WORLD WIDE WEB FOUNDATION

A4AI ALLIANCE FOR AFFORDABLE INTERNET

CLOSING THE INVESTMENT GAP:

How Mulitilateral Development Banks Can Contribute to Digital Inclusion

April 2018

CONTENTS

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A4AI ALLIANCE FOR AFFORDABLE INTERNET

About A4AI

The Alliance for Affordable Internet (A4AI) is the world's broadest technology sector coalition working to reduce the cost of internet access to enable universal, affordable access for all. Initiated by the Web Foundation in 2013, the Alliance is composed of 80+ member organisations from across the private, public, and not-for-profit sectors in both developed and developing countries. Working through a consultative, locally-driven and locally-led process in member countries throughout Africa, Asia, and Latin America, A4AI works to shape the policies and regulations needed to drive down prices and enable everyone, everywhere to afford to connect.

About the Web Foundation

The World Wide Web Foundation is an independent, international organisation working for digital equality – a world where everyone has the same rights and opportunities online.

Established in 2009 by web inventor Sir Tim Berners-Lee, the Web Foundation works to advance a free and open web 'for everyone' by influencing government and corporate policies to ensure everyone can use the web freely and fully.

About Xalam Analytics

Xalam Digital Analytics is a boutique research and analytics firm focused on digital infrastructure and services markets in Africa and the Middle East. We leverage data analytics tools and investment research to help clients identify and act on digital transformation opportunities. We develop extensive data sets and market visualizations that underpin the analysis of the digital economy: "Foundational infrastructure" markets (broadband connectivity, backbones, data centers), digital services and applications (managed hosting & cloud services, video streaming, e-commerce, mobile money and emerging IoT models), all in key enterprise and consumer segments.

KEY ABBREVIATIONS

AFDB	AFRICAN DEVELOPMENT BANK
ADB	ASIAN DEVELOPMENT BANK
AIIB	ASIAN INFRASTRUCTURE INVESTMENT BANK
EIB	EUROPEAN INVESTMENT BANK
ICT	INFORMATION AND COMMUNICATIONS TECHNOLOGIES
IBRD	INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
IDA	INTERNATIONAL DEVELOPMENT ASSOCIATION
IFC	INTERNATIONAL FINANCE CORPORATION
IMF	INTERNATIONAL MONETARY FUND
ITU	INTERNATIONAL TELECOMMUNICATIONS UNION
MDBS	MULTILATERAL DEVELOPMENT BANKS
MSWG-MDB	MULTI-STAKEHOLDER WORKING GROUP ON MDB INVESTMENT STRATEGIES IN THE ICT SECTOR
NDB	NEW DEVELOPMENT BANK
SDGS	SUSTAINABLE DEVELOPMENT GOALS
WB	WORLD BANK
WEF	WORLD ECONOMIC FORUM

EXECUTIVE SUMMARY

Given the considerable size of investment needed to achieve universal access, we conducted an analysis of MDB investments in the ICT sector across low- and middle-income countries to assess whether and how MDBs' considerable capabilities could be better harnessed to accelerate progress toward universal access and digital inclusion. The research primarily included an analysis of the size, nature, and drivers of MDB investments in the ICT sector. It also encompassed a quantitative assessment of the capital gap to achieve universal access to connectivity, along with the development of a set of recommendations and guiding principles for more effective MDB investments in the ICT sector.

MDB investments in the ICT sector overall are low.

- Multilateral Development Banks (MDBs) have made a significant contribution to infrastructure development around the world, through their own direct investments, a coalescing of government and private sector capabilities to implement large-scale projects, and by supporting governments to develop policies that attract and enable private sector investment. Between 2012 and 2016, MDBs have committed a cumulative $525 billion to funding development projects in low- to middle-income countries worldwide. MDB commitments to development projects now average around $100–$120 billion annually, to help finance 1100 to 1400 projects every year.

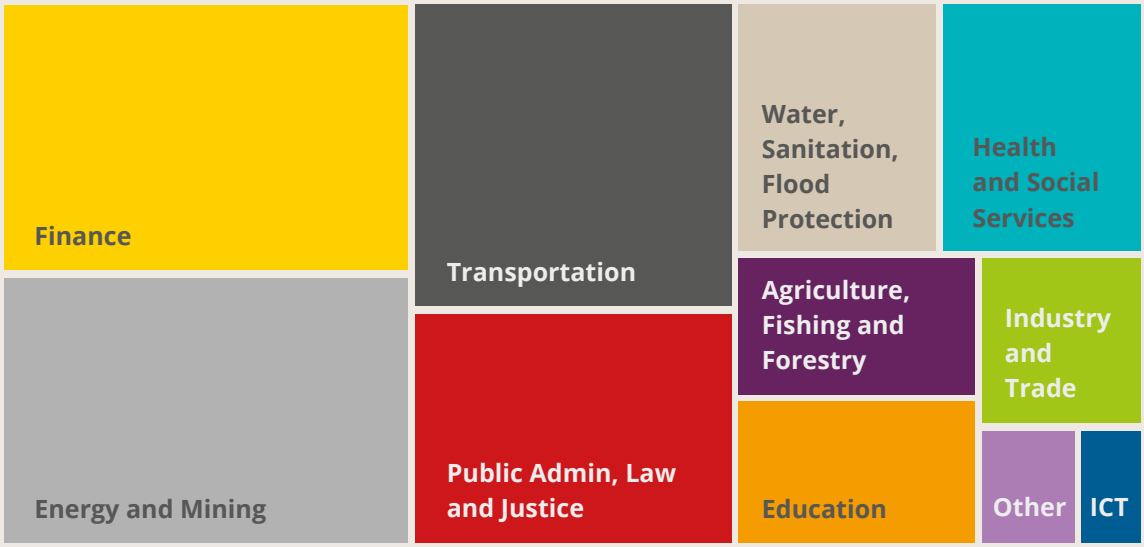
- However, the information and communications technology (ICT) sector has attracted just 1% of MDBs' cumulative project commitments since 2012, despite increasing global recognition of ICTs and wider digital access as critical to the realisation of the Sustainable Development Goals (SDGs). Between 2012-2016, contribution levels to ICT projects in low- and middle-income countries have been stable, typically in the 1% to 1.4% range.

- Investments in the ICT sector are unevenly distributed across MDB institutions. As a group, three World Bank Group institutions (International Bank for Reconstruction and Development (IBRD), International Development Association (IDA) and International Finance Corporation (IFC)) account for about half of MDB overall global commitments to projects in low- and middle-income countries. Likewise, the IFC is the largest individual contributor to MDB investment in the ICT sector in terms of capital investment volumes; it is also the institution that spends the most in the ICT sector as a proportion of its overall commitments — around 4% of its annual commitments.

- South East Asia and Sub-Saharan Africa have attracted the majority of MDB commitments to the ICT sector in low- to middle-income countries; these two regions account for around 70% of all cumulative commitments over the 2013-2017 period, and around two times what MDBs spend in all other regions combined.

Between 2012 and 2016, MDBs have committed a cumulative $525 billion to funding development projects in low-to middle-income countries worldwide. Just 1% of these project funds have gone toward ICT projects.

Cumulative MDB Annual Capital Commitments by Sector – 2012-16

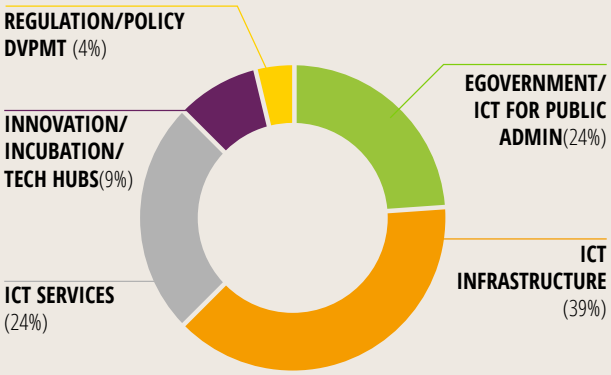


Based on data from 9 MDBs (IBRD, IDA, IFC, AFDB, ADB, IDB, EIB, AIIB and NDB);
Sources: MDBs, Xalam Analytics Research

MDB investments to support the development of enabling ICT policy frameworks are in decline.

- Less than 5% of MDB commitments to the ICT sector were specifically dedicated to supporting regulation and policy projects over the 2012-17 period. Indeed, the proportion of ICT projects dedicated to regulation and policy has been in decline since 2013, to near-zero levels in 2016.
- This underinvestment comes at a crucial time for ICT regulatory frameworks in many low- and middle-income countries. Rapid technological progress around spectrum usage, cloud computing and artificial intelligence has challenged established regulatory boundaries, and upended business models and conventional market structure definitions. In turn, many countries are seeing their regulatory frameworks become increasingly out of date, with significant implications for their ability to attract additional investment in the ICT sector.
- Around 40% of MDB commitments to the ICT sector are focused on infrastructure buildout projects — typically submarine and terrestrial fibre projects. Another 25% goes to fostering the usage of ICT services, with the balance being allocated to e-government initiatives and, increasingly, tech and innovation/incubation hubs.

Multilateral Development Banks' ICT Projects by Type, 2012-2016 *



*Based on a sample of 155 identified ICT projects approved by 9 global and regional MDBs between January 2012 and December 2016; based on primary focus of the project; some projects may overlap categories; segment categories based on Xalam Analytics definition.
Sources: MDBs' operations datasets; Xalam Analytics Research

Investment in the ICT sector is perceived as a private sector activity — and this model is showing its limits when it comes to connecting the unconnected.

- The fundamental reason behind the low levels of MDB commitments to the ICT sector is the established perception of the sector as an industry driven almost exclusively by private capital, with limited need for public sector participation.
- While there is broad acknowledgement of the importance of ICT to achieve the SDGs, this understanding does not seem to influence all levels of government and investment decisions. As a result, it affects government prioritisation of the ICT sector — Ministries of Finance, which typically serve as the primary interface with MDBs, often do not prioritise the ICT sector when it comes to raising funds from international institutions.
- Within MDBs, the private capital-driven nature of the ICT sector, combined with a need to adhere to the priorities of their client governments and a reluctance to crowd out private capital, has reinforced an emphasis on focusing MDB capital primarily towards perceived areas of market failure.
- A critical consequence is a model that is fostering a "middle class-centric" view of ICT markets, whereby capital investments are primarily focused on the needs of the growing urban middle class, leading to a deepening of the digital divide between urban and rural areas.
- This private sector-driven model is showing its limits when it comes to connecting the unconnected, and achieving the broader objective of digital inclusion. Extending access to connectivity in rural areas is a highly complex, multi-faceted challenge. Capital requirements are considerable; projects have extra layers of complexity tied to economics, government participation and physical conditions, and private sector stakeholders are reluctant to invest, while dedicated rural area players face substantial hurdles in raising capital.
- This, in turn, calls for new, more suitable approaches to conceptualising and financing rural area projects, including new financing and implementation models, fresh approaches to private sector incentivisation, pertinent measures of success, etc.

$10 billion a year is needed to close the universal access gap, and expanded digital inclusion will require more capital — from MDBs, the private sector, and public sector alike.

- The challenges associated with achieving universal access are considerable. Our analysis shows that low- and middle-income countries would need to bring online over 2 billion new users over the next 10 years to hit a 95% penetration rate (up from around 40% in 2017).

- Assuming stable private sector investment levels, this translates into an investment gap of around $100 billion globally over the next 10 years — or about $10 billion a year that would need to be added to capital expenditure budgets. Around 60% of this gap would be tied to the need for expanded infrastructure deployments, with the balance going to interventions designed to foster adoption and usage, around skills building, awareness, and local content.

