CONNECTING THE NEXT FOUR BILLION:

STRENGTHENING THE GLOBAL RESPONSE FOR UNIVERSAL INTERNET ACCESS

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The authors' views expressed in this publication do not necessarily reflect the views of any other entity.

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LIST OF ACRONYMS

A4AI	Alliance for Affordable Internet
APC	Association for Progressive Communications
ARPU	Average Revenue Per User
CTO	Commonwealth Telecommunications Organization
DFAT	Australian Department of Foreign Affairs and Trade
DFID	UK's Department for International Development
DFI	Development Finance Institution
DFS	Digital Financial Services
DIAL	Digital Impact Alliance
EO	Executive Order
EPIC	Emerging Policy Innovation and Capability Innovation Hub
GAP	Global Access Policy
GBI	Global Broadband and Innovations Alliance
GCI	Global Connect Initiative
GDP	Gross Domestic Product
GSMA	GSM Association
ICT	Information and Communications Technology
ITU	International Telecommunications Union
ISP	Internet Service Provider
LDCs	Least Developed Country
MCC	Millennium Challenge Corporation
MDB	Multilateral Development Bank
MNO	Mobile Network Operator
NGO	Nongovernmental Organization
OPIC	Overseas Private Investment Corporation (OPIC)
SDG	United Nations' Sustainable Development Goal
SIDA	Swedish International Development Cooperation Agency
SSG	SSG Advisors
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNGA	United Nations General Assembly
USAID	United States Agency for International Development
USF	Universal Service Fund
WEF	World Economic Forum
WSIS	United Nations World Summit on Information Society

PREFACE

We live in a world where the Internet is increasingly integrated into our daily lives. Beyond getting online through computers or mobile devices, wrist bands track our daily exercise, and smart thermostats moderate our home climates. Even more importantly, much of our work and many of our transactions are conducted online, from communicating with our friends and coworkers, to ordering dinner, to flagging where a pot hole or fire hydrant needs to be fixed in our local community. As embedded as the Internet has become for many of us, it seems almost inconceivable that so many—over half of the world's population—have never gotten online.

This demonstrates a strong truth: The Internet is no longer additive to our daily lives; it is becoming essential. For those who do not access it, they risk greater losses than a cold home or undocumented exercise. They risk missing out on society's continued advances.

This realization—that the digital divide remains wide and, more importantly, that its consequences will be grave and far-reaching—is why we have recently seen a sharp increase in attention from the global community, and development actors specifically, on achieving universal access. But attention and broad mandates to address this issue are not enough. As the international community struggles to develop a unified strategy around how a diverse set of actors—from policymakers to industry players to civil society members—will coordinate their activities, this paper was commissioned to identify some of the ways that this community can take action with greatest impact. What follows, therefore, is an analysis of remaining gaps in the global access effort and a set of clear recommendations on where there are opportunities for catalytic impact, in order to best channel the upswing in attention toward efforts that will move the needle on universal access.

We know that Internet access for the world's last billion is both critical and within reach. Yet this vision cannot be realized without collective action that prioritizes Internet access on the development agenda, helps last billion business models reach scale, and invests in understanding what works and what does not.

Today, the Internet is the basis for a dynamic global conversation and bustling economic activity. Imagine what it could be if the other half of the world's population joined in.

EXECUTIVE SUMMARY

"Today we live in a world with more than 7 billion people, but more than 4 billion of us are not on the Internet. And we talk about having an equal opportunity to be able to create a change in the world, and I think that's a really hard thing to do if you don't have access to some of the basic infrastructure and technical tools that are necessary to build these kinds of technical products."

– President Obama, Global Entrepreneurship Summit 2016

Despite remarkable increases in connectivity over the last decade, less than half of the world's population currently has access to the Internet. For the development community, it is increasingly clear that the digital divide is becoming *a development divide* that, if left unaddressed, could substantially increase inequities both between and within countries. The vast majority of the unconnected are the urban poor, marginalized groups, and rural communities—precisely the groups the development community is most trying to assist, and those who will risk falling even further behind if left without access. Recognizing the growing importance of access to the Internet as foundational to global socioeconomic development, the international community has begun to focus more attention on the issue, through both new strategic initiatives and ambitious targets such as that of the UN Sustainable Development Goals (SDGs) to achieve universal access by 2020.

To better inform investments in access and connectivity by the international development community, the Digital Impact Alliance (DIAL)[1] requested SSG Advisors to assess the global response to increasing access to information and communication technology (ICT) and the Internet in least developed countries (LDCs). Building on a previous report, titled *Connecting the Last Billion: Market Approaches to Increasing Internet Access,*[2] and understanding that the business models that were the focus of that assessment were only one part of the solution to the challenge of universal access, SSG sought to better understand the key gaps in the global effort to expand Internet access.

The outcome of this analysis is meant to provide policymakers, industry, and global development actors with a high-level understanding of the access challenge, the current players working and efforts being undertaken to increase access, gaps in global response, and, most importantly, actionable recommendations regarding how those gaps might best be closed.

Building on existing research, therefore, this paper determined primary barriers to access, and used an examination of the landscape of existing efforts and actors to identify gaps in response and steps that decision makers could take to address these gaps. Existing literature demonstrated a strong consensus around four key barriers to access: infrastructure, affordability, user capabilities, and incentives. A review of the landscape of actors and initiatives led to a list of seven primary roles that actors are playing to address these barriers: convening, funding, research, advocacy, technology deployment, business model development, and building capacity (See Chart on Pg. 7 for a summary).

This research reveals an encouraging range of efforts, large and small, focused on promoting greater access to the Internet. Some of these efforts are proving effective in bringing ever-larger numbers of users online in real and meaningful ways. Other efforts are helping to shine a light on the access challenge, creating the impetus for policymakers, industry leaders, and others to take action. Although the international response thus far has been encouraging, our analysis also revealed significant gaps in global response that, if left unaddressed, will slow, or in some cases even impede, progress toward universal access. These include a greater need to operationalize global agendas, promote business models, curate best practices, research new technologies, and fund activities.

Three clear recommendations emerged that would allow the international development actors to take advantage of their respective capabilities and tools in order to serve as catalysts for spurring growth in access for the most vulnerable populations, particularly in LDCs.

1. Mainstream Access Across the Development Agenda, both through building capacity to make access a priority across development organizations and within host governments, and through the development of an economic impact model to clearly demonstrate the beneficial impacts of increased access.

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[1] DIAL is a partnership between the Bill and Melinda Gates Foundation, the Swedish International Development Cooperation Agency (SIDA), the U.S. Agency for International Development, and the UN Foundation.
[2] This report was led by SSG and published within the USAID mSTAR project, through FHI 360

2. Amplify Innovative Business Models, through concerted and coordinated efforts to explore and finance successful models.

3. Develop Consistency in Approaches to Digital Access, through researching and establishing a collection of best practices.

As the global community approaches the third decade of the 21st century, the importance of the Internet in our social, economic, and political lives will only continue to grow. The prospect of billions of the most vulnerable people left without access and, therefore, unable to participate fully in our increasingly digitally intermediated world ought to be cause for alarm for policymakers, industry, and civil society alike. The recommendations in this report are a call to action for building on the progress to date and ensuring that the global community focuses on Internet access as a foundational element for sustained socioeconomic development.

Key Barriers to Access

1. **Lack of Infrastructure**
2. **Low Incomes and Affordability**
3. **User Capabilities**, including basic literacy and digital literacy
4. **Incentives** for access, including lack of awareness, relevant content, and cultural or social acceptance

Activities of Current Stakeholders

1. Leveraging Networks and Convening and Hosting Discussions
2. Providing Funding and Capital
3. Conducting Research and Establishing Thought Leadership
4. Driving Advocacy
5. Developing and Deploying Technology Solutions
6. Incubating and Scaling Innovative Business Models
7. Building Capacity

Global Gaps

1. Operationalizing Global Agendas
2. Researching and Promoting Innovative Business Models
3. Defining Success through Data and Thought Leadership
4. Generating and Curating Best Practices and Toolkits
5. Researching and Developing New Technologies
6. Funding Activities Across the Barriers to Access

Recommendations

1. **Mainstream Access Across the Development Agenda**, both through building capacity to make access a priority across development organizations and within host governments, and through the development of an economic impact model to clearly demonstrate the beneficial impacts of increased access
2. **Amplify Innovative Business Models**, through concerted and coordinated efforts to explore and finance successful models
3. **Develop Consistency in Approaches to Digital Access**, through researching and establishing a collection of best practices

INTRODUCTION

A growing body of empirical evidence suggests that Internet access is an important human development accelerant globally, and for developing countries in particular, enhancing activities across a wide range of sectors—social, economic, and political. Furthermore, as more processes, businesses, and governmental services are brought online, those populations without the knowledge of or access to these systems risk being left behind.

