2013/09/23/tech/innovation/microsoft-beams-internet-into-africa/; Mitsol, “Microwave Wireless,” accessed April 3, 2017, www.mitsol.co.za/solutions/internet/microwave-wireless/; Boris Maysel, “Fast, Affordable Gigabit for MDUs,” *Broadband Communities* 36, no. 6 (October 2015): 56–58, www.bbpmag.com/Features/1015Fast-Affordable-Gigabit-for-MDUs.php.
- 21 For more on the Global Connect Initiative, a U.S. Department of State-led international connectivity effort, see Catherine Novelli, “The Global Connect Initiative: Making the Internet a Development Priority,” DipNote (U.S. Department of State blog), January 25, 2016, <https://blogs.state.gov/stories/2016/01/25/global-connect-initiative-making-internet-development-priority>.
- 22 The effort proposed in this brief should be seen as complementary to and an extension of existing efforts by these and other organizations. For more, see NetHope, *New High-Speed Network Connects Dadaab Aid Agencies for Collaboration* (Fairfax, VA: NetHope, n.d.), <https://s3.amazonaws.com/nethope/DadaadNET-casestudy-final.pdf>; U.S. Agency for International Development (USAID), “Global Broadband and Innovations (GBI) Program: Overview of Services” (program overview, USAID, Washington, DC, 2012), http://pdf.usaid.gov/pdf_docs/PA00KDSN.pdf; World Bank Group, *World Development Report 2016: Digital Dividends* (Washington, DC: International Bank for Reconstruction and Development and The World Bank, 2016), <http://documents.worldbank.org/curated/en/896971468194972881/pdf/102725-PUB-Replacement-PUBLIC.pdf>.

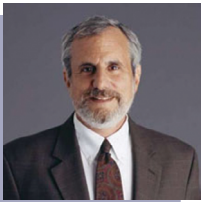
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