- Our analysis further suggests that the investment gap is highest in Southeast Asia and Sub-Saharan Africa. Together, these two regions account for around 90% of the investment gap that needs to be filled to achieve universal access.

- Substantial efforts are needed from all stakeholders to close this considerable shortfall in capital. Current MDB spend in the ICT sector represents only around 10% of the existing capital investment gap. Likewise, telecoms operators would have to increase their average annual network expansion spend by around 15-20% to fill the infrastructure portion of the investment gap (~$6 billion annually).

- While our estimates are largely policy neutral, it must be emphasised that the biggest contribution to closing the investment gap may yet come from the actioning of critical policy levers, notably with respect to network infrastructure sharing, spectrum, taxes, and other measures that would increase the viability of rural area ICT projects.

KEY RECOMMENDATIONS

1. Change the investment narrative within and outside of MDBs to re-establish the ICT sector as a priority sector.

- Remind and impress upon all stakeholders the strong link between digital access and the SDGs;
- Leverage the breadth of presence of MDBs to drive a cross-sector digital agenda;
- Make digital access/usage an inherent part of MDB project assessment, or an integral part of MDB project sustainability;
- Evolve the broader terminology used in order to better capture the role of ICTs in the context of SDGs.

2. Develop innovative financing solutions for rural area projects.

- Create funding mechanisms that are more suitable for rural area projects, including last-mile solutions;
- Increase the amount of financing allocated to smaller, often transitional projects;
- Optimise the use of government incentives to attract private capital and improve the rural project business case.

3. Increase investments in the development of enabling policy frameworks.

- A renewed effort to increase capital commitments to MDB ICT policy/regulatory projects;
- Assess and learn from areas of policy failure to inform the development of new enabling frameworks;
- Focus efforts to develop infrastructure sharing policies and open access models, appropriate spectrum flexibility, and more efficient taxation schemes that attract private capital into underserved areas.

01

MDB INVESTMENTS IN THE ICT SECTOR

A historical perspective

Multilateral Development Banks (MDBs) have made a significant contribution to infrastructure development around the world, through their own direct investments, a coalescing of government and private sector capabilities to implement large-scale projects, and by supporting governments to develop policies that attract and enable private sector investment.

- Between 2012 and 2016, MDBs[1] committed a cumulative $525 billion to funding development projects in low- and middle-income countries worldwide. MDB commitments to development projects now average around $100–$120 billion annually, and help finance 1100 to 1400 projects every year. Project commitment volumes are increasing, boosted by expanded capital availability within traditional development banks, along with the launch of new institutions such as the Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (NDB). Overall MDB commitments have risen by an average of around 10% annually since 2013; in 2016, commitment volumes were around 20% higher than they were in 2012.

- In this context, MDB investments in the ICT sector have been relatively small. Our analysis shows that only around 1% of MDB cumulative commitments to projects in low- and middle-income countries over the 2012-16 period were specifically targeted towards the ICT sector, or had ICT as a primary project component. That contribution level has been stable, with ICT sector allocation

1 The analysis in this paper is based on data from 9 main multilateral development banks: The World Bank Group (including IBRD, IDA and IFC), the African Development Bank (AFDB), the Asian Development Bank (ADB), the Inter-American Development Bank (IDB), the European Investment Bank (EIB, non-EU investments only), the Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (NDB).

typically in the 1% to 1.4% range. This pattern is reinforced in the context of MDB commitments to infrastructure development, with the ICT share of MDB infrastructure-related commitments oscillating between 2% and 3% since 2012.

- The relative paucity of MDB commitments to the ICT sector is even more pronounced at an individual MDB level. We estimate the median share of ICT investments within the world's largest MDBs to be around 0.5% in 2016, down from around 1% in 2015. During some years, several MDBs do not explicitly allocate any capital budget to ICT sector projects.

- Investments in the ICT sector are unevenly distributed across MDB institutions. As a group, three World Bank Group institutions (IBRD, IDA and IFC) account for about half of MDB global commitments to projects in low- and middle-income countries. Their contribution to ICT sector commitments is higher, with the World Bank Group accounting for around 70% of overall MDB commitments to the sector.

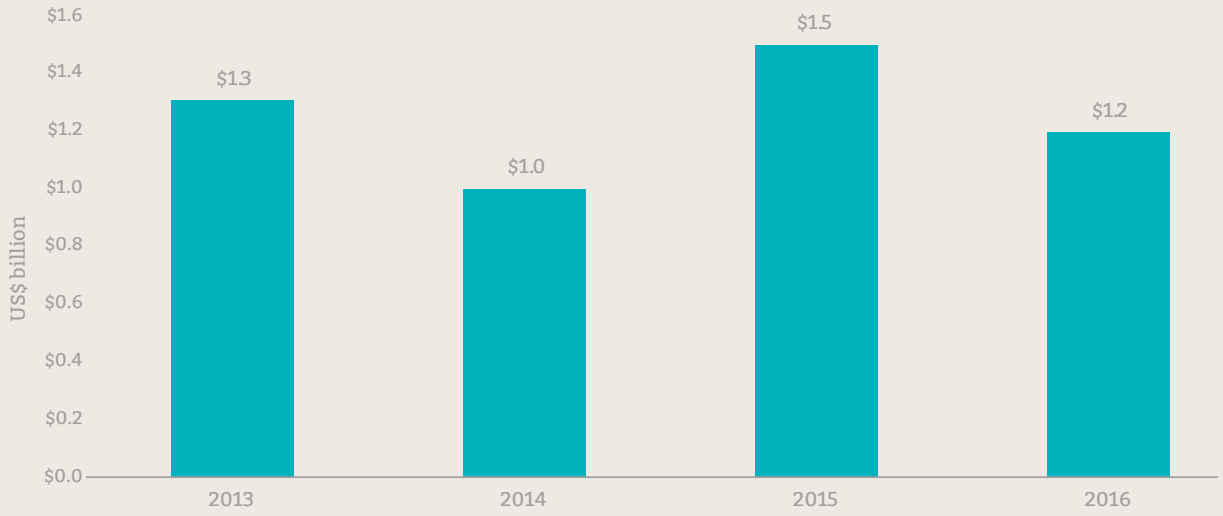
- The IFC is the largest individual contributor to MDB investment in the ICT sector, in terms of capital investment volumes. Since 2012, the IFC has invested around $2 billion in the ICT sector using a variety of instruments (e.g. equity participations, loans or guarantees) — nearly 45% of all MDB investments in the sector. The IFC is also the institution that spends the most in the ICT sector as a proportion of its overall commitments, spending around 4% of its annual commitments — slightly higher than the MDB median of less than 1%.

- Southeast Asia and Sub-Saharan Africa have attracted the majority of MDB commitments to the ICT sector in low- to middle-income countries; these two regions account for around 70% of all cumulative commitments over the 2013-2017 period, and around two times what MDBs spent in all other regions combined.

Evolution of MDB Annual Capital Commitments by Sector

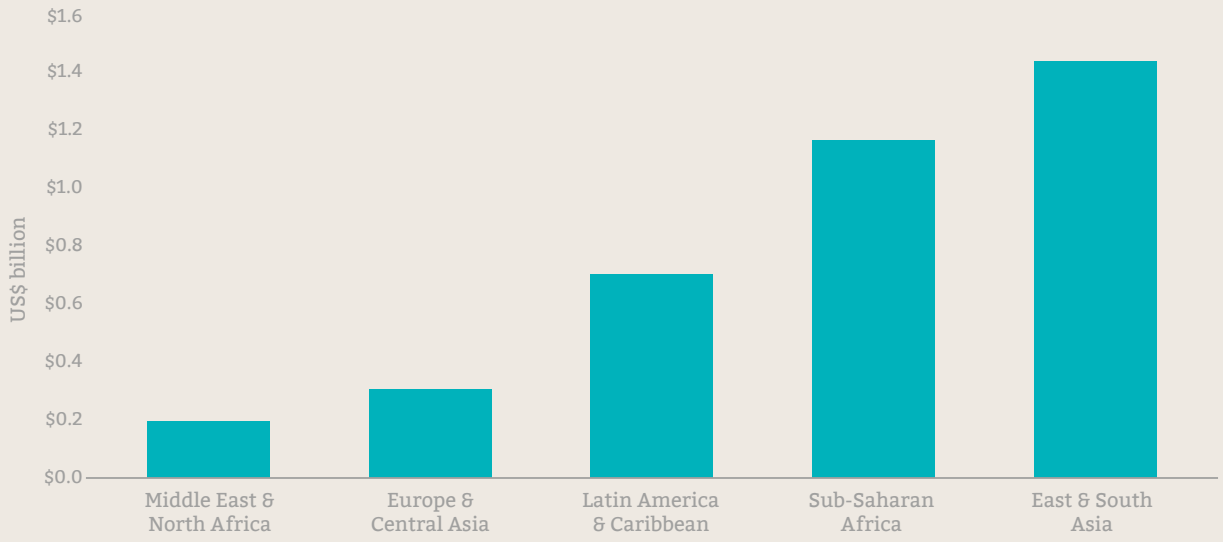
Based on data from 9 MDBs (IBRD, IDA, IFC, AFDB, ADB, IDB, EIB, AIIB and NDB); Sources: MDBs, Xalam Analytics Research

Evolution of MDB Annual Capital Commitments in the ICT Sector



Based on data from 9 MDBs (IBRD, IDA, IFC, AFDB, ADB, IDB, EIB, AIIB and NDB). Source: MDBs, Xalam Analytics Research

MDB ICT Commitments by Region – January 2013 to June 2017



Based on operations datasets from 9 MDBs (IBRD, IDA, IFC, AFDB, ADB, IDB, EIB, AIIB and NDB); including only projects focused on ICT and/or specifically identified as ICT projects; numbers may differ slightly from reported commitments.
Source: Xalam Analytics Estimates based on MDB operations data

02

UNDERSTANDING THE NATURE OF MDB INVESTMENTS IN THE ICT SECTOR

To better understand the nature of MDB ICT projects, we further analysed a sample of around 7000 projects approved by nine MDBs around the world, between January 2012 and June 2017. Within this sample, only around 167 (~2.4%) were considered ICT projects. Due to the cross-cutting nature of ICT, many projects carry some form of ICT component. For the purposes of this analysis, our sample focused on projects specifically identified by MDBs as ICT projects, and/or those projects which included, per our assessment, an ICT component that superseded components pertaining to other sectors.

Our analysis uncovered several points:

- MDBs commit to around 30 to 40 ICT projects a year in low- and middle-income countries around the world (out of around 1100-1400 total projects); the number of ICT projects approved rebounded in 2016 after two consecutive years of decline. In value terms, MDB commitments to ICT projects declined by 20% in 2016.

- Nearly 40% of MDB projects in the ICT sector are generated by (or include some participation from) the IFC; and as a group, World Bank Group institutions have accounted for nearly 70% of all MDB commitments to the ICT sector over the past five years. For the most part, however, the share of ICT as a proportion of project portfolios is relatively similar across MDBs (~2.4%).

- Around 85% of MDB ICT projects take place in Africa, Southeast Asia, and Latin America/Caribbean, with each of these regions contributing around a third. At individual country level, Bangladesh, Brazil, and Myanmar have attracted the highest number of discrete, country-focused MDB ICT projects since 2012 (around 7 each). In value terms, key

recipients of MDB investment in ICT include those three markets, along with Argentina and Gabon. It must be noted that around a quarter of all projects (and around 15% of committed investments) cover multiple countries.