Though the private sector has, in many cases, traditionally driven the expansion of Internet access, public, private, and social actors all have valuable roles to play—and many are already doing critical work.

These roles vary depending on each actor's capabilities, and which barrier to access they address. In addition, some interventions are more relevant to targeting existing problems, effective at overcoming barriers, or efficient in their methodology than others.

With organizations forming new projects within the access and connectivity space at an increasing rate, these projects and interventions are sometimes coordinated with each other, but also often act in isolation. Identifying and matching the resources that stakeholders across government, industry, and the development community can bring to their work with the needed interventions can help all those seeking to increase access to work more effectively. Therefore, DIAL asked SSG Advisors to analyze the current global landscape of actors and interventions to better understand where there may be gaps in the global response, and how those gaps might be best addressed.

In April 2016, SSG published the first report in the *Connecting the Last Billion* series, a report called *Business Models for the Last Billion: Market Approaches to Increasing Internet Access*, with the support of FHI 360 through the USAID/mSTAR project. The paper focused its assessment on finding the ways in which new and innovative business models could potentially disrupt the current state of Internet access expansion, and reach those at the Base of the Pyramid. Following the analysis in that report, this paper seeks to address additional interventions alongside business models that can also help to increase access.

Drawing on the insights of the existing community of thinkers and practitioners, SSG sought to answer the following four core questions to determine what a meaningful role in the access space would look like:

→ What are the primary barriers to access?
→ What is the existing landscape of efforts and actors working to address these barriers?
→ Where are there gaps in efforts to address the barriers to access?
→ What steps can new or existing actors take to most easily address these gaps, while providing the most impact?

To answer these questions, SSG compiled and reviewed the existing literature on Internet access for low-income and marginalized populations (see Annex 2); conducted 23 focused interviews with key stakeholders; and reviewed over 70 organizations and projects to assess challenges they sought to address, roles they played, geographies they targeted, and the relative intensity of their efforts. SSG used these data to capture the current landscape of efforts to increase Internet access, assess gaps in the global response, and identify opportunities for catalytic action for new or existing global development actors.

Definitions

Definitions for basic terms used in describing Internet connectivity vary widely. In this report, we use the following terms:

Coverage
A person lives or works within the footprint of mobile broadband, Wi-Fi, or other forms of Internet service provision, where it would be possible, with the correct devices and services for that person to use the Internet.

Access
A person has Internet coverage and the agency (resources, skills) to choose to use the Internet.

Adoption
A person has used the Internet, irrespective of device, at least once in the last three months.

ACCESS: CURRENT REALITIES AND BARRIERS

The Current Reality

Connectivity and ICT:
Increasing in Importance to Policymakers and the International Community

Policymakers are becoming increasingly more aware of the value of Internet access, both at home and around the world:

- In September 2016 the U.S. House of Representatives passed legislation to help promote Internet access in developing countries. According to the Digital Global Access Policy Act of 2016, (HR5537. Digital GAP Act) "the internet offers tremendous opportunities—for those that have access to it." A similar bill has been introduced in the Senate: The Driving Innovation and Growth in Internet Technology and Launching Universal Access to the Global Economy Act (The DIGITAL AGE Act).

- President Obama also issued an Executive Order at the Global Entrepreneurship Summit in June 2016, outlining the need for investment and programs focused on entrepreneurship, with several sections focused specifically on global Internet access. Specifically, through the U.S. State Department Global Connect Initiative (GCI), this executive order asks "foreign countries to prioritize Internet connectivity in development plans, promoting the formation of region-specific multi-sector working groups to ensure technical and regulatory best practices, and encouraging the development of digital literacy programs in developing nations."

- At the International Telecommunications Union (ITU) 2014 Plenipotentiary Conference, Member States unanimously adopted the Connect 2020 agenda, which commits these Member States to work toward the shared vision of "an information society, empowered by the interconnected world, where telecommunication/ICT enables and accelerates socially, economically and environmentally sustainable growth and development for everyone."

- The United Nations Sustainable Development Goal 9c, calls to "significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020."

With the advent of the new SDGs, as well as a growing list of initiatives and mandates around Internet connectivity, the goal of universal access has been gaining visibility within the global community, and with good cause. The potential to increase GDP by expanding Internet access (along with the requisite complementary systems) is well documented through numerous case studies as well as data from the World Bank.[3] Emerging empirical evidence also links increased Internet access, and digitization more broadly, with socio-political benefits in education, political participation, and governance transparency, creating net gains in the Human Development Index.[4] The mainstreamed integration of digital services into the global economy means that those without access not only lose the potential for further development, but may also lose opportunities to communicate or collaborate with the parts of the globe that have transitioned to a more fully digitized means of operating.

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[3] Estimates from the World Bank find that "ICT capital accounted for nearly one-fifth of global growth, 1995–2014" (World Development Report, 2016), and a "10% increase in mobile broadband penetration drives a 1.4% increase in GDP for low-to-middle income countries" (Kim et al., 2010).
[4] PwC.. Connecting the World: Ten mechanisms for global inclusion. (2016). Strategy& Digital Prosperity Project.

Defining Success

Currently, there is no universally accepted standard or target for success in the Internet access space. There are, however, a number of different global goals and targets set for the immediate future:

- The Global Connect Initiative has set a goal of 1.5 billion more people online in developing countries by 2020.

- The UN World Summit on Information Society (WSIS) calls for Internet access for 55 percent of households—and 60 percent of individuals—by 2020, while making telecommunications 40 percent more affordable.

- The Connect 2020 Agenda seeks to cover 90 percent of the world's rural population with broadband services by 2020.

- The UN Sustainable Development Goal 9c is to "strive to provide universal and affordable access to the Internet in least developed countries by 2020."

Important nuances and assumptions underlie each of these definitions. Is basic access sufficient, or should other factors be considered, such as the speed and quality of Internet connections; the consistency and reliability of connections; and the distribution of access – across nations, regions, and communities (emerging markets versus LDCs, urban versus rural, middle-income versus poor, male versus female)?

Fortunately, the past two decades have witnessed explosive growth in access to the Internet, with Internet users swelling from 1 billion in 2005 to over 3 billion in the span of a decade.[5] At the same time, however, there are growing indications that the current mobile operator-dominated access paradigm, which until now has been tremendously successful at expanding networks and building effective local ecosystems, may be approaching the limits of its serviceable market. Slowing growth in the numbers of smartphone users worldwide[6] can be seen as an indication of both mature market saturation and the growing challenges that mobile operators in developing countries face in reaching people outside of the urban and middle-class market segments. According to industry observers, declining average revenue per user (ARPU) and the ongoing need to upgrade network infrastructure buildout, particularly in rural areas, make extending access increasingly hard to monetize.[7]

This, in turn, can further exacerbate other types of inequality for so-called "last-mile" users, as more rural and less densely populated areas that are also often poorer will have less access to the tools and resources available online that can help create both economic and social growth.[8] Those left offline, therefore, will be the most vulnerable populations in the LDCs; the vast majority of the unconnected are the urban poor, marginalized groups (women in particular), and rural residents—precisely the groups the development community is most trying to assist.[9]

Key Barriers to Internet Access

Given the global development community's increasing recognition of the importance of digital access, why are 2.5 billion people projected to remain unconnected?[10] What barriers are inhibiting access in developing countries?

SSG's research found significant consensus regarding the principal barriers to increasing access: lack of infrastructure, low incomes and affordability, user capabilities (i.e., basic literacy and digital literacy), and incentives (i.e., cultural and

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[5] "The number of Internet users has more than tripled in a decade—from 1 billion in 2005 to an estimated 3.2 billion at the end of 2015" (World Development Report, 2016).

[6] Meeker, Mary. (2016). Internet Trends 2016 Code Conference. KPCB.

[7] Broadband Commission for Digital Development. The State of Broadband 2015: Broadband as a foundation for sustainable development. (2015).

[8] Pepper, Robert and Garrity, John. (2015). "ICTs, Income Inequality, and Ensuring Inclusive Growth." The Global Information Technology Report 2015. World Economic Forum. 31-38.

[9] McKinsey & Company. Offline and Falling Behind: Barriers to Internet Adoption. (2014).

