



2017 ICT Backbone Sector

Private Participation
in Infrastructure (PPI)



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Acknowledgement & Disclaimer

This report was written by a team comprising Deblina Saha (Task Team Leader), Alex Shao and Iuliia Zemlytska, with copy editing by Luba Vangelova and design by Victoria Adams-Kotsch. The team is very grateful for the support and guidance received from Jordan Schwartz (Director, IPG Group), Abha Joshi-Ghani (Senior Adviser, IPG Group) and Towfiqua Hoque (Head of Infrastructure Finance and PPPs, Singapore). The team is thankful to Darwin Marcelo (Senior Infrastructure Economist, IPG Group) and Natasha Beschorner (Senior ICT Policy Specialist, Transport & Digital Development) for providing valuable comments which helped shape the report. Cover photo © pixelfusion3d / istock-photo.

This report describes Private Participation in Infrastructure (PPI) as indicated in the [Private Participation in Infrastructure Database](#). The database records investment information for infrastructure projects in low- and middle-income countries globally.

The PPI Database represents the best efforts of a research team to compile publicly available information, and should not be seen as a fully comprehensive resource. Some projects—particularly those involving local and small-scale operators—tend to be omitted because they are usually not reported by major news sources, databases, government websites, and other sources used by the PPI Projects database staff.

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2017 ICT- Backbone Highlights

- **Considerably higher investment in ICT-backbone¹** in 2017. In 2017, PPI investment in ICT-backbone projects reached US\$3.0 billion across six projects. This is six times the 2016 investment level of US\$462 million and twice the previous 10-year average of US\$1.3 billion. The PPI investment commitment in the ICT-backbone sector in 2017 accounted for 3.2 percent of the total PPI investment, compared to 1.3 percent over the past 10 years.
- **East Asia and Pacific (EAP) and Latin America and Caribbean (LAC) were the only regions to receive investments** in 2017 at US\$2.1 billion and US\$946 million respectively. Historically, regional investments in the ICT sector have been unevenly distributed, with Sub-Saharan Africa (SSA) receiving the largest amount of PPI investment in the ICT sector over the last 10 years, while in the same period only one ICT-backbone project was recorded in South Asia- where either purely private or purely government investments are prevalent.
- In 2017, only one project, the share-border project in Samoa and Fiji, received government support. Overall, seven of the 37 ICT projects received government support in the past 10 years.
- Divestiture projects were once dominant in the ICT sector, contributing 60 percent of annual investments. However, only one divestiture project has been recorded since 2012.
- Countries that received investment in fiber-optic cable and network infrastructure development projects have witnessed varying degrees of improvement in terms of mobile Internet penetration rate and number of mobile cellular subscribers.

¹ The report is based on ICT-backbone infrastructure (such as fiber-optic cables (land-based/submarine cables), mobile towers, base stations and other hard assets) with an active government component, whereby the government is involved by way of being a contracting authority (i.e., a party to a concession agreement) or the full or part-owner of the assets. It doesn't include purely private or merchant type private sector involvements in the ICT sector where the role of the government is only limited to licensing.

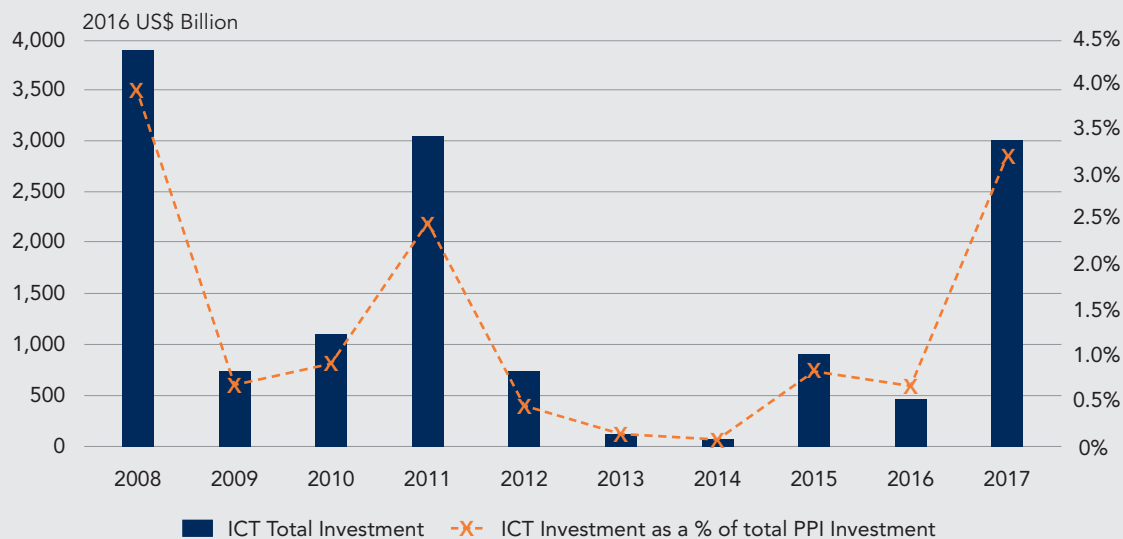
1. Overview

Starting in 2017, PPI investment² has been reported for ICT-backbone infrastructure (such as fiber-optic cables (land-based/submarine cables), mobile towers, base stations and other hard assets) with an active government component, whereby the government is involved by way of being a contracting authority (i.e., a party to a concession agreement) or the full or part-owner of the assets. Information was also back-filled for the previous 10 years based on the new methodology, therefore this note covers a 10-year period. Tracking private investment in this sector will be increasingly important due to the critical role that ICT plays in development. With some seven billion mobile connections and 60-percent coverage of 3G networks worldwide, the ICT sector is critical for disruptive innovation and for leapfrogging development and enhancing the impact of the fourth Industrial Revolution.