- MDB ICT commitments are small. Average project commitment size is around $30 million, with a median of around $20 million over the 2012-2017 period; this is the lowest level among key MDB investment sectors — about five times lower than transport projects and 1.5 times lower than public administration projects.

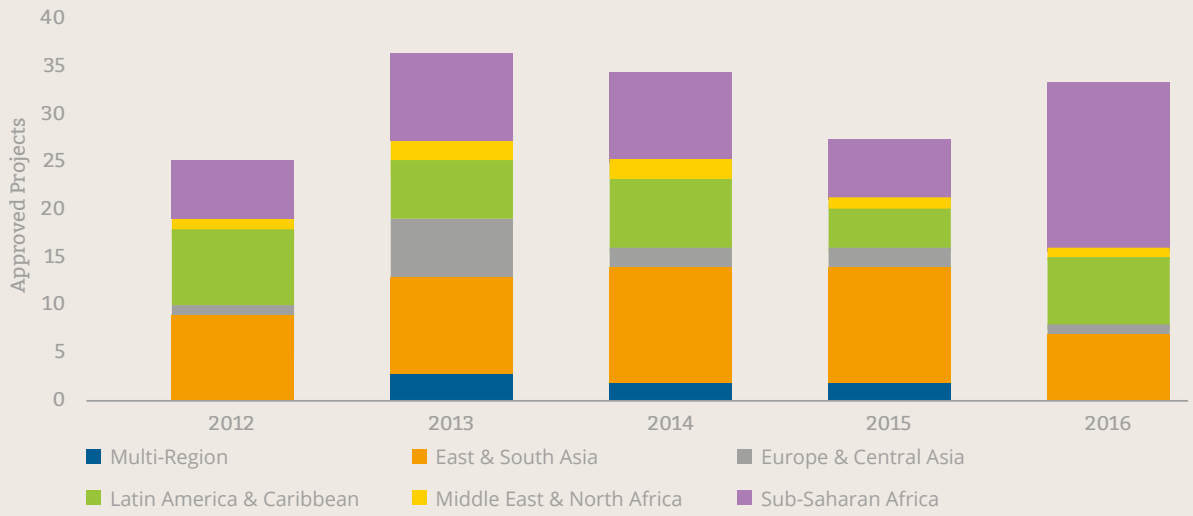
- Around 50% of MDB commitments to the ICT sector are focused on infrastructure buildout projects; another 25% goes to fostering the usage of ICT services, with the balance being allocated to e-government initiatives, and increasingly, tech and innovation/incubation hubs. Less than 5% of MDB commitments to the ICT sector went specifically to supporting regulation and policy over the 2012-17 period.[2]

- MDBs have largely focused their ICT infrastructure investments over the past five years on submarine and terrestrial fibre projects. Around half of MDB ICT infrastructure commitments have gone to such fibre transmission projects, with the balance going to broadband connectivity projects (~25% of ICT infrastructure commitments) and supporting cell tower companies (~20% of ICT infrastructure commitments).

2 For the most part, however, regulation/policy projects have been integrated into larger infrastructure projects.

Around 50% of MDB commitments to the ICT sector are focused on infrastructure buildout; 25% goes to fostering ICT usage; less than 5% goes to supporting regulation and policy development.

Multilateral Development Banks' ICT Projects by Region (2012-2017) *

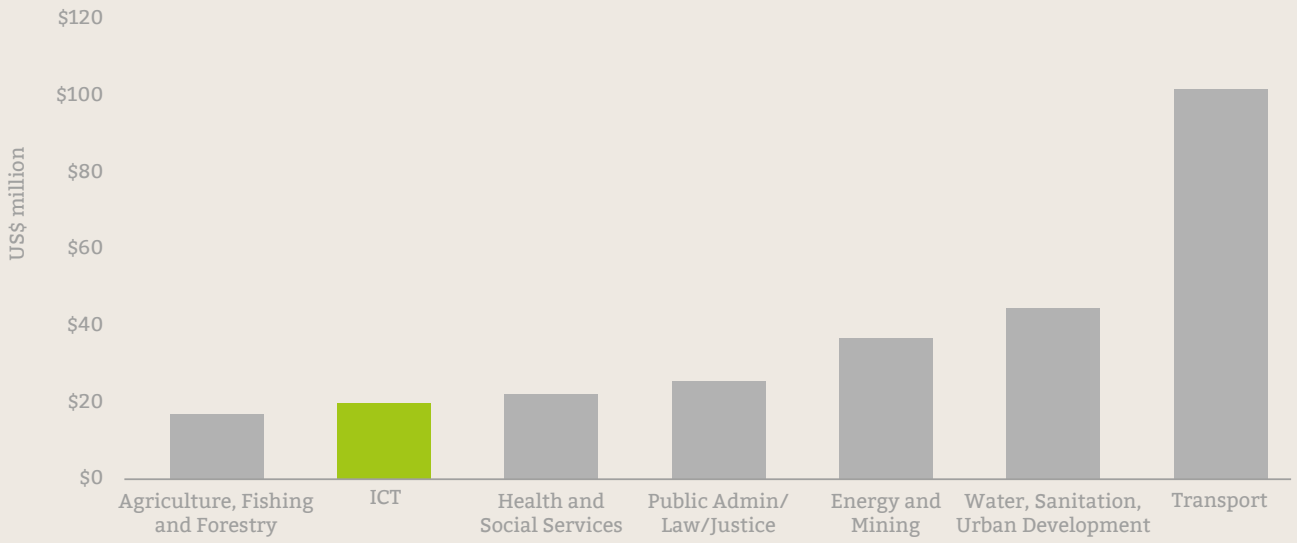


*Based on a sample of 167 identified ICT projects approved by 9 global and regional MDBs between January 2012 and June 2017; based on primary focus of the project.Sources: MDBs' operations datasets; Xalam Analytics Research

Multilateral Development Banks' ICT Project Commitments by Country (2012-2017) *

*Based on a sample of 167 identified ICT projects approved by 9 global and regional MDBs between January 2012 and June 2017; based on primary focus of the project; some countries may receive more as part of multi-country projects; numbers may differ from MDB aggregate numbers.Sources: MDBs' operations datasets; Xalam Analytics Research

Multilateral Development Banks' Project Median Value for Sample Key Sectors* (2012-2017)



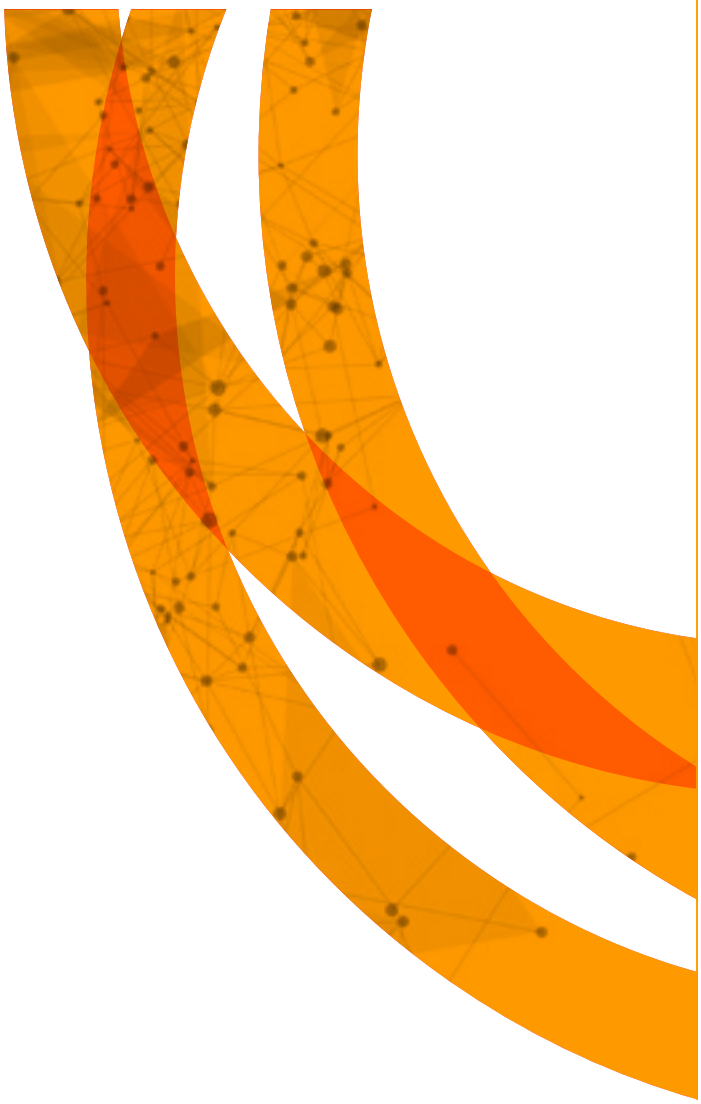
*Based on a sample of 6700 projects approved by 9 global and regional MDBs between January 2012 and June 2017; based on primary focus of the project; some projects may overlap categories; Sources: MDBs' operations datasets; Xalam Analytics Research

Multilateral Development Banks' Commitments to ICT Projects by ICT Sub-Sector (2012-2017)

*ICT infrastructure projects in darker green shade; based on a sample of 167 identified ICT projects approved by 9 global and regional MDBs between January 2012 and June 2017; based on primary focus of the project; some projects may overlap categories; segment categories based on Xalam Analytics' definitions.Sources: MDBs' operations datasets; Xalam Analytics Research

03

WHY MDB INVESTMENTS IN THE ICT SECTOR ARE LOW



The relatively low levels of MDB investment in the ICT sector are at odds with the sector's broadly acknowledged contribution to economic growth. The impact of ICT — and broadband connectivity in particular — on GDP growth has been detailed in many research studies; for example, one study found that a 10% increase in fixed broadband penetration could increase long term GDP levels by 0.25% to 1.38%[3]. In another study, when focusing on countries in Latin America and the Caribbean the authors found that a "10 percent rise in the market penetration of broadband services increases the GDP by 3.2 percent on average."[4]

There are a variety of factors that explain the low level of MDB investment in ICT, relative to MDB involvement in other sectors. Our research and survey have highlighted several, as outlined below.

1. For Most MDBs, Other Sectors Have Higher Priority

Our research and interviews with MDBs highlighted a broad consensus among development institutions on the vital role of ICT in achieving the Sustainable Development Goals (SDGs). In addition, our discussions also pointed to a growing acknowledgement (though no unanimity) on the notion that building digital infrastructure is increasingly becoming as vital as building traditional infrastructure (e.g., roads, dams, ports, etc.).

3 Working Together to Connect the World by 2020, a Discussion Paper by the ITU, January 2016.
4 Broadband as a Catalyst of Economic Growth and Social Progress in Latin America and the Caribbean, Inter-American Development Bank (2012).