[10] GSMA predicts that 2.5 billion will remain unconnected in its 2016 report, The Mobile Economy. In addition, in its report, *Business Models for the Last Billion: Market Approaches to Increasing Internet Access*, SSG forecast that the current mobile operator-dominated paradigm could have a serviceable market of an additional 1–2 billion users, most of whom are coming from areas where population density allows for enough return, through added users, to justify additional investment from operators in infrastructure buildout.

social acceptance of Internet use, awareness and understanding of the Internet, and available and attractive local content).[11]

In the table below, SSG compares the barriers referenced in its analysis to those cited in seven major publications in recent years. There are some slight variations in the definitions of these four barriers. For example, cultural and social acceptance is included under "Readiness" by Internet.org and Strategy&, and User Capabilities and Incentives are combined into "Usage" in Ericsson and Columbia University's *ICT & SDGs* report. However, there is general agreement on the primary barriers to access.

Table 1. Comparison of Barriers in the Literature

		Barriers as Listed in Key Recent Literature						
		McKinsey & Co. *Offline and Falling Behind*	GSMA *Digital Inclusion 2014*[12]	Huawei *Digital Enablement*	Internet.org *State of Connectivity 2015*	World Economic Forum (WEF) *Internet for All*	Strategy& *Connecting the World*	Ericsson & Columbia University *ICT & SDGs*
Proposed Barriers	**Lack of Infrastructure**	X	X	X **(Availability)**	X (**Availability,** or proximity of necessary *infrastructure*, including mobile access networks, adjacent infrastructure, and access innovation)	X	X **(Availability)**	X
	Low Incomes and Affordability	X	X	X	X (**Affordability,** including costs of devices and data packages relative to income)	X	X	X
	User Capabilities *Lack of digital literacy* *Lack of basic literacy*	X	X	X **(Ability)**	X (**Readiness**, which includes skills, awareness, and cultural and social acceptance)	X (Under **Skills, Awareness, and Cultural Acceptance**)	X (**Readiness**, which includes skills, awareness, and cultural and social acceptance)	X (Under **Usage**, or "demand stimulation including local content and ICT skills")
	Incentives *Lack of awareness and demand, lack of relevant content, and/or lack of social or cultural acceptance*	X	X	X **(Appetite)**	X Split between: **Readiness Relevance** (i.e., is useful, relatable, and accessible content available to the user)	X Split between: **Skills, Awareness, and Cultural Acceptance Local Adoption and Use**	X Split between: **Readiness Relevance**	X (Under **Usage**, or "demand stimulation including local content and ICT skills")

Lack of Infrastructure

As the table above demonstrates, lack of infrastructure remains a key barrier to users' ability to get online. This buildout is necessary at multiple levels, from laying new international deep sea cables to additional national cables, middle-mile buildout, intra-city networks, and last-mile infrastructure.[13] It can take the form of mobile infrastructure (increased 3G, 4G, or even new 5G buildout) or fiber infrastructure, or it might follow other, more innovative delivery methods. For example, cheaper satellite options (including Medium-Earth Orbit satellite systems) could potentially replace middle-mile infrastructure, and the Google Loon project is aiming to extend middle-mile infrastructure with Wi-Fi-enabled balloons. For

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[11] With a goal to synthesize, not recreate, existing research, SSG chose to use the terminology put forward by McKinsey and Company in its *Offline and Falling Behind* report, which was also referenced by GSMA in its 2014 *Digital Inclusion* report.

[12] Note: GSMA references McKinsey's framework (Infrastructure, Low Incomes and Affordability, User Capabilities, and Incentives) in its 2014 *Digital Inclusion* report. However, as part of this report, GSMA decides to prioritize four different but related barriers for action, including Network Infrastructure and Policy (related to Infrastructure), Taxation (linked to Affordability), Consumer Barriers, including illiteracy, digital illiteracy, and awareness (linked to User Capabilities and Incentives), and Local Content (linked to Incentives).

[13] Dalberg and PwC. Digital Infrastructure Compendium. (2015). The Mobile Hub.

now, these options are not cost-competitive in most markets, and projects such as Google Loon and the Facebook drone program (Aquila) are still in pilot stages.[14]

The challenge of addressing this barrier is multilayered. It requires substantial investment, innovative technologies and business models, progressive National Broadband Plans, and close coordination between companies, donors, and host-country governments. In addition, national policies, tax regimes, and regulations can either facilitate or hamper infrastructure buildout and related private sector investment.

Low Incomes and Affordability

The affordability barrier has two key components: user incomes, and the relative costs of devices, services, and data packages. The general consensus across key actors in the access space is that for telecom services and devices to be considered "affordable," they must cost less than 5 percent of consumers' monthly incomes.[15] Although, historically, the price of devices has been a major barrier to access, the proliferation of low-cost feature-phones and smartphones, along with robust secondary smartphone markets, are rapidly lowering costs. Service costs, however, remain an issue. High service costs (for example, a data package for a mobile phone, a monthly Wi-Fi subscription, or access to a fixed line) drive overall costs for many consumers beyond the 5 percent threshold, presenting a significant barrier to affordability for poor and lower income populations in many countries.[16]

Affordability could potentially be addressed through a number of complementary pathways, including increasing consumer incomes; increasing competition among Internet service providers; lowering taxes, fees, and regulatory hurdles for companies and consumers; government subsidies for private sector investment (e.g., Universal Service Funds); improved infrastructure buildout (including adjacent infrastructure such as roads and electricity); and innovative products or business models that drive down the costs of devices and services.

User Capabilities

To access the Internet, users must have the ability to use digital services. Learning to use a computer and mouse requires a full new set of skills, as does understanding how to navigate icons on a phone. In addition, general literacy is a fundamental skill for the full use of digital services and often a pre-cursor to digital literacy. Low literacy and numeracy rates[17] impact the ability of consumers to use devices and access the Internet. In fact, recent surveys on the African continent cited lack of knowledge of how to use the Internet as the most significant reason for low usage.[18]

Both education generally, and digital literacy courses specifically, can address this barrier. Intentional site and device design can also improve a user's experience, making it simpler for new or inexperienced users to navigate online. In addition, as voice- and video-based and visual interfaces proliferate, this may become less of a barrier over time. However, poor literacy—and poor digital literacy in particular—remains a key barrier to Internet use today.

Incentives

Related to User Capability is the question of whether users *want* or *see a need* to get online. Given that 2.5 billion of the 4 billion people not currently using the Internet live within the range of 3G networks,[19] it can be inferred that demand-side issues, such as incentives, play a major role in Internet access, in addition to considerations of affordability and user capabilities. There are three primary aspects to the question of user "appetite": awareness, relevant content, and social and cultural acceptance. For example, a Research ICT Africa study found that survey respondents' primary reason for not using the Internet was that they did not know what it was.[20] Language is also a key impediment in designing and providing local content that will appeal—and be accessible—to a larger range of consumers. Currently 80 percent of online content

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[14] Though Ark Invest estimates that the cost of Internet access through Google Loon infrastructure could be as low as $4 per month, Google Loon is currently in its pilot stage. The same article estimates that satellites could provide Internet access at a cost of $18 per month, which is too pricey for many low-income consumers (Keeney, 2015).

[15] State of Broadband 2015; Internet for All, 2016.

[16] Affordability Report, 2016; Connected Society, 2016.

[17] According to the World Economic Forum, currently, 15 percent of adults globally are illiterate. Luxton, Emma. (2016). 4 billion people still don't have Internet access. Here's how to connect them. World Economic Forum.

[18] World Bank. World Development Report 2016: Digital Dividends. (2016). 123.

[19] GSMA. Connected Society: Mobile Connectivity Index Launch Report. (2016). 3.

[20] Research ICT Africa. Stork, Chirstoph; Calandro, Enrico; and Gillwald, Alison. (2012). Internet going mobile: Internet access and usage in eleven African countries. International Telecommunications Society. Conference Paper.

is available in only 10 languages, which only around 3 billion people speak as their first language.[21] Finally, part of users' interest (and ability) to get online stems from whether Internet use is seen to be socially or culturally acceptable. For example, gender and cultural barriers can impede the ability of women and other marginalized populations to access devices and the Internet. In a recent survey in Kenya on attitudes toward the Internet, respondents named a number of challenges that they felt Internet use might create, such as immorality, corruption, and time wastage.[22] Gender barriers are also well documented, with women being up to 50 percent less likely to be online than men.[23]

As more users create content and interact on sites and platforms such as WhatsApp, Wikipedia, Facebook, and YouTube, this type of user generation may serve to alleviate the language barrier, and bring more content online that is both interesting and appropriate for a variety of cultures (though currently 85 percent of the user-generated content indexed by Google comes from the United States, Canada, and Europe).[24] In addition, the development of online products, such as digital financial services (DFS), and online health applications, can create incentives for users to access the Internet.