In 2017, private investment in ICT amounted to US\$3.0 billion across six projects (including one cross-border project). This marked a significant increase over the investment level of US\$462 million in 2016, as well as the previous 10-year average (2007-2016) of US\$1.3 billion. The 3.2-percent share of ICT in global PPI investment in 2017 marked the second highest share of the last 10 years, after the four-percent share in 2008 (Figure 1). However, the ICT sector only accounted for an average of 1.3 percent of global PPI investment over the last 10 years. Overall, there were 37 ICT-backbone projects recorded since 2008, totaling US\$14.1 billion.

FIGURE 1

Investment Commitments in ICT-Backbone Projects with Private Participation in Emerging Market and Developing Economies (EMDEs), 2008–2017



Source: PPI Database, World Bank, as of April 2018

² “Investment” refers to private investment commitments at the time of financial closure in projects serving the public in low- and middle-income countries.

Of six projects in 2017, two fell into the category of mobile-network infrastructure development. The remaining projects were submarine/land fiber-optic cable-installation projects. The two network-development projects, namely the US\$1.5 billion 4G-network-development project in Myanmar and the US\$946 million national-mobile-network development project in Mexico, contributed more than 80 percent of the total ICT investment.

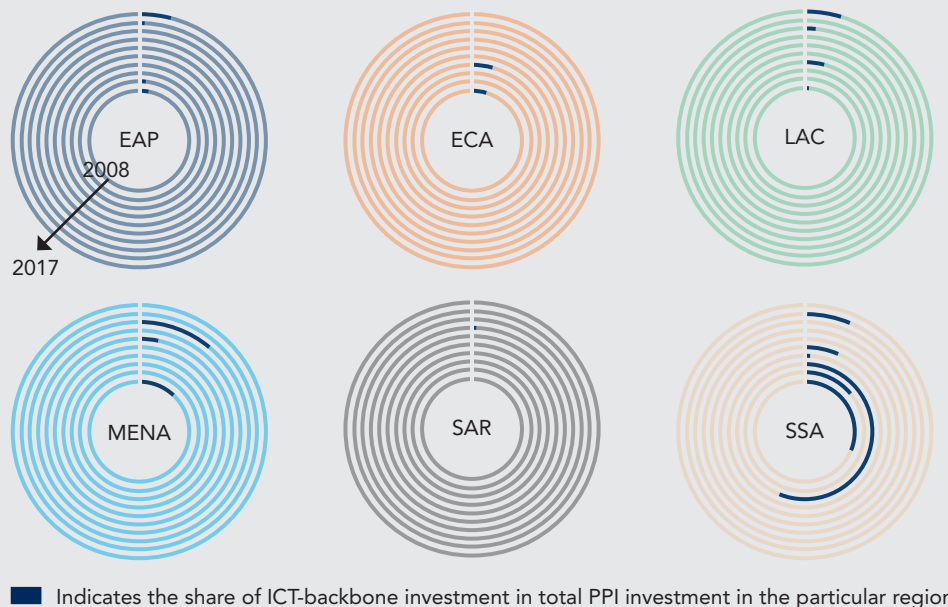
The average project size in 2017 (US\$500 million) was almost five times higher than in 2016, because all the projects in 2016 were cable-installation projects, which are typically smaller than network-development projects. However, the average project size in the previous ten-year period was US\$381 million.

2. Regional Trends

In 2017, only two regions (EAP and LAC) received PPI investment in the ICT-backbone sector. In EAP, the US\$2.1 billion of PPI investment in ICT represented four percent of the overall regional PPI investment in 2017. LAC saw US\$946 million worth of investment in 2017, which was significantly higher than the regional 10-year average of US\$270 million (including seven years of no investment in the ICT-backbone sector).

FIGURE 2

Annual Investment Commitments in ICT-Backbone Projects as a share of Regional Total Investment with Private Participation in EMDEs, 2008–2017



The annual PPI investments in ICT-backbone projects have been distributed unevenly both within and across regions over the past ten years (Figure 2). For example, the 2017 regional leader, EAP, had two projects from 2008 to 2009, followed by six years of inactivity, and then another project in 2016. Sub-Saharan Africa (SSA) is the region that attracted the highest proportion of investment in the ICT

sector—an average of 20 percent over six years with ICT investments. Though SSA did not receive any ICT-backbone investment in 2017, it is still showing the most consistent ICT-backbone investment trend. In 2010, three divestiture programs, worth a total of US\$1.1 billion, accounted for 56 percent of the total regional PPI investment.