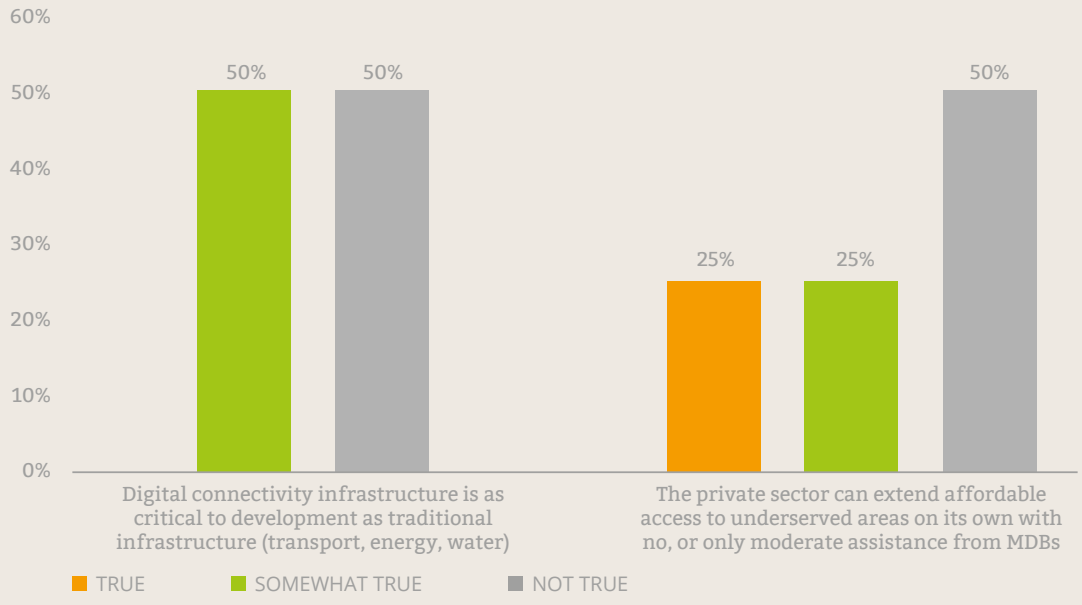
In practice, however, most MDBs do not consider the ICT sector to be a 'Top 5' priority sector to achieve their institutional goals. "ICT is not part of the core business of the Bank", one respondent noted. In effect, the ICT sector is seen as an important, but still mostly complementary sector within the context of broader MDB missions. "Our mission is really to support major infrastructure projects, and ICT does not fall into that", noted another MDB.

Nonetheless, there are signs of steady, if measured change. Most respondents noted a renewed appreciation within MDB top management of the need for the Banks to do more to support countries to develop their digital infrastructure. Turning that appreciation into action remains a slow process, however, for reasons ranging from MDB legacy structures, to a client government demand that remains focused on 'heavy' infrastructure sectors (e.g., transportation, energy, etc.). There is also a relative lack of consensus among MDBs around what the key areas of MDB intervention in the ICT sector should be.

Nearly all the MDB respondents to our survey noted that their current level of investment in the ICT sector "should be higher than it is"; the majority expected the proportion of their institution's commitments to the ICT sector to increase over the next two years — "We believe there is substantial potential for intervention beyond what we've been doing", one participant said.

Nearly all the MDB respondents to our survey noted that their current level of investment in the ICT sector "should be higher than it is".

MDB Survey Responses: In general, which of the following statements do you most agree with, as it pertains to your organisation's goals and priorities?



Source: Xalam MDB ICT Investment Survey, 2017

2. For Client Governments, Other Sectors Have Higher Priority

Additional factors impacting MDB investments in the ICT sector include the traditional structure of MDB project pipelines and stakeholder relationships. For most development banks, the primary relationship with client governments runs through the Ministry of Finance. The Ministry of Finance makes the loan commitments on behalf of the country, and also helps set the country's economic and investment priorities together with the sourcing of the funding required. By virtue of its role, it typically carries more weight than most other government departments. While MDB sector teams deal primarily with their corresponding ministries, the institutional relationship of the MDB is with the Ministry of Finance, even more so with respect to project capital allocation. "The Ministry of Finance is the gatekeeper", one MDB noted.

MDBs typically find that client governments do not consider the ICT sector a priority sector when it comes to raising funds from international institutions. This may seem at odds with most public pronouncements. Around the world, governments continue to stress the need to build digital infrastructure as a critical component of future, sustainable economic growth. Likewise, there is broad consensus around the need for a more inclusive digital economy, with access to connectivity extended to unconnected and rural areas.

In practice, however, governments consider investment in ICT infrastructure to be a predominantly private sector activity. As such, the sector is not a key priority with respect to public capital allocation. This broad stance creates material challenges for MDBs' own ICT initiatives. "Our action is driven by demand", one MDB remarked; "it is difficult for the Bank to prioritise a sector that the government itself does not prioritise." Indeed, MDBs' strategies and structure are largely geared to address the needs of client governments, and their effectiveness is highly impacted by the effectiveness of client governments in taking MDB assistance. If a client government does not prioritise ICT, it becomes extremely difficult for the MDB to do so. It is notable, therefore, that the MDB with the highest proportion of capital commitments allocated to the ICT sector is the IFC, which can engage directly with the private sector.

Another challenge for MDBs is that project advocacy activity is traditionally targeted toward the corresponding Ministry overseeing the sector. This is understandably vital — an ICT project will typically not go through if the Ministry of ICT does not want it to — but it also highlights the need for more intense advocacy efforts directed specifically at Ministries of Finance. "We have spent too much time preaching to the converted", one MDB noted. "You need to convince the Ministries of Finance of the importance of prioritising ICT projects" another mentioned, adding that "this is a big, big challenge". `

3. A Strong Perception that Building ICT Infrastructure is a Private Sector Activity

The nature of an ICT industry that has traditionally been powered by private capital also impacts MDB perception of and approach to the sector. The transformational growth of the ICT sector over the past two decades and the dramatic leaps in global connectivity have taken place largely — though not solely — on the back of market-driven forces and private sector investment.

This has cemented the perception (and admittedly, reality) of ICT infrastructure investment as a private sector activity. For governments, the availability of private capital has helped establish a stance of eschewing public capital for ICT infrastructure initiatives, except in a few targeted, specific cases. Even as they acknowledge the need to build and expand their digital infrastructure, governments have gradually de-prioritised public investment in the ICT sector, putting the emphasis on attracting private capital — a stance that has underpinned the place of ICT in their relationship with MDBs.

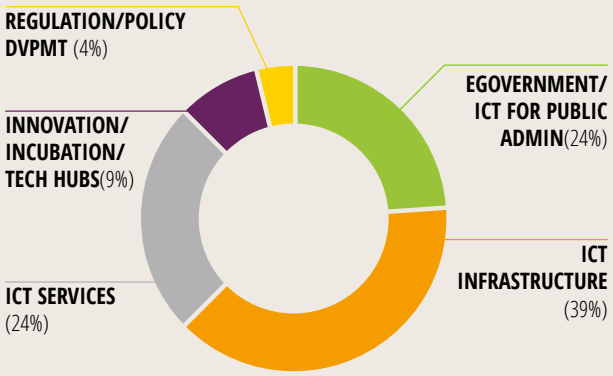
The market-driven nature of the ICT sector has similarly had a fundamental influence on MDBs' own strategies for the sector. 75% of MDB respondents in our survey agreed with the statement that "ICT sector capital requirements are adequately covered by the private sources of capital". This perception, in turn, has spurred a strong preference for focusing MDB efforts and capital toward creating the enabling environments that attract private capital to drive ICT service penetration.

In addition, the weight of the private sector in the ICT

space has reinforced an MDB reluctance to crowd out private capital, along with more emphasis on targeting MDB capital primarily towards policy and regulation support projects, or perceived areas of market failure.

This pattern is reflected in the general profile of MDB projects. Of the nearly 155 identified ICT projects undertaken by MDBs in our project sample between January 2012 and December 2016, only around 40% have been pure infrastructure projects; excluding IFC investments, that proportion falls to around 38%.

Multilateral Development Banks' ICT Projects by Type, 2012-2016 *



*Based on a sample of 155 identified ICT projects approved by 9 global and regional MDBs between January 2012 and December 2016; based on primary focus of the project; some projects may overlap categories; segment categories based on Xalam Analytics definition.
Sources: MDBs' operations datasets; Xalam Analytics Research

One implication of the private sector-focused approach to ICT has been what one MDB respondent called a "middle class-centric" view of ICT markets, whereby capital investments, following the lead of the private sector, are primarily focused on (an admittedly considerable) urban, mostly middle-class demand for a variety of ICT services and applications. This has accelerated a deepening digital divide between urban and rural areas, as capital flows freely in one case, and is highly constrained in the other.

The challenges of increasing access to connectivity in lower income, rural areas, combined with the private sector's general reluctance to invest in such areas are increasingly testing this hands-off approach to the ICT sector. Most MDBs are acknowledging this challenge. The perception that investing in ICT infrastructure is the role of the private sector, one respondent noted, "makes sense in urban areas, but not so much in rural areas". "Within the next two years", another remarked, "there will be a starker realisation that market forces cannot possibly provide universal access to connectivity".

There is however, limited consensus on what areas of MDB intervention need to be prioritised in order to remedy this challenge. Some MDBs favor an increase in capital spend targeted to rural areas, while others prefer to focus on developing attractive frameworks that would attract private sector capital into rural areas.

4. A Lack of Human Capacity to Pursue and Take on Larger ICT Project Pipelines

Respondents to our survey also pointed to a lack of human, institutional capacity as a critical hurdle to increased MDB investment in the ICT sector. Few MDBs have a stand-alone ICT sector unit; most MDB ICT units are small, and generally attached to a larger unit with a broader focus (e.g. infrastructure, transport, or markets). Some MDBs have no full-time ICT specialist. At a broad level, this is a consequence of the low prioritisation of ICT projects relative to other sectors; MDBs are understandably staffed to address their main priorities — and the ICT sector is not a main priority.

But the lack of institutional capacity also reinforces the cycle of low prioritisation afforded to the ICT sector. It constrains MDB ability to develop and build their ICT project pipelines, and it compels a deeper prioritisation of budgets and projects within the ICT sector, particularly given the limited capacity to adequately manage multiple large-scale projects. The lack of capacity also curtails the intensity of ICT project advocacy efforts, within the banks themselves, and with partner governments and other partner institutions.

This is largely reflected in the scale of ICT projects undertaken by MDBs. The median size of an MDB project in the ICT sector is around $20 million, slightly lower than public administration projects, and three to four times lower than project size in the transport and energy sectors.

Another factor is tied to the organisational structure of MDBs. While there is increasing interaction between sector teams, many still have a siloed approach, limiting MDB ability to maximise the cross-cutting potential of ICT. "Whenever there is a need to prioritise between digital infrastructure and building a road", one MDB respondent noted, "the decision will almost always go to building the road, with no consideration that perhaps adding some fibre would not cost all that much more."

While institutional capacity is generally expected to improve, it remains inherently tied to the broader place of ICT as a sector within MDBs. "Only after MDBs have demand at a given scale can they truly build more institutional capacity to address it", one respondent noted.

5. An Absence of Proven, Successful Frameworks for Rural Area Connectivity Projects

The lack of proven and repeatable frameworks for successful rural area connectivity projects is another constraint for MDB investment in increasing access to connectivity in underserved areas. Most MDBs engaged over the course of this research highlighted the sheer complexity of large-scale rural ICT projects, including the multiplicity of stakeholders, social, and environmental considerations, and low economic returns. "Rural projects are hard," noted one MDB respondent. "They require a high level of participation by the government, they are highly complex and they have a low success rate".