Cross-Cutting Themes

Finally, it is important to note that the four categories of barriers above are interconnected and complex. As discussed, addressing the challenge of infrastructure availability has direct implications for affordability, and increased awareness and demand for Internet services may incentivize providers (and national governments) to invest in infrastructure, relevant local content, and context-appropriate business models. Therefore, these barriers should not be addressed in isolation. Effective solutions should take an ecosystem approach, involving diverse actors and approaches, recognizing the "big picture," and changing and adapting as that picture continues to evolve.

UNDERSTANDING CURRENT PLAYERS AND EFFORTS TO INCREASE ACCESS

Primary Roles in the Access Ecosystem

A wide range of organizations and initiatives are working to address these barriers to access. SSG's analysis suggests that most contribute in one of seven principal ways.

Leveraging Networks and Convening and Hosting Discussions

Owing partly to the fact that stakeholders within the access landscape come from private sector, civil society, *and* government institutions, communication and coordination between actors is not always smooth or consistent. For this reason, convening stakeholders is often a critical tool for encouraging communication across sectors and coordinating efforts across barriers. Some players work explicitly to organize and convene, hosting discussions to share ideas and solutions, coordinate projects and action, and encourage new partnerships. "We have a lot of conveners: the ITU broadband commission, World Economic Forum, and Global Connect," said one key government stakeholder.

In addition, certain organizations, by virtue of their reach, resources, and/or reputation, have access to a wide variety of potential partners and collaborators. Large technology firms such as Microsoft, Google, and Facebook, for example, have a unique ability to partner with diverse industry and government stakeholders, and have a vested business interest in ensuring a robust digital ecosystem. These networks can be brought to bear to either spark meaningful cross-sector collaboration, or to lobby for greater participation from key sectors (such as industry or host-country governments).

Providing Funding and Capital

Sustainable and sufficient finance is a critical need across the barriers to access. This includes financing for infrastructure expansion, technology development and deployment, and access projects and initiatives, as well as seed funding and investment in new and emerging business models for expanding access in developing countries. Financing access requires investment and participation from a range of players, from multilateral development banks and donors to impact investors and companies. The need for capital is high. As one development stakeholder said, "We can improve on what we've been doing, come up with innovative ways to do it, but change is still primarily about getting more funding into this area, to take advantage of those initiatives." Host country governments, meanwhile, play a critical role in financing

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[21] Luxton, Emma. (2016). 4 billion people still don't have internet access. Here's how to connect them. World Economic Forum.

[22] Thanki, R. (2015). Measuring the local impact of TVWS broadband. Manila, Philippines: ECS Parnters, University of Southampton

[23] Luxton, Emma. (2016). 4 billion people still don't have internet access. Here's how to connect them. World Economic Forum.

[24] World Bank. World Development Report 2016: Digital Dividends. (2016).

infrastructure, developing National Broadband Plans that set aside funds for access expansion, and establishing Universal Service Funds to subsidize industry efforts to enhance access in rural and underserved areas.

Conducting Research and Establishing Thought Leadership

Another vital role involves researching, publishing, and disseminating new ideas, and spearheading new methods for improving access. Organizations such as the GSM Association (GSMA) and the World Bank produce widely read studies and publications that help drive and inspire action in the access space. These organizations' research includes indices and global progress reports tracking current realities in access across the globe, and particularly in developing country contexts. For example, the Broadband Commission for Sustainable Development's annual *State of Broadband* report explores access, affordability, and broadband infrastructure in over 160 economies, and the GSMA has profiled specific countries' efforts in expanding access.[25] Reports also investigate the barriers to access, including their root causes, such as those articles highlighted in the key barriers section of this report (see Table 1, above). Other research explores and refines best practices for addressing the barriers to access. For example, WEF's 2016 *Internet for All* report presented best practices to facilitate the development of replicable models for public–private collaboration.

Universities and research organizations also provide valuable insights, whether as part of larger alliances—such as Columbia University's role in the Connect to Learn initiative, where it leads research on ICT use within education—or independently. Research ICT Africa, for example, focuses on collecting data to inform ICT policy and regulations.

Driving Advocacy

Advocacy is an important tool, especially for raising the profile of the access challenge on the global agenda, pushing for greater host-country involvement and funding, and encouraging the adoption of more favorable regulatory, tax, and policy regimes to encourage private sector investment and to lower costs for consumers. "Governments often ask, 'Why should I be first?'" said one member of an advocacy organization, "There is little confidence on their part with regards to the benefits of Internet access," and this is one area that advocacy helps to address. This role addresses multiple barriers, since policy and regulatory change are a key aspects of both the Infrastructure and Affordability challenges.

Industry groups, such as the GSMA, ITU, the Dynamic Spectrum Alliance, and Commonwealth Telecommunications Organization (CTO), and cross-sector coalitions, such as the Alliance for Affordable Internet (A4AI) and the World Wide Web Foundation, are advocating directly for policy reform by working with and lobbying host country governments to develop more favorable policies, tax structures, and regulations, to ease policy and regulatory barriers to access. Others are advocating for particular approaches to addressing the barriers to access. For example, the People-Centered Internet initiative advocates for a universal, open, and affordable Internet. Organizations such as UNESCO and ITU's Broadband Commission for Sustainable Development play a more indirect advocacy role by creating best practices, research, and action agendas that advocate for certain platforms, such as the development of broadband infrastructure.

Developing and Deploying Technology Solutions

Access is by no means a static field. Newer and faster means of sharing information and extending access are constantly being developed. Technology companies such as Google and Facebook are innovating around new ways to expand coverage, through hot-air balloons, satellites, and high-altitude drones, while device manufacturers such as Ericsson and Huawei are developing improved and lower-cost devices for emerging markets.

Meanwhile, the continued deployment and expansion of established technologies and infrastructure (including both expanding coverage, and increasing speed and efficiencies, for example through deploying new localized server farms across the African continent) are also essential for increased access. Many development finance institutions (DFIs) are investing in established telecoms, which, with additional resources, can build out new towers to increase their reach, or upgrade networks from 2G to 3G or 4G. As one expert noted, "Broadband rollout is a scale activity: it can only be done really efficiently at scale. You might find different technology solutions, depending on population and other factors, but at the end of the day, it's like any other infrastructure delivery." Existing technologies can also be reimagined to address access gaps, including new ways of using TV White Space, localized mesh networks, and edge computing.

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[25] GSMA Intelligence. (2015). Rural coverage: strategies for sustainability. GSM Alliance.

Smart deployment of technology addresses all four key barriers to access: it can lower costs for consumers and companies, and provide new platforms and content, which increases the Internet's appeal for new users and draw additional people online.

Incubating and Scaling Innovative Business Models

Although the existing mobile operator-dominated paradigm has been phenomenally successful in bringing billions of people online, it does not appear poised to offer universal access.[26] Alternative or complementary business models that serve low-income and rural customers are starting to emerge, including those championed by companies such as AirJaldi in India, Mawingu in Kenya, and Ericsson's Managed Rural Coverage in sub-Saharan Africa. "Business models aren't cut-and-paste where you can take it from Sweden and put it to Botswana," said one DFI stakeholder. "There are challenges that are unique to developing countries that aren't necessarily there in developed countries."

Many of these new business models directly address the affordability barrier, by reducing costs for consumers and companies. Others serve to make new infrastructure deployment more affordable. For example, the growth in the last 10 years of tower companies that capitalize on sharing network infrastructure in markets such as India and Myanmar has allowed established telecoms to defray their costs, increasing their reach and return on investment, and thus potentially lowering costs for the end-user as well. Innovative models around infrastructure buildout—including public-private partnerships to lay cable, such as the cable management organization that Bridgespan Ventures has brokered in the Gambia[27]—can support buildout for expanded access. Creative approaches to content, such as Over-the-Top services and Zero-Rated data, can also create solutions for affordability for users. Mobile network operators have promoted initiatives such as Econet Zero, which offers free access to over 50 websites through its services in Zimbabwe and Lesotho; technology companies are also working in this space, including Facebook's Free Basics.

The success of these business models requires more than a promising initial concept. Emerging models must be piloted; they require seed funding and finance for scale; they will need tailored incubator and accelerator services; and the lessons learned from both successes and failures must be effectively analyzed, understood, and shared.

Building Capacity

Building capacity involves developing the ability of individuals and organizations to both take advantage of the Internet and related services, and more effectively act to tackle the barriers to access. Addressing demand-side barriers such as incentives and user capabilities, it might relate to improving digital literacy for target users in emerging markets, such as what Intel's She Will Connect initiative works to accomplish. Or, on the supply side, building capacity might entail helping organizations or governments better understand their political economy, infrastructure, and other needs and relevant policy options, and empowering them with the skills to design and implement interventions to address those needs. For instance, the Inter-American Development Bank is supporting governments in planning for infrastructure deployment, and developing National Broadband Plans or policies around Universal Service Funds (USFs), spectrum management, and open access conditions. USAID's Global Broadband and Innovations program is similarly supporting host country governments in designing and implementing National Broadband Plans and in increasing the effective implementation of USFs. As one DFI stakeholder explained, "Much of what is needed in the telco space is not so much lending and investment, but advice."

Gaps in the Global Response

SSG's review suggests that, despite the diverse commitments to increased access from global development partners, significant gaps remain. To uncover these gaps, SSG mapped 60 initiatives across over 50 organizations—including non-profits, foundations, industry, private finance, DFIs, nongovernmental organizations (NGOs), research institutions, and government-led institutions[28]—to the roles they play and the barriers they seek to address. Many organizations work to

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[26] Meeker, Mary. (2016). Internet Trends 2016 Code Conference. KPCB.
[27] FHI 360 and SSG Advisors. Business Models for The Last Billion: Market Approaches to Increasing Internet Connectivity. (2016).
[28] Please refer to Annex 3 to see a condensed version of this mapping for 19 key organizations. Though there are myriad organizations working to address different aspects of access, this mapping focused on a representative sampling of larger organizations. With new projects stepping into the space on an almost daily basis, a full landscape map of every project and organization was not feasible within the confines of this analysis. Further, it should be noted that information on different initiatives' current activities and future plans is not always readily accessible; SSG worked with information currently available online or through the existing literature, and supplemented where possible through interviews with key stakeholders.

address more than one barrier, and they may do so by playing a number of different roles. However, SSG's analysis sought to organize each organization or initiative by their fundamental focus barrier(s) and primary role(s).[29]

SSG scored each initiative based on its **intensity** and **sufficiency**. *Intensity*—a measure of effort—took into account an intervention's resourcing, geographic scope, degree of likely traction, and potential impact. For example, through interviews with key stakeholders, it became clear that DFID's Emerging Policy Innovation and Capability (EPIC) Innovation Hub, while focused on supporting new business models for access, is in the process of reassessing its strategy, and therefore currently has few distinct projects. Consequently, it has a much lower intensity ranking than the Connect to Learn initiative (founded by Ericsson, Millennium Promise, and Columbia University's Earth Institute), which has educated over 76,000 students across 22 countries, while engaging 16 mobile operators. Intensity of effort, however, is only one part of the equation. Not every intervention has the same overall criticality; some roles are more or less appropriate to address different barriers, and different interventions may require different levels of effort to succeed. We, therefore, considered *Sufficiency*, which serves as a measure of the level of need. For example, although there is a high intensity of effort for providing funding for infrastructure development, it still requires billions of additional dollars in funding and investment. Meanwhile, it may require comparatively little in terms of thought leadership, for instance.

By exploring the relationship between these two factors—defined as **a ratio of intensity (level of current effort) to sufficiency (level of need)**—this analysis identified 14 gaps in interventions (see Table 2 below). These gaps overlapped to a fair degree, so SSG further consolidated these into six key gaps in the access landscape.

Table 2 Gap Analysis: The Ratio of Intensity to Sufficiency*

	Cross-cutting	Incentives	Infrastructure	Low Incomes & Affordability	User Capabilities
Building capacity	low	medium	low	medium	medium
Conducting Research and Establishing Thought Leadership	medium	high	low	medium	low
Creating Innovative Business Models	low	medium	low	low	high
Driving Advocacy	medium	medium	low	medium	low
Leveraging Networks and Convening and Hosting Discussions	high	high	medium	high	low
Providing Funding and Capital	medium	medium	medium	medium	low
Technology Solutions	low	medium	medium	low	low

* Low intensity relative to sufficiency (in red) indicates that there is insufficient effort to meet the needs of that role to move the needle for that particular barrier.

Gap #1: Operationalizing Global Agendas

Although there are many efforts underway to coordinate approaches and strategies, (including those by the State Department's Global Connect Initiative, and the Commonwealth Telecommunications Organization's Universal Broadband and Regulation initiative,) these efforts often take place primarily at a high level and have not been effectively operationalized both within the development community and beyond. One development professional questioned, "What

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[29] Initiatives often addressed multiple barriers using a variety of roles; the landscape map captures these distinctions. For example, the Broadband Commission for Sustainable Development, an initiative of UNESCO and the ITU, was established to advocate for development of broadband infrastructure and focus on the SDGs, so it clearly drives advocacy. It also produces yearly reports on the state of broadband, however, contributing to research and thought leadership. Therefore, this initiative was tagged under both Driving Advocacy and Conducting Research. Since the initiative looks to bring a focus on the SDGs, it is also tagged as a cross-cutting initiative.

happens after convening? It needs to be operationalized." A director at a global technology company added, "We all know the problem and what generally needs to be done; it is a question of how. The challenge is getting beyond superficiality." Another technology company executive noted that, at current convenings, he always asks, "What is the outcome?" and rarely gets an answer. "It would be better to make the convenings smaller or more focused," he suggested. Other interviewees agreed that there is considerably more to be done, particularly with host country governments, donor organizations, DFIs, MDBs, and others to actually operationalize best practices on the ground.

Gap #2: Researching and Promoting Innovative Business Models

Current efforts are under way to identify and support emerging business models for access. However, despite promising existing efforts, more is still needed to support and elevate new business models at the required scale, particularly for those regions where traditional business models begin to fail. As the CEO of a global organization noted, "different models for connectivity and services, supporting local capacity and experimentation, are really important. There are lots of good organizations in the global South around ICT, but they're not getting resources to more rigorously test and share their ideas." Though able to address cross-cutting barriers, these models are particularly important for addressing affordability, lowering costs through approaches that include freemium, advertiser-subsidized, and loss-leader models for lowering (or even eliminating) the cost of data for end users, network-extension models using low-cost technologies such as Wi-Fi, and global Over the Top service-mobile network operators (MNO) partnerships that provide access.

Gap #3: Defining Success through Data and Thought Leadership

Although many organizations publish valuable thought leadership pieces on Internet connectivity, there is a lack of reliable, comparable data from implementation efforts to help the practitioner community determine relative effectiveness, return on investment, and the distinctions between the types and qualities of access. In particular, a more nuanced understanding of the types and value of Internet use is necessary. Currently, much of the discussion and activity around understanding Internet use is limited to a binary framing of "Internet access" and "no Internet access." As the executive director of one organization focused on expanding connectivity explained, "Infrastructure, investment, and network planning on the ground is only one part of the equation; there is a need for an engagement-link to the user as well." Understanding and tracking how people can engage with the Internet to benefit broader development goals is critical to making the argument for access to be integrated across these goals.

For example, through its Web Index, the World Wide Web Foundation tries to track the extent to which ICTs are actually being deployed to improve education, health, agriculture, and disaster risk reduction in poor communities, but often discovers that the data are difficult to find. "There are only pilot projects, and no systematic approach," said one stakeholder. Better data creating that linkage could help to make the case for more focused attention. As a lead specialist for a DFI explained, "There are use cases, but economic modelling is the next step. There is quite a void right now in terms of this analysis." Backed by better information on the linkages between access and other development goals, a shared understanding of what constitutes "meaningful use" will help to drive and clarify disparate efforts in the access ecosystem, addressing cross-cutting barriers.[30]

Gap #4: Generating and Curating Best Practices and Toolkits

A number of organizations and initiatives focus on convening discussions around best practices or setting global agendas to address access as a whole. The gaps in this role relate to the need for additional research, particularly around best practices for infrastructure, affordability, and user capabilities. Specifically, SSG's analysis showed a need for key stakeholders (such as the GSMA), in conjunction with universities and other research institutions, to work together to develop landscape assessments and collect data to generate, showcase, and curate best practices in these areas, and to create associated toolkits to streamline implementation accordingly. One researcher suggested, "Maybe there are already many capacity-building organizations and research organizations, but there is space for an new actor to coordinate these efforts, or to support grassroots organizations that are already in place, and perhaps are in direct contact with policy-makers."

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[30] DIAL, Caribou Digital, and other sector leaders have played a leading role in promoting a more nuanced definition of meaningful use of the internet.