This inherent complexity fosters a built-in caution among many MDBs with respect to rural ICT projects — a pattern compounded by the reluctance of the private sector to participate, the lack of MDB human capacity, and an absence of clear, repeatable frameworks. "MDBs are very conservative", noted one respondent. "They are comfortable with what they are used to doing. So, you need to develop a model that works in rural areas, and that MDBs can reasonably bolt onto their own approaches"

04

ASSESSING THE INVESTMENT GAP TO ACHIEVING UNIVERSAL ACCESS TO CONNECTIVITY

While there is an emerging consensus on the need for MDBs to increase their spending on and overall participation in the ICT sector in order to achieve universal access, there is less agreement around the scale of such an increase, or what form it should take. Also largely undefined is exactly how much capital would be required to achieve the global goal of access for all, as well as the associated investment gap (based on current capital investment levels), and the approximate contributions to this gap from various sets of stakeholders (private sector, governments and MDBs)

A number of studies have started to address some of the above questions. In 2016, the ITU estimated the cost of connecting 1.5 billion unconnected by 2020 at around $450 billion.[5] In 2017, an assessment by the World Economic Forum (WEF) estimated that it would cost around $6.3 billion to extend internet access to more than 95% of the population in East Africa's Northern Corridor (Kenya, Uganda, Rwanda, and South Sudan).[6]

We developed our own estimates for the purposes of this research, using the broad framework put forth by WEF, to assess overall capital requirements to achieve universal access and, as a corollary, the implications for MDB commitments in the ICT sector. Our assessment covers a sample of 50 low- and middle-income countries around the world, based on the 50 largest recipients of MDB investments in ICT (or MDB total project commitments) over the past three years.

For this analysis, we used the "Internet for All" model developed by WEF; we applied per person investment assumptions across markets, with some variations based on income and physical characteristics. We then

5 Working Together to Connect the World by 2020, a Discussion Paper by the ITU, January 2016.
6 Internet for All - An Investment Framework for Digital Adoption; A White Paper by the WEF, July 2017

matched estimated capital requirements against current levels of (mostly private sector) ICT investment, current levels of mobile broadband network coverage, and identified MDB ICT spend in each country to derive a broad assessment of the universal access capital investment gap — and the MDBs' potential contribution to filling it.

Our methodology and key assumptions are detailed in the box below.

CAPITAL REQUIREMENTS TO ACHIEVE UNIVERSAL ACCESS

Methodology Overview

- Our analysis is based on a sample of 50 primarily low- and middle-income countries. The sample countries were identified based on total cumulative MDB investments over the past three years, and MDB investments in the ICT sector in particular. A full country list is available in the Appendix.
- We estimated capital requirements to achieve universal access on a country-by-country basis, using (a) available estimates at country level, if such analysis has been conducted and can be identified, or (b) a top-level assessment based on current internet access penetration levels, along with modeling based on the WEF Internet for All model.
- We used the WEF Internet for All approach for all 50 markets — but at a top level only. We applied per person capital requirement estimates generated for East Africa's Northern corridor, with adjustments made on a market-by-market basis based on estimated cost of network rollout in each, physical characteristics, and other factors. The WEF Internet for All baseline model is available here.
- For each country, we collected data and estimates of telecoms capital expenditure on network infrastructure over the past three years, along with current levels of internet penetration and current levels of mobile broadband network coverage. This allowed us to assess the overall number of internet users that would need to be added to achieve identified penetration targets, along with the investment gap based on current levels of spend and coverage. Our model assumes that between 10% and 30% of annual network capital expenditure (capex) goes to expanding 3G (or 4G) coverage in previously uncovered areas, with the balance dedicated to existing network capacity needs.
- Further, we matched up current MDB investment in each market against requirements and current network capex levels, to generate estimates of contribution to the gap by each set of stakeholders.
- While this exercise is largely built on a country-by-country basis, a few key assumptions are still the object of some degree of extrapolation. It is therefore important to note, as was emphasised in the WEF model, that more in-depth and detailed modeling would need to take place at an individual country level to generate the best results.

CAPITAL REQUIREMENTS TO ACHIEVE UNIVERSAL ACCESS TO CONNECTIVITY

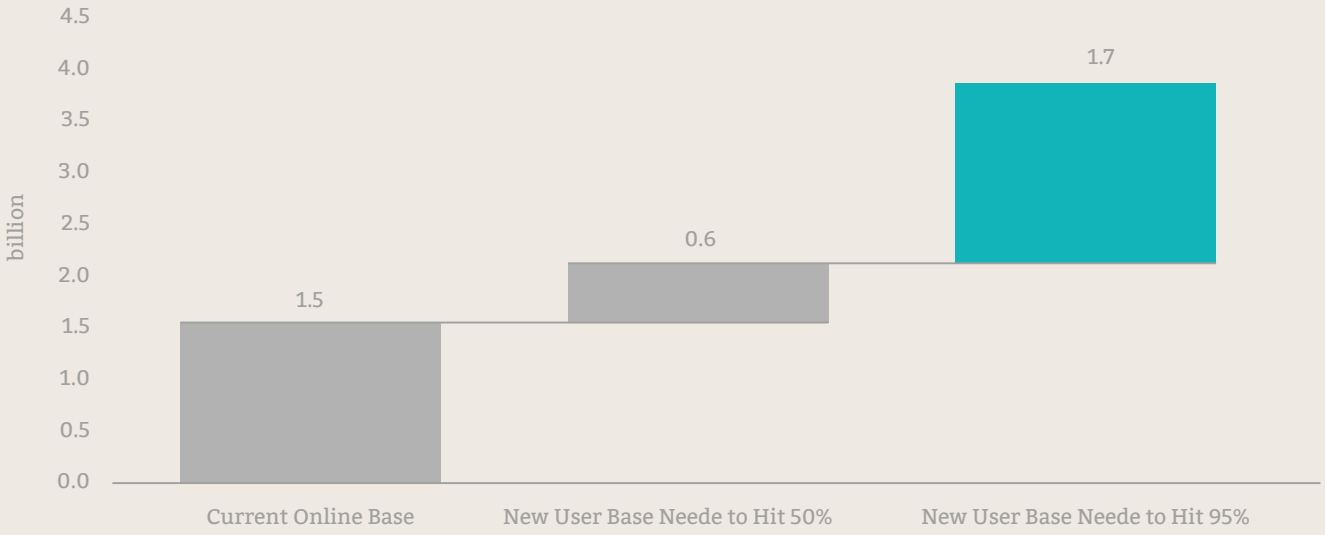
Key Modeling Assumptions

- We provide estimates of universal access based on the capital needed to achieve network coverage/reach, and the capital needed to foster adoption (excluding smartphones and data pricing — see below). We used a 95% penetration of the population as the threshold for 'universal' access and adoption.
- The Internet for All model identifies four specific areas of intervention to address the barriers to universal access: (1) infrastructure, (2) skills/awareness, (3) local content, and (4) affordability (access to smartphones and affordable data packages). Our assessment focuses on the first three interventions, as we note that capital for the fourth intervention (affordability) will be driven from the consumer side, and a function of market approaches and business models (potentially including various forms of subsidies, though those are not considered here).
- We use 3G and 4G coverage as the primary network technologies to establish access to connectivity, while recognising that other approaches exist that may potentially be more effective on a case-by-case basis.
- There are multiple definitions for internet penetration and users; for consistency purposes across countries, this analysis focuses on the number of 3G/4G connections, with no adjustment for multi-SIM ownership.
- Our assessment is policy neutral; as noted by the WEF model, however, the optimal policy approaches (e.g. on spectrum or infrastructure sharing) can considerably reduce capital requirements, perhaps making the difference between a sustainable business case and a continued lack of investment.
- We applied a ten-year target horizon to achieving universal access; for indicative purposes, we also provide capital requirement estimates for achieving 50% internet access penetration over a three-year horizon.
- Our model assumes constant population; for the purposes of gap estimation, the model also assumes that operator CapEx and MDB commitment levels are constant (based on an average of the past three years).

The challenge of achieving the global goal of universal internet access is considerable. Under the estimates generated for this analysis, low- and middle-income countries would need to bring around 2.3 billion new users online over the next 10 years in order to hit a 95% penetration rate, up from around 40% in 2017 (based on the number of active mobile broadband connections). The total cumulative capital investment required to hit universal access levels would be around $160 billion (excluding smartphone/device costs), 70% of which would be dedicated to infrastructure build-out.

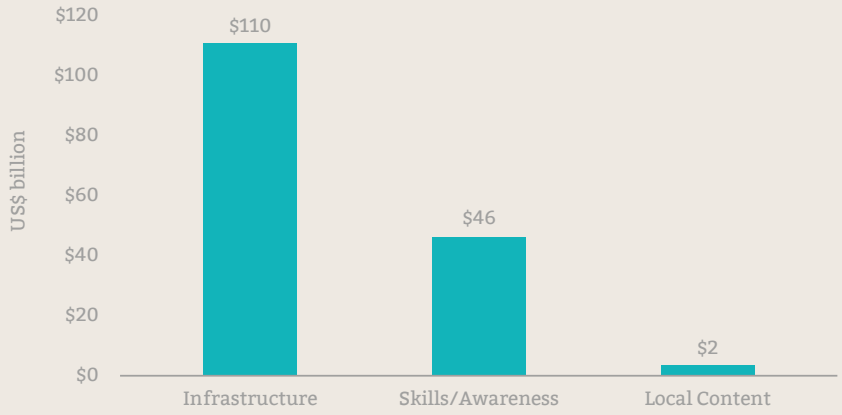
But this is more than a mere challenge around network infrastructure coverage or reach. The median 3G network coverage of the population in our country sample was 80%, as of mid-2017. Within the next two to three years, the population in most markets will be within reasonable reach of at least a mobile 3G signal. Additional capital will be needed to shore up capacity, build skills and awareness, ramp up local content capacity, and critically, drive data service affordability.

Number of Users that Need to be Brought Online to Achieve Universal Internet Access in Low- and Middle-Income Countries



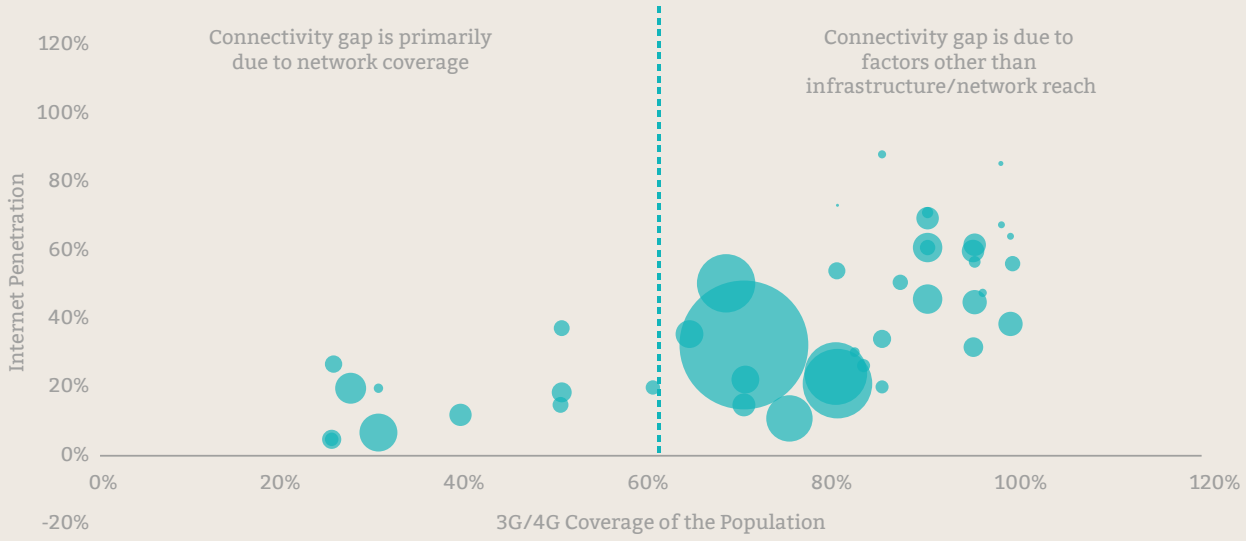
*Based on a sample of 50 low and middle-income economies; low/middle-income based on World Bank definition; for consistency purposes, we use the number of 3G/4G connections as a proxy for calculating internet penetration; our internet user estimates may therefore vary materially from some country reports.Sources: Xalam Analytics Estimates