Gap #5: Researching and Developing New Technologies

The access landscape is ever-changing, with the emergence of new, breakthrough technologies and new methods for using existing resources to address the barriers to access. Although a number of groups, including those within Google, Facebook, Ericsson, and Huawei, are innovating and deploying new and refashioned technology solutions, SSG's gap analysis clearly showed that more research and development would be beneficial in several specific areas, including technology solutions for extending infrastructure (for example, continuing Facebook's Aquila beyond the pilot stage, or developing Google's Loon to the point to which it can be cost competitive with fiber cables). Ongoing research into methods for decreasing technology costs (both in terms of infrastructure and devices) is also necessary, and new user interfaces that are more intuitive and do not rely on written text will help address incentive and capability barriers.

Gap #6: Funding Activities Across the Barriers to Access

Although the investments by the multilateral development banks (MDBs) and other DFIs are significant, they are often directed to more commercially viable opportunities targeting urban and middle-class market segments. "Financing gaps exist for smaller more startup oriented businesses with an idea in the pilot stage," noted one finance director. A small but growing number of impact investors such as CRE Ventures and Vulcan are providing critical financing to early-stage access-related businesses in developing countries, and other organizations are providing grants at a much smaller scale as key financing under broader initiatives, such as Microsoft's Affordable Access Initiative. However, the need in this area remains high. As a key representative from USAID pointed out in an interview, "In order to take advantage of those initiatives, we need to be turning them into budget." Additional financing, therefore, would aid in a number of areas, including large-scale infrastructure deployments, supporting trainings and building capacity, scaling and supporting cross-cutting initiatives, kick starting and growing new business models, and R&D into new technologies, both for infrastructure development, and devices and services.

These six gaps represent both a challenge and opportunity to those seeking to advance universal access. Although these gaps are significant and represent a major shortfall in the global response, they also highlight areas for cooperation and collaboration across host governments, the development community, industry, and civil society. There are opportunities for actors from each sector to make meaningful and even catalytic contributions toward the broader goal of universal access to aid overall development objectives.

ADVANCING ACCESS: OPPORTUNITIES FOR COLLECTIVE ACTION

Through an assessment of the current actors, barriers, and roles, this analysis has highlighted that critical gaps remain. Taken as a whole these gaps may seem daunting, but three clear recommendations emerged that would allow the international development actors to take advantage of their respective capabilities and tools in their work to achieve universal access. They therefore present major opportunities for collective action across governments, development organizations, industry, and civil society.

Recommendation #1: Mainstream Access Across the Development Agenda

Relevant Gaps	
Operationalizing Global Agendas	✓
Researching and Promoting Innovative Business Models	
Defining Success through Data and Thought Leadership	✓
Generating and Curating Best Practices and Toolkits	✓
Researching and Developing New Technologies	
Funding Activities Across the Barriers to Access	

Though the issue of increasing access has been gaining attention from a variety of global players, there is currently a gap between a discussion of the issues, and a way of integrating operational solutions into development projects and national agendas. Accordingly, there are two key parts to this recommendation:

Make Access a Priority

As noted at the outset of this report, the benefits of increased access extend across the development agenda—health, economic growth, agriculture, and governance. Development organizations, therefore, have an opportunity to leverage the momentum created by high-level calls to action into

"We need to create a structure that brings together representatives of MDBs and country directors, and share best practices on policy, so as to recognize cross-sector impact on health care, education, etc., and be practical on what they can achieve."

– Senior Advisor in Government

concrete, on-the-ground results. Even successful global initiatives have struggled to generate follow-through within both development organizations and host-country governments. Here, development agencies, with their large stocks of patient capital, have a significant role to play in providing the funding, expertise, and advocacy needed to push universal access as a mainstream component across the development agenda

Actions for Impact

→ Conduct outreach to key stakeholders in the access community to collectively create a case for more investment in and measurement of the economic benefits of access programs at the regional and sectoral levels.

→ Work with key donor organizations on internal communications strategies to ensure that access is well understood by sectoral program managers.

→ Develop training frameworks and toolkits that can be used by development agencies to build the capacity of staff and host country partners on how to integrate access into program design across development sectors.

→ Work with leaders at bilateral development organizations to advocate for legislative bodies to support access goals (similar to HR 5537 and the recent Executive Order, or EO).

→ Work with an academic partner to develop a curriculum for mid-level government ministry officials to help them more effectively present their needs for infrastructure development, tax policy changes, and other regulatory reforms to those with the power to implement these changes.

By leveraging the global calls to action, development organizations have the opportunity to both amplify these high-level mandates and, more importantly, provide the means for translating those calls into results on the ground where it matters.

Build an Economic Impact Model

"From our perspective one of the main problems is that there is lack of data – there just isn't enough data."

- Lead ICT researcher

There is a need to to enable host government policymakers and civil society leaders to better understand the economic and social benefits of investing in access. An Economic Impact Model could clarify the connection between access and improvements in economic growth and social outcomes. Initially this model would use publicly available data in a few pilot countries and predictive analytics to judge the long-term outcomes of access programs that are being deployed today, or will be deployed in the future.

Actions for Impact

→ Conduct a thorough assessment of the leading indicators that could help measure economic growth over time, including improved employment rates, development and use of e-government services, improved health care delivery, decreased mortality rates, increased access to education (particularly by girls), increased numbers of new businesses, and improved access to new sectors.

→ Assess what similar tools exist or have been developed, even in single countries or as pilots in certain sectors, to determine successes and challenges with those tools.

→ Partner with a firm specializing in data and analytics to determine the best way to collect, aggregate, and display information, including the development of an online interface to allow access to data, or to allow governments to customize data.

→ Promote pilot projects for the tool at both the national and regional levels in four to six key developing markets to track how investments in access can help develop a more holistic digital ecosystem.

→ Develop a plan to scale to further countries in the next five years.

→ Use the data and analysis from this tool to publish frequent reports, thought pieces, and other collateral to drive

attention toward the benefits of increased access.

Such a tool could serve another important purpose: although a limited number of MDBs, DFIs, and private investors are providing direct capital and funding to support expanded access, the Economic Impact Model could provide useful information that encourages a greater number of private and public investors to commit resources toward access, to secure both economic and societal returns. There is also an opportunity for a global organization to play a critical supporting role, encouraging, directing and helping to mobilize further investment and capital for improved access.

Developing and promulgating an Economic Impact Model can support the case for continued and sustained public sector investments in access initiatives from within host countries and with support from the MDBs.

Recommendation #2: Amplify Innovative Business Models

In the first report in the Connecting the Last Billion series, SGG highlighted innovative business models that can help deliver access to populations not traditionally reached by the major MNOs. However, these models and enterprises face major challenges, including a lack of early-stage financing, limited partnership opportunities, and unfamiliar or restrictive regulations. Some organizations, including Microsoft, have directly financed individual companies with such business models, but these efforts have largely been ad hoc. There is a need for greater leadership in this area by creating an actionable strategy to not just identify new business models, but to scale them within specific geographies or across regions. In the absence of this coordinated strategy, there is a risk that donors and investors will continue to take a scatter-shot approach to scaling new business models, leaving only those enterprises that have resources, luck, and persistence with the ability to truly scale.

Relevant Gaps	
Operationalizing Global Agendas	
Researching and Promoting Innovative Business Models	✓
Defining Success through Data and Thought Leadership	
Generating and Curating Best Practices and Toolkits	
Researching and Developing New Technologies	✓
Funding Activities Across the Barriers to Access	✓

Actions for Impact

→ Establish a working group with key partners from development organizations, the private sector, and other key initiatives to ensure coordination of efforts, funding, and research (groups would include Microsoft, Google, Facebook, Vulcan, USAID, Australian Department of Foreign Affairs and Trade (DFAT), DFID, Millennium Challenge Corporation (MCC), and WEF).

→ Leverage the working group to conduct research on disruptive models for affordability in different markets.

→ Develop a blended financing model/mechanism for supporting innovative access business models as they move from start-up, to early-stage, to minimum viable product, to revenue growth and scaling.

→ Work with existing incubators/social impact innovators to scale the mechanism over time through their networks.

→ Create opportunities to promote enterprises that are successfully deploying and scaling new business models, especially at key global convenings such as United Nations General Assembly (UNGA), WEF, Mobile World Congress, and others.

By developing strategies to identify, incubate, accelerate, and scale innovative business models,developing and promoting case studies of successful and profitable business models that can be replicated in new markets, and researching emergent models, actors would be promoting opportunities to expand access to those who would otherwise risk being left with none.

Recommendation #3: Develop Consistency in Approaches to Digital Access

Relevant Gaps	
Operationalizing Global Agendas	
Researching and Promoting Innovative Business Models	
Defining Success through Data and Thought Leadership	
Generating and Curating Best Practices and Toolkits	✓
Researching and Developing New Technologies	
Funding Activities Across the Barriers to Access	

SSG's analysis found that, despite the large number of organizations focused on access, there have been very few efforts to develop a single global clearinghouse of information about what does and does not work across the different barriers to access. This is partly due to both the fact that the access space is relatively new and does not have strongly defined value chains, and that approaches to date have been quite fragmented. Here, there is an opportunity to support universities, industry associations, and others to assess and showcase best practices and create toolkits that will help other organizations develop more targeted and more effective access programs.

Actions for Impact

→ Hold in-depth conversations with stakeholders to better understand their key learnings, what tools are currently in place, including where they are being used and how they are being used, and where there may be gaps in broad understanding. Initial areas of exploration could include:

- o Affordable devices and services
- o Infrastructure development
- o The size of the digital literacy challenge, and options for addressing it
- o The most effective trainings and building capacity methodologies for teaching digital skills
- o Addressing cultural and gender barriers

→ Collect case studies, toolkits, and other materials from key organizations to analyze their effectiveness, and consolidate them into a suite of resources that can be shared across a broader spectrum of partners and markets.

→ Partner with one or more universities (examples include Columbia, Harvard, Tufts, Johns Hopkins, University of Washington, Berkeley, and Stanford) to develop online courses that help organizational leaders and entrepreneurs better understand how to address key barriers to access.

→ Refine and edit materials for consistency, with a focus on well-defined audiences (for example, policymakers, entrepreneurs, or development professionals).

→ Build a database of case studies that show how successful models work in a variety of geographies and across countries with different levels of willingness or ability to engage in expanding access.

→ Develop an online property that will allow for easy curation and dissemination of best practices, including a self-assessment tool for private sector players to determine their readiness to enter the space.

CONCLUSION

The global community is increasingly recognizing the importance of delivering Internet access to those who do not have it. Although there has been great progress over the last decade, less than half of the world's population is able to access the Internet and, more troubling, growth in access is slowing rapidly across the developing world. In the past, this question of access has largely been the purview of industry, host government regulators, and infrastructure providers. As the social, economic and governance benefits of digitization become ever more obvious, however, the centrality of universal access to the development agenda is increasing. There is, therefore, ever greater focus on how to attain universal Internet access.

With greater attention on access, higher levels of political will, and a host of organizations and governments incorporating access into their strategies, development organizations have an opportunity—now—to leverage their core capabilities to create meaningful impact with regard to achieving the goal of universal access. By working together across sectors, international actors have the chance to significantly accelerate access and enable the world's poor, rural, and marginalized populations to play an important role in our increasingly digitally intermediated world.

ANNEXES

Annex 1: Limitations of Analysis

The research and analysis that informed this report were conducted from July through August 2016. The outcome is *not* intended to be a comprehensive or complete review of the access landscape. Rather, it is meant to inform and inspire global actors. There are several limitations to this analysis that should be noted:

- Interviewees were selected to provide insight into key organizations in the access landscape. They represent civil society, industry, and the donor community. However, given the small sample size—23 interviews—and the relatively quick timeframe for conducting interviews, there is a bias reflected here toward those who were more responsive to interview requests (perhaps because they were familiar with either SSG or DIAL) and toward interviewees and organizations prioritized by the DIAL and SSG teams.

- Further, it should be noted that information on different initiatives' current activities and future plans is not always readily accessible; SSG worked with information currently available online or through the existing literature, and supplemented where possible through interviews with key stakeholders. For this reason, some information about current actors' activities and future plans may be incomplete, outdated, or incorrect.

- Finally, SSG acknowledges that its rankings of intensity and sufficiency are by and large subjective, though informed by SSG's research and analysis over the course of this project.

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Annex 3: Cross Section of Projects and Organizations Working in Access

The following Organizational Landscape Map reflects the activities of a range of key actors and initiatives in the access space, taken from a larger map that SSG used to conduct its analysis. This map is not exhaustive, however, and does not include all of the projects or relevant actors working on this issue today. Because this space is relatively new and ever changing, SSG opted to focus on a representative sampling of larger organizations.

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
African Development Bank	African Development Bank	In 2015, the Bank invested $2 billion in 17 transport and ICT operations (there are currently 114 projects under implementation in 44 countries, worth $11 billion, but these are much more focused on transportation than ICT). In the short term, the Bank plans to focus on direct financing of broadband infrastructure and on enabling policy and regulatory environments. In the medium term, it seeks to stimulate demand for ICT networks and provide knowledge products and share information. Its funding to address the barrier of infrastructure has also included funding for regulatory reform.	Incentives; Infrastructure	Providing funding and capital
Universal Broadband and Regulation	Commonwealth Telecommunications Organization (CTO)	As part of its strategic goal, the CTO, made up of 34 member countries and 21 ICT sector members (including 15 from industry), is advocating for regulatory changes and increased Internet access, specifically through mobile broadband technologies and the Third Generation Partnership, developing 3G standards. It works through international conferences, capacity development training programs and research projects.	Infrastructure	Leveraging networks and convening and hosting discussions; Building capacity; Driving advocacy
Internet.org; Free Basics; Connectivity Lab; Express Wifi	Facebook	**Free Basics:** Initiative to introduce people to the benefits of the Internet by providing free access to services like news, local jobs, etc. It is available in 48 countries with a variety of mobile operators. **Express Wifi**: Initiative to empower local entrepreneurs to provide fast/affordable Internet access in India currently, by working with local Internet service providers or mobile operators, allowing them to use software provided by Facebook to connect their communities. Facebook plans to expand to other regions soon. **Connectivity Lab**: Aquila unmanned aircraft, using laser technology to make access affordable. It had its first test flight in July 2016, but there is still a lot of work before this becomes	Low incomes and Affordability; Incentives; Infrastructure	Developing and deploying technology solutions; Incubating and scaling innovative business models

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
		viable.		
Project Link; Loon; A4AI	Google	**Loon**: Using high-altitude, wind-propelled balloons to help mobile operators extend wireless networks without building cell towers or running fiber optic cable. Initial connections have been made, but more work is needed for scale. **Project Link**: Building micro fiber networks to enable Internet service providers (ISPs) and MNOs to share infrastructure. Pilot built in Kampala, Uganda. Currently working in Accra, Ghana. No information on level of funding publicly available.	Infrastructure; Low Incomes and Affordability	Developing and deploying technology solutions; Incubating and scaling innovative business models
Mobile for Development (Connected Society, Connected Women, Mobile Money, Mobile for Development Utilities; Ecosystem Accelerator Program)	GSMA	**Mobile for Development:** Works with mobile operator members, the wider mobile industry, and the development community to deliver mobile services in emerging markets through initiatives such as Connected Society, Mobile Money, and Mobile for Development Utilities. GSMA has rolled out 104 initiatives across 49 countries in partnership with 50 mobile operators since 2007.	Low incomes and Affordability; Incentives; User Capabilities	Leveraging networks and convening and hosting discussions; Building capacity; Conducting research and establishing thought leadership; Driving advocacy; Providing funding and capital
She Will Connect	Intel	Trains and provides an online peer network and gender-relevant content to help women in Kenya, Nigeria, and South Africa increase digital literacy. No public information on funding available.	User Capabilities	Building capacity
Digital Finance Innovation	Inter-American Development Bank	Initiatives to support governments on infrastructure deployment; support governments to develop national broadband plans, USFs, spectrum management, open access conditions, including national broadband plans in Mexico, Costa Rica, and Argentina, and infrastructure deployment in Nicaragua and Peru. Has also created a broadband index and toolkit with OECD. No public information on funding available.	Infrastructure; Low Incomes and Affordability	Providing funding and capital; Building capacity
Connect 2020; Broadband Commission for Sustainable Development	International Telecommunications Union (ITU)	Adopted agenda in 2014 for members to work toward shared vision on growth, inclusiveness, sustainability, innovation, and partnership.	Cross-cutting	Leveraging networks and convening and hosting discussions; Driving advocacy