Investments Required to Reach Universal Access to Connectivity in Low- and Middle-Income Countries



*Universal access defined as 95% internet subscription penetration of the population; Based on a sample of 50 low and middle-income economies, using World Bank definition; requirements excluding smartphone costs; projections are policy-neutral; Source: Xalam Analytics Estimates

3G/4G Coverage vs. Internet Penetration in Low- and Middle-Income Countries

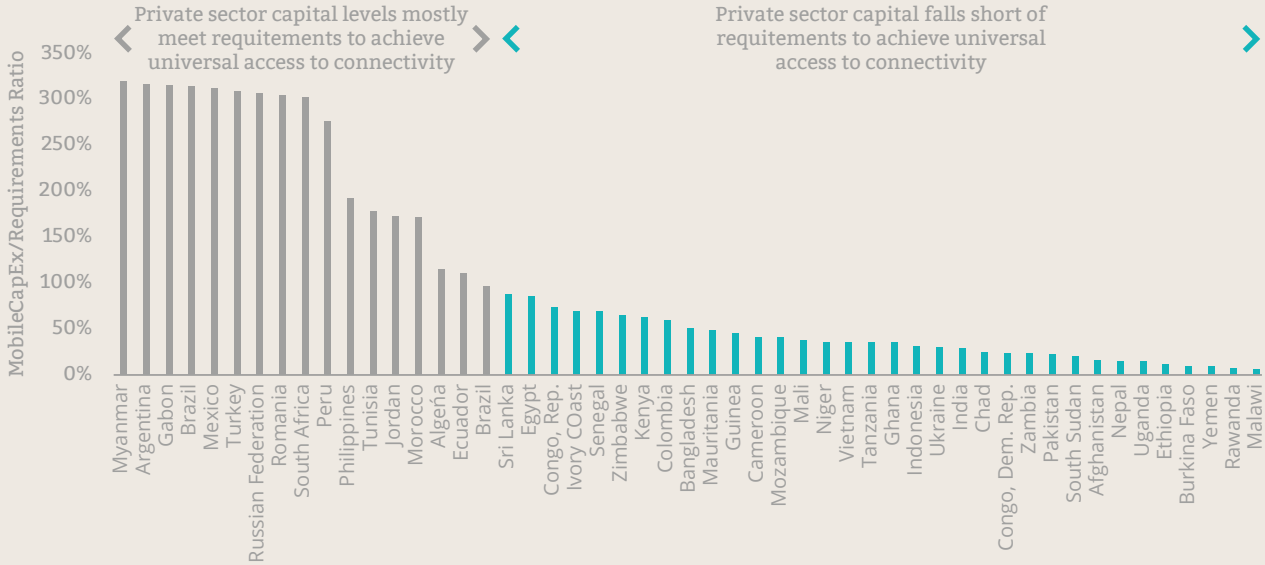


*Based on a sample of 50 low and middle-income economies, bubble size indicates size of capital requirements to achieve universal access to connectivity; Sources: Coverage data from operators, regulators, GSMA; Xalam Analytics Estimates

The assessment of capital requirements against the prism of current investment levels provides a sharper view of the investment gap that would need to be closed to achieve universal access targets. Our analysis suggests that in about 20 low- and middle-income countries, current levels of private capital are high enough to be the predominant source of capital in achieving universal access, assuming stable levels of expenditure dedicated to network expansion (from 2015-17 levels). In these markets, government and MDB contributions can remain targeted at ensuring an enabling policy and regulatory environment for the private sector, fostering ICT use, capacity building, and deploying intermittent, gap-filling infrastructure investments in specific, identified areas.

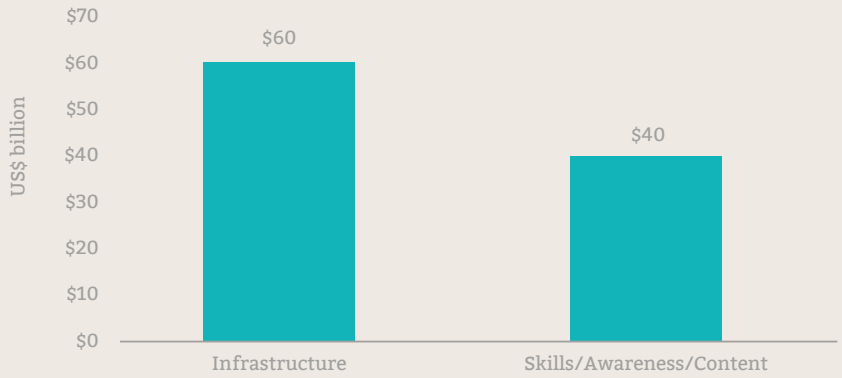
For most other markets, however, additional intervention may be indispensable. At current levels, we estimate that private sector capital would fall considerably short of requirements to achieve universal access. For these markets, we estimate the cumulative gap to achieving a 95% internet penetration at around $100 billion globally over the next 10 years — or around $10 billion a year that would need to be added to capital expenditure budgets. Around 60% of this gap would be tied to the need for expanded infrastructure deployments, with the balance going to interventions designed to foster adoption and usage, around skills building, awareness, and local content. While we did not include smartphone and overall affordability actions to our estimates (see methodology), we note that an intervention around smartphone affordability would add another $4 billion to $5 billion a year to these gap estimates.

Private Sector Investments as a % of Estimated Capital Requirements to Achieve Universal Access to Connectivit



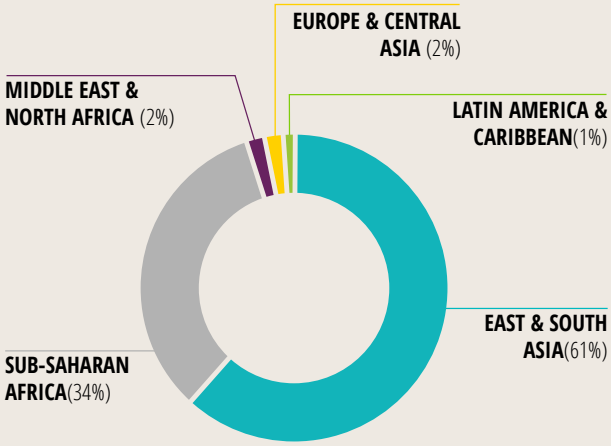
*Based on a sample of 50 low- and middle-income economies; country mobile capital expenditure is used as the primary proxy for private sector capital investment; it is important to note that a ratio above 100% does not mean that non-private capital is not needed; rather, it suggests that the combination of operator capex levels, current network coverage and current internet penetration could reasonably be expected to cover a large proportion of capital requirements to achieve universal access to connectivity. In such cases, government and MDB interventions can be more on a smaller scale, and more targeted. Sources: Operator, regulator data; Xalam Analytics Estimates

Cumulative Capital Investment Gaps to Achieve Universal Access Universal Access to Connectivity



* Universal access defined as 95% internet subscription penetration of the population; based on a sample of 50 low- and middle-income economies; gap assumes no change in current private sector CapEx levels; requirements excluding smartphone costs. Assuming a 10-year period to achieve universal access to connectivity.Source: Xalam Analytics Estimates

Distribution of Annual Capital Investment Gaps to Achieve Universal Access (by region)



*Gap assumes no change in current private sector capex levels; requirements excluding smartphone costs. Source: Xalam Analytics Estimates

Our analysis further suggests that the investment gap is highest in Southeast Asia (India alone accounts for around 40% of the overall shortfall) and Sub-Saharan Africa. Together, these two regions account for around 90% of the investment gap that needs to be closed to achieve universal internet access.

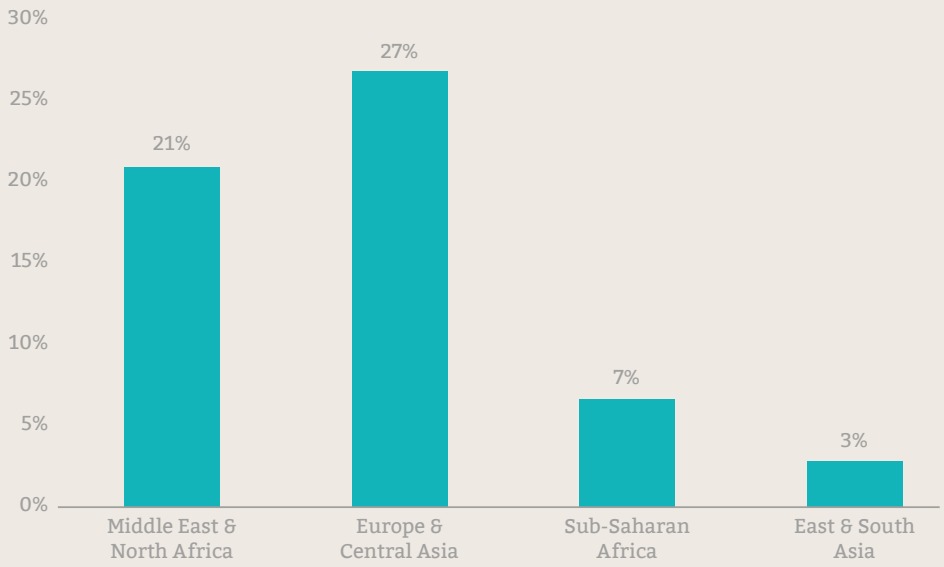
Our analysis also highlights critical challenges with respect to key sources of funding to close the investment gap:

- Telecoms operators (and the broader private sector) would have to increase their average annual network expansion spend by around 15% to 20% in order to fill the infrastructure portion of the investment gap (~$6 billion annually). At a time when most operators are looking to cut back on capital expenditure or are concentrating capital spend on high-traffic urban areas, they would likely need strong incentives to go deeper into rural areas.

- An assessment of MDB spending in ICT by region suggests that with current levels of commitment, MDBs can make a strong contribution to closing the investment gap in the MENA and Europe/Central Asia regions.

- An assessment of MDB spending in ICT by region suggests that with current levels of commitment, MDBs can make a strong contribution to closing the investment gap in the MENA and Europe/Central Asia regions.
- By contrast, MDBs' current commitments to the ICT sector in Southeast Asia and sub-Saharan Africa represent only 3% and 7%, respectively, of the estimated annual investment gap. In those two regions, substantial efforts would be needed from all stakeholders beyond their current commitment levels to close the considerable shortfall in capital needed to connect all.
- And finally, while our estimates are largely policy-neutral, it must be emphasised that the biggest contributions to closing the investment gap may yet come from the actioning of critical policy levers, notably with respect to network infrastructure sharing, spectrum, taxes, and other measures that would increase the viability of rural area ICT projects. As was noted by WEF in their 'Internet for All' White Paper, governments can help reduce the per person cost of bringing new users online by as much as 50% over the long term; this is perhaps the most significant contribution that could be made to reduce the investment gap in achieving universal access.