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
Affordable Access Initiative	Microsoft	Microsoft has pledged $1 billion in donated cloud services to nonprofits and university researchers from 2016–2019. It also has initiatives to support local innovation for affordability and last mile connectivity, such as grants to help scale business models (12 in 2016; in Argentina, Botswana, India, Indonesia, Malawi, Nigeria, Philippines, Rwanda), and education programs to support digital literacy (YouthSpark, started in 2013, in 70 countries)	Low Incomes and Affordability	Developing and deploying technology solutions; Incubating and scaling innovative business models; Leveraging networks and convening and hosting discussions; Providing funding and capital
Public Challenge; Global Hub	Mozilla Foundation	**Public Challenge:** Public challenge spurs innovation and equal-rating solutions for digital literacy. It is part of USG's Global Connect Initiative in partnership with the World Bank and IEEE. It has run over 5,000 local events in 90 countries to teach digital literacy in the last five years. **Global Hub**: Building a global hub (as of April 2016) to help more women learn to read, write, and participate online; part of USG's Global Connect Initiative in partnership with the World Bank and IEEE. It is currently working with UN Women to set up clubs for women and girls in South Africa and Kenya as pilots.	Incentives; User Capabilities	Building capacity
OPIC	Overseas Private Investment Corporation (OPIC)	Pledged at least $1 billion for financing ICT expansion. Funds larger investments ($140–$250 million range) as well as smaller initiatives, such as Mawingu (~$4 million). Investments in ICT in more than 37 countries, from broadband to satellite TV.	Cross-cutting; Infrastructure	Incubating and scaling innovative business models; Providing funding and capital
Global Connect Initiative	U.S. Department of State	Launched in 2015, to prioritize Internet access across U.S. development agencies and advocate for participation from international development banks and other governments. Also, works within specific countries to integrate ICT on an as-needed basis (adopting a listening-first approach). Working with Tunisia to coordinate stakeholders to help the country meet its two goals of connecting all their schools by 2017 and all of their people by 2020. No public information on funding available, but is focused on increasing funding levels from DFIs and other stakeholders.	Cross-cutting	Leveraging networks and convening and hosting discussions

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
Global Broadband and Innovations; Africa Broadband Partnership; Global Development Lab; A4AI; mSTAR	USAID	**Global Development Lab**: Through Digital Development work, catalyzes programs and partnerships in 1) digital finance, 2) inclusive access to digital- and mobile-based information and service delivery, and 3) the use of data collected by digital devices to improve decision making. Works through a variety of programs, including support of GBI (which sits within the Lab) and support for A4AI. Also developed Principles for Digital Development that have been endorsed by UNICEF, FHI 360, the World Food Program, the World Health Organization, and the United Nations Development Program, among many others. **mSTAR**: mSTAR is a DC-based, globally focused project that fosters the rapid adoption and scale-up of digital technologies to advance broad development goals. Focus areas include Digital Inclusion, Digital Financial Services (DFS), and Real-Time Data. Working in 18 countries in Africa, Latin America and the Caribbean, and Asia on a number of initiatives including a data-driven framework for understanding key barriers to accessing ICT/mobile solutions, the mAccess Diagnostic Tool that will enable Missions to assess mobile access in their countries and provide them with a decision-making framework relevant to the strategic planning stage, and a number of research and convenings around DFS. **Global Broadband and Innovations**: Launched in 2010, working with the public sector to release USFs and to establish National Broadband Plans and extend broadband into rural communities. Working with the private sector to increase rural broadband deployments and introduce cost-effective technology solutions in Kenya, Nigeria, Ghana, Colombia, Peru, Jamaica, Indonesia, and Burma.	Infrastructure; Low Incomes and Affordability	Leveraging networks and convening and hosting discussions; Driving advocacy; Providing funding and capital; Building capacity

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
The Web Index; Women's Rights Online; A4AI	World Wide Web Foundation	**The Web Index**: First released in 2012, the Web Index ranks 86 countries yearly based on research into the web's global impact on four pillars: Universal Access, Freedom and Openness, Empowerment, and Relevant Content. The Index combines existing secondary data with new primary data derived from an evidence-based assessment survey. **Women's Rights Online:** WWW Foundation advocates for evidence-based national ICT and gender plans established in at least 7 new countries within 5 years, with a focus on 10 countries in Africa, Asia, and Latin America (starting in 2014) in order to address gender barriers in digital inclusion. * For Research: surveyed 10,000 poor urban men and women in 10 countries across Africa, Asia, and Latin America to find out more about the digital gender gap.	Cross-cutting; Incentives	Conducting research and establishing thought leadership; Driving advocacy
ICT and Transport Group	World Bank	Working since 2014 to map Tech Hubs in Africa; issued several reports, including 2016 *Digital Dividends* report, *Broadband Networks in MENA: Accelerating High-Speed Internet Access*, and *Connections*, a notes series exploring Transport and ICT Issues. It has also created the Broadband Strategies Toolkit, a guide for policymakers regarding broadband development issues (a joint production with infoDev and ITU), a live resource for policymakers, the telecom industry, and consumers, that provides a global overview of telecom policy implementation. The Bank's portfolio of ICT components in active projects was $2 billion in 2015. Its strategy for the next three years (2016–2018) aims at enabling the right policy and regulatory frameworks, building digital skills, and improving global cooperation for trans-boundary challenges like cyber-crime. World Bank launched a Digital Development Partnership (DDP) in 2016 as a platform for innovation and financing focused on data and indicators (will develop a toolkit), enabling policy environments, building capacity to governments, facilitating e-Government models, and making transport systems more efficient.	Cross-cutting	Conducting research and establishing thought leadership; Providing funding and capital

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
Internet for All	World Economic Forum	Created the *Internet for All* report (2015) to detail successful practices in order to develop scalable, replicable new models of public–private collaboration that accelerate Internet access and adoption. Starting in 2016 to implement programs, starting in Rwanda, Kenya, Uganda, and South Sudan focused on public–private collaboration for Internet access and adoption. Up to three other country programs in other regions will be scoped in 2016, with India identified as a potential second country program.	Cross-cutting	Conducting research and establishing thought leadership; Incubating and scaling innovative business models
Dynamic Spectrum Alliance	Facebook, Google, Microsoft, Mawingu, others	Goal is to increase access to spectrum. Advocates for laws and regulations for more efficient spectrum utilization. Has created technical rules and regulations on DSA MODEL White Spaces, and on commercial deployments, pilots, and trials. It comments on regulations, including FCC on spectrum bands above 24GHz and ICASA consultation on white spaces. No public information on funding available.	Infrastructure	Driving advocacy
A4AI	USAID, Google, Omidyar Network, DFID, World Wide Web Foundation	Initiatives to address the high costs of Internet access through policy and regulatory reform with multi-stakeholder coalitions in the countries below; projects mostly in the research/work plan creation stages, some in policy proposal development stages. Funding levels unclear from public documents. **Nigeria** (started in 2013): focused on pricing transparency (safeguards for anti-competitive behavior); open access framework and infrastructure sharing (infrastructure investment); harmonization and rationalization of taxes across local, state, and national levels (community issues and concerns); spectrum policy (fair allocation and innovative uses, availability of free/unlicensed spectrum); data collection and indicators (M&E) across areas, systematic national level of effort; USF efficiency and collaboration among stakeholders. **Ghana** (started in 2014): focused on data collection/research to develop solid evidence for policy decision making around USFs, mapping Ghana's infrastructure, inclusion, taxation, infrastructure sharing in context of an open access model, pricing transparency, and user awareness of services). **Mozambique** (started in 2014): data collection and reporting; infrastructure investment and sharing; taxation. **Liberia** (started in 2015): plan of action unclear. **Dominican Republic** (started in 2014): working groups on creating and socializing a digital agenda across D.R.; taxation and ICT financing; infrastructure sharing (research, sharing of best practices, creation of work plan to move forward); data and research. **Myanmar** (started in 2015): infrastructure sharing and deployment; taxation; USF	Low Incomes and Affordability	Leveraging networks and convening and hosting discussions; Driving advocacy; Buildling capacity; Conducting research and establishing thought leadership

Initiative Name	Founding Partners	Activities	Target Barriers	Role(s)
		administration; data collection and research frameworks		
Broadband Commission for Sustainable Development	UNESCO, International Telecommunications Union (ITU)	Established in 2015 as an extension of the UN Broadband Commission established in 2010 to advocate for the development of broadband infrastructure and focus on the SDGs. Outputs include annual reports (including the *State of Broadband* annual report as part of efforts to advocate for development of broadband infrastructure, includes access and affordability rankings for over 160 economies), working groups (currently on digital gender divide, digital health, demand, and platforms and content in support of the SDGs), and two meetings every year.	Cross-cutting	Driving advocacy; Conducting research and establishing thought leadership