Average Annual MDB Investments in the ICT Sector as % of the Capital Investment Gap to Achieve Universal Access (by region)



*Gap assumes no change in current private sector capex levels; MDB annual investment based on annual average over the 2012-16 period; Source: Xalam Analytics Estimates

05

RECOMMENDATIONS

Recommendation 1:

Change the ICT narrative within and outside of MDBs

Digital technologies are a key enabler of achievement of the SDGs; in spite of this, as our research has shown, the ICT sector does not rank as a priority sector in the MDB capital/budget allocation process. A set of actions would therefore be necessary to explicitly reinforce the central position of ICT in the achievement of SDGs. This will require extensive support and buy-in from the executive leadership of each MDB and includes the following:

1. Remind and impress upon all stakeholders the strong link between digital access and the SDGs. This will include making the case that increased investment in digital infrastructure and services is necessary for the realisation of the SDGs. In this vein, studies that show a correlation between poverty and 'digital poverty' (or alternatively, a link between poverty reduction and digital poverty reduction) can be consistently highlighted.

2. Leverage the breadth of presence of MDBs to drive a cross-sector digital agenda. MDBs can take a lead role in expanding the adoption of digital development goals across sectors — internally (within the MDBs themselves) and externally (between MDBs, their client governments and other development finance stakeholders). MDBs have strong credibility within the broader development finance community. If they consistently reinforce — through their own internal structures, messages, actions and budget prioritisation — the link between the poverty reduction and the reduction of 'digital

poverty', the impact on the prioritisation of the ICT sector could be far-reaching.

3. Make digital access/usage an inherent part of MDB project assessment, or an integral part of MDB project sustainability. Under such a framework, a connectivity/ICT factor could be integrated as part of project assessment and due diligence. This ICT impact assessment could be automatic for projects in a number of key sectors (e.g. transportation or health), or projects of a given size (e.g. >$100 million). The assessment would determine whether connectivity infrastructure/ICT service usage/local content can be integrated into the project without material impact on overall project cost. A framework would need to be developed to establish what constitutes an acceptable threshold of investment to integrate ICT into the project (5% of project value? 10%?), and what type of ICT contribution would be most beneficial.

4. Evolve the broader terminology used in order to better capture the role of ICTs in the context of the SDGs. As such, one would not talk of 'increasing investment in ICT', but of 'reducing digital poverty', expanding digital infrastructure, access to digital skills, or access and usage of digital infrastructure and services.

Recommendation 2:

Develop innovative financing solutions for rural area projects

Improving connectivity in rural areas is a highly complex, multi-faceted challenge, which includes a lack of last-mile solutions. Capital requirements are considerable; rural area projects have extra layers of complexity tied to economics, government participation and physical conditions; private sector stakeholders are typically reluctant to invest; dedicated rural area players face substantial hurdles in raising capital. All these challenges suggest that traditional approaches to financing infrastructure, skills and content development projects have shown their limits in rural areas. This in turn calls for new, more suitable approaches to conceptualizing and financing rural area projects, including new financing and implementation models, fresh approaches to private sector incentivization, measures of success, etc. Specifically, we suggest the following:

1. Create funding mechanisms that are more suitable for rural area projects. One possible avenue is a rural digital development fund, an "IFC for rural area projects", which would have the core mandate of investing in ICT rural area projects, or projects that increase digital inclusion in unconnected or underserved areas. Additional features of such a mechanism can include:

a The fund would operate as a typical private fund, driven by MDBs and running independently from but a complement to traditional universal service and access funds;

b The fund would operate under a set of parameters optimized for the reality and challenges of rural area projects; while it would still be expected to generate returns, such return expectations would be aligned with rural area project economics.

c The fund would finance all types of providers (from established mobile operators to innovative community networks), so long as the projects meet an established set of conditions related to connecting the unconnected including where relevant targets for women's access and use;

d A key role of the fund would be to optimize PPPs for rural area projects, coalescing resources and participation from governments, the private sector, the community and MDBs; this is a monumental task, one perhaps best addressed by a dedicated, relatively independent entity.

2. Increase the amount of financing allocated to smaller, often transitional projects. The inherent challenges of implementing digital inclusion projects in rural areas mean that, by nature, rural area projects can be extremely daunting. Indeed, the scale of the challenge is itself a deterrent for many service providers and investors. A possible pathway to address this challenge would be to increase the

financing allocated to smaller-scale projects, in effect going for a series of small, but highly impactful wins. This would have several benefits:

a Increased ease of implementation and higher chances of success;

b Testing and adapting models to the nature and characteristics of the community; for example, public access models could get more consideration as appropriate;

c Lower upfront capital commitments (though human capacity requirements for could potentially be higher);

d The success of smaller-scale networks could offer a demand foundation for larger-scale rural initiatives, through a more frequent and robust research of usage patterns, economic impacts, expanded user awareness of ICT services and their potential benefits;

- Smaller scale projects would expand the base of learning for rural digital inclusion projects, in turn providing a foundation for developing successful, adaptable and repeatable frameworks.

3. Optimise the use of government incentives to attract private capital and improve the rural project business case. The utilisation of tax incentives can be a key component in reducing the overall cost of investing in rural areas. Governments routinely use tax incentives (tax credits, tax holidays, etc.) to attract private investments in targeted economic sectors or geographic zones. Similar mechanisms can be integrated into rural area project frameworks, and tied to a variety of network deployment (e.g. number of villages covered) or digital services utilisation targets. In addition, tax incentives (a public budget expense) can be positioned as the government's contribution within a broader public-private partnership-based project framework

Recommendation 3:

Increase investments in the development of enabling policy frameworks

Our research highlighted two key findings with respect to policies to foster digital inclusion in low- and middle-income economies: (1) the proportion of MDB ICT commitments dedicated to regulation and policy is low, at around 5%; and (2) the use of adequate policy levers can be a significant contributor to closing the capital requirement gap for investing in rural areas. Closing the digital divide is therefore as much a matter of policy as it is a matter of capital. Furthermore, many low- and middle- income countries have seen ICT policy and regulation fall behind the frenetic pace of change in technology, market structure, and business models. As a result, ICT policy frameworks are often outdated, lack the flexibility needed to adequately address rural area challenges, and represent a significant constraint for private sector participants.

We therefore strongly recommend:

1. A renewed effort to increase capital commitments to MDB ICT policy/regulatory projects, so as to: (1) adapt frameworks to technology and market evolution; and (2) make them flexible enough to allow for different implementation approaches in rural areas. Policy interventions would thus be leveraged to help reduce the upfront and recurring costs of rural area service provision, along with building ICT skills and encouraging efforts to increase awareness of ICT applications.

2. Assess and learn from areas of policy failure to inform the development of new enabling frameworks;

3. The urgency of action and the nature of the adequate policy measures will vary with each country's context; nonetheless, a number of critical areas call for particular attention:

a Infrastructure sharing policies and open access models, notably for (but not limited to) fibre backbones and other means of transmission capacity;

b Appropriate spectrum flexibility, to allow the use of licensed and unlicensed spectrum in targeted instances;

c More efficient taxation, as part of incentives to attract private capital into underserved areas.

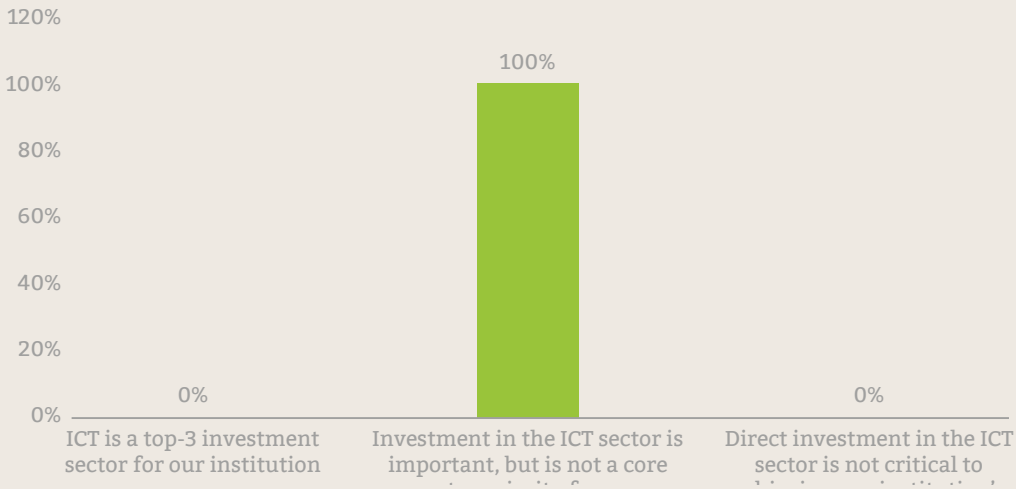
Appendix

Appendix A — List of Countries in Investment Requirements Modelling Sample

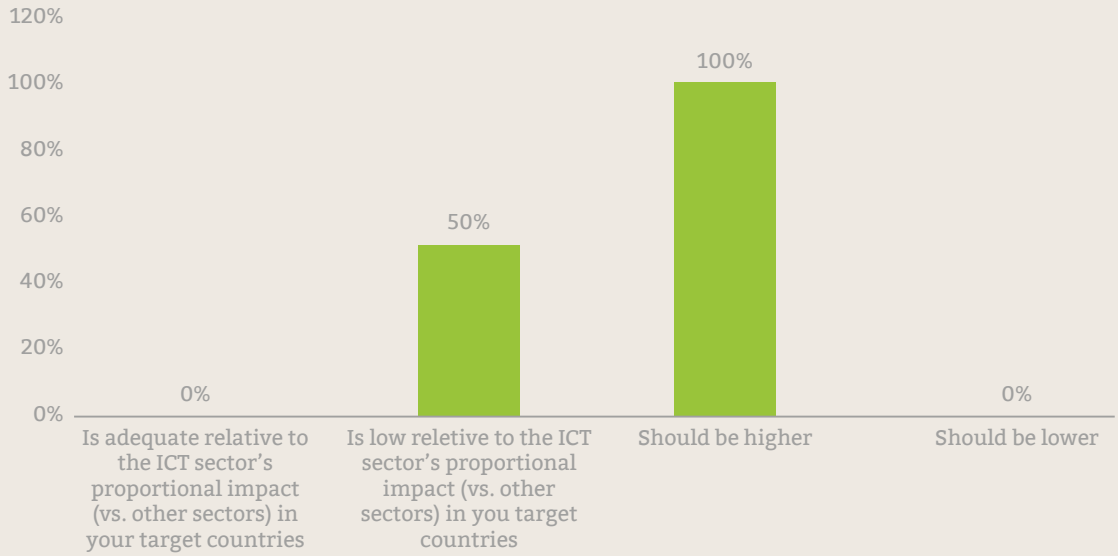
SUB-SAHARAN AFRICA	SOUTH EAST ASIA	EUROPE & CENTRAL ASIA	LATIN AMERICA	MIDDLE EAST & NORTH AFRICA
GHANA	INDIA	RUSSIAN FEDERATION	ARGENTINA	TUNISIA
GABON	BANGLADESH	TURKEY	BRAZIL	EGYPT
CHAD	MYANMAR	ROMANIA	ECUADOR	MOROCCO
MALAWI	INDONESIA	UKRAINE	MEXICO	JORDAN
CONGO, DEM. REP	SRI LANKA		PERU	ALGERIA
SENEGAL	VIETNAM		COLOMBIA	YEMEN
CONGO, REP.	PAKISTAN			
NIGERIA	PHILIPPINES			
NIGER	NEPAL			
CAMEROON	AFGHANISTAN			
KENYA				
UGANDA				
BURKINA FASO				
MAURITANIA				
ETHIOPIA				
TANZANIA				
MOZAMBIQUE				
MALI				
GUINEA				
SOUTH AFRICA				
IVORY COAST				
ZAMBIA				
RWANDA				
ZIMBABWE				
SOUTH SUDAN				

Appendix B — Sample MDB Survey Results

How critical is investment in the ICT sector for your institution, in light of your core goals and strategies?

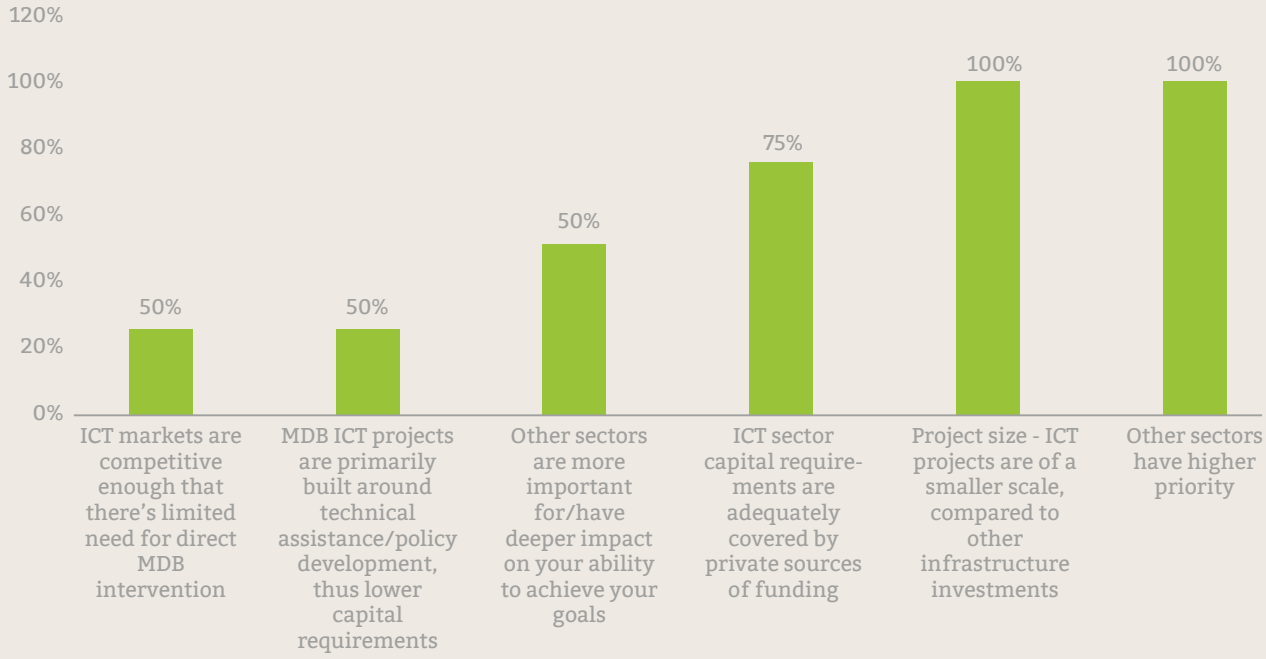


In your opinion, the proportion of your institution's annual investments (including loans, grants, equity) that is allocated to ICT*:



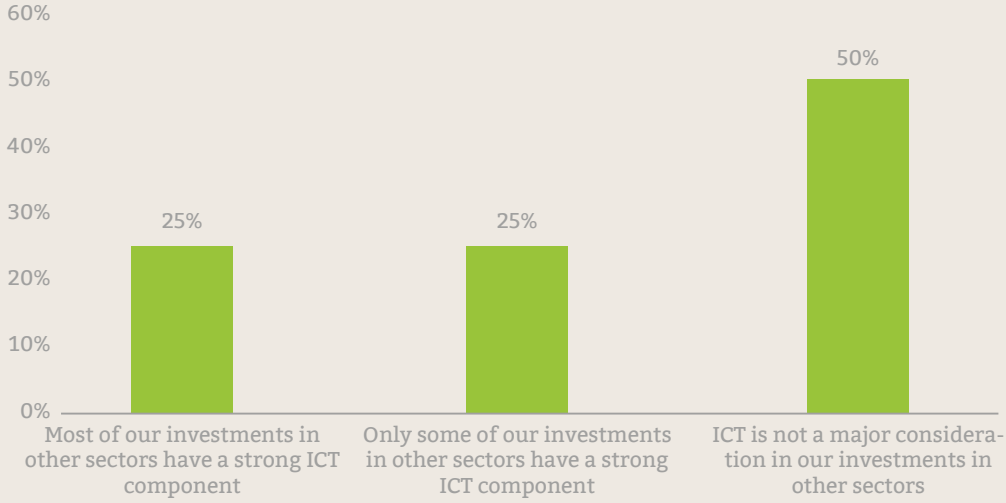
*Aggregate can be higher than 100%; respondents could pick more than one answer.

Our preliminary analysis indicates that the ICT sector generally accounts for less than 3% of annual investment commitments by Multilateral Development Banks (MDBs). To what would you attribute this low contribution? (Please select 1 to no more than 5 factors).

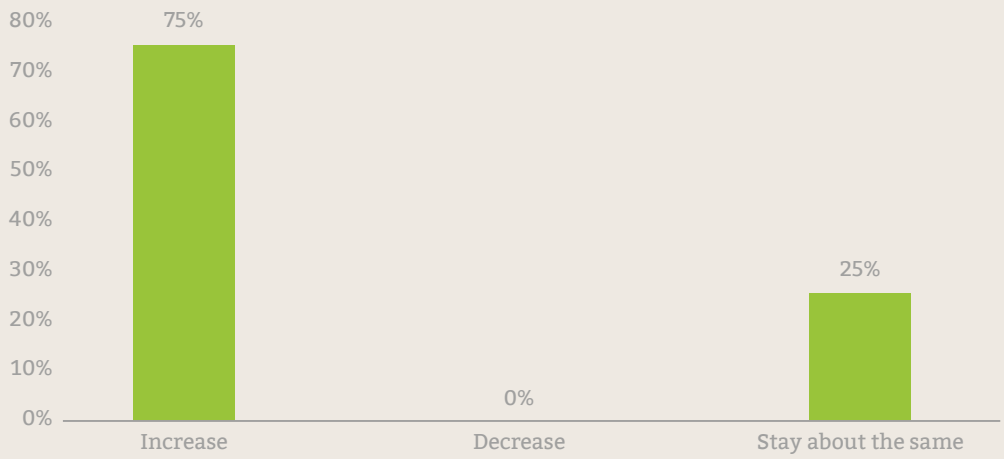


*Aggregate can be higher than 100%; respondents could pick more than one answer.

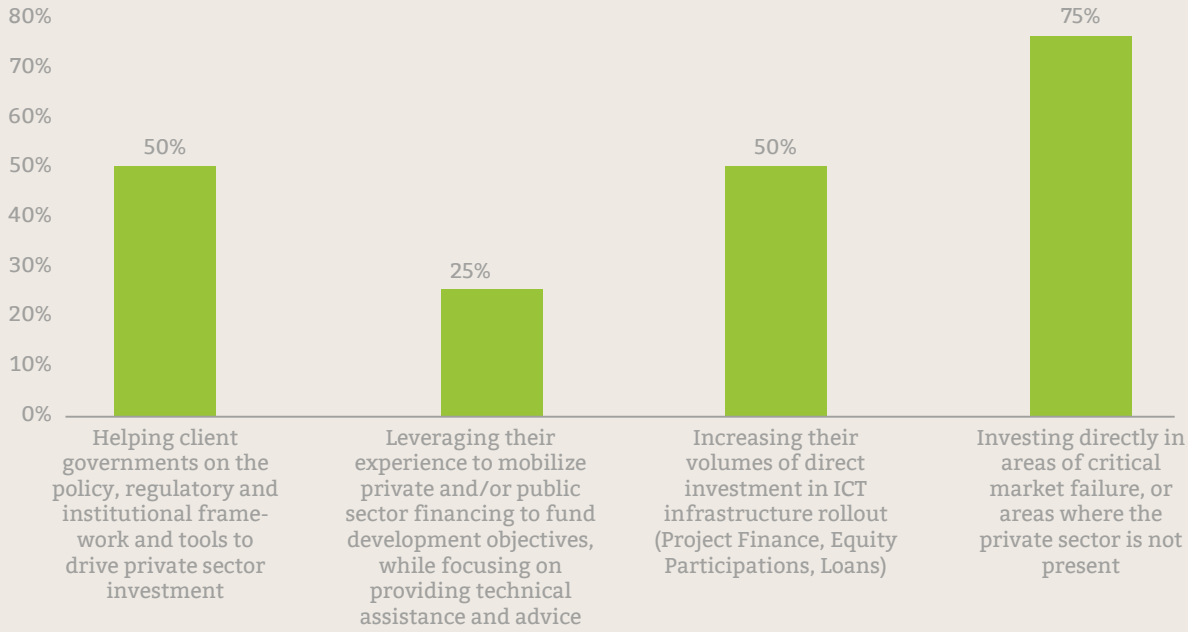
To what extent is ICT integrated in your institution's investments in other sectors?



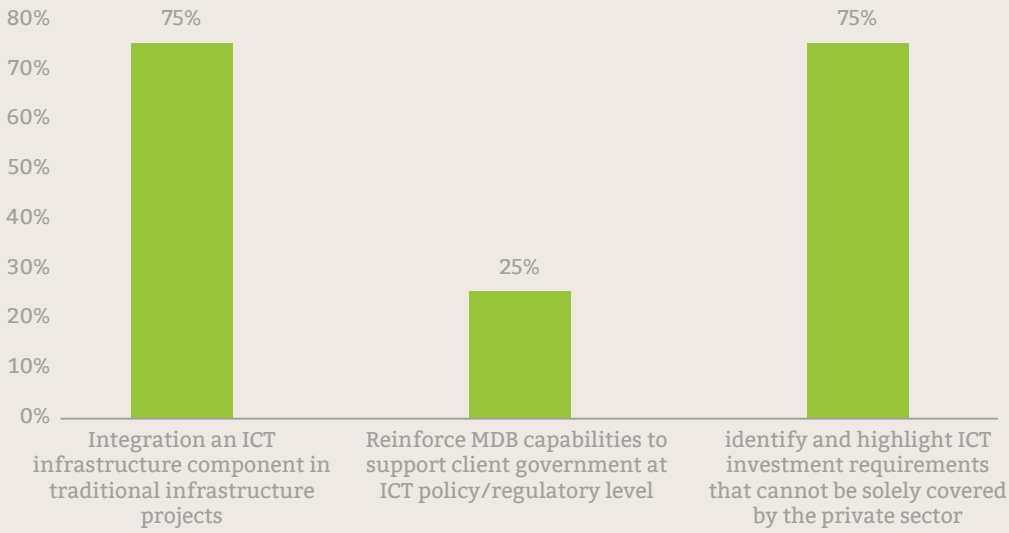
In the next two years, you expect the proportion (%) of your institution's investments that is allocated to the ICT sector to:



To achieve the highest impact on extending affordable access to internet connectivity, MDBs should concentrate their action, as a priority, on (please select no more than 2 answers):



What type of steps/actions can be taken to increase ICT share of MDB infrastructure investments and/or the impact of MDB commitments in the ICT sector?



*Aggregate can be higher than 100%; respondents could pick more than one answer.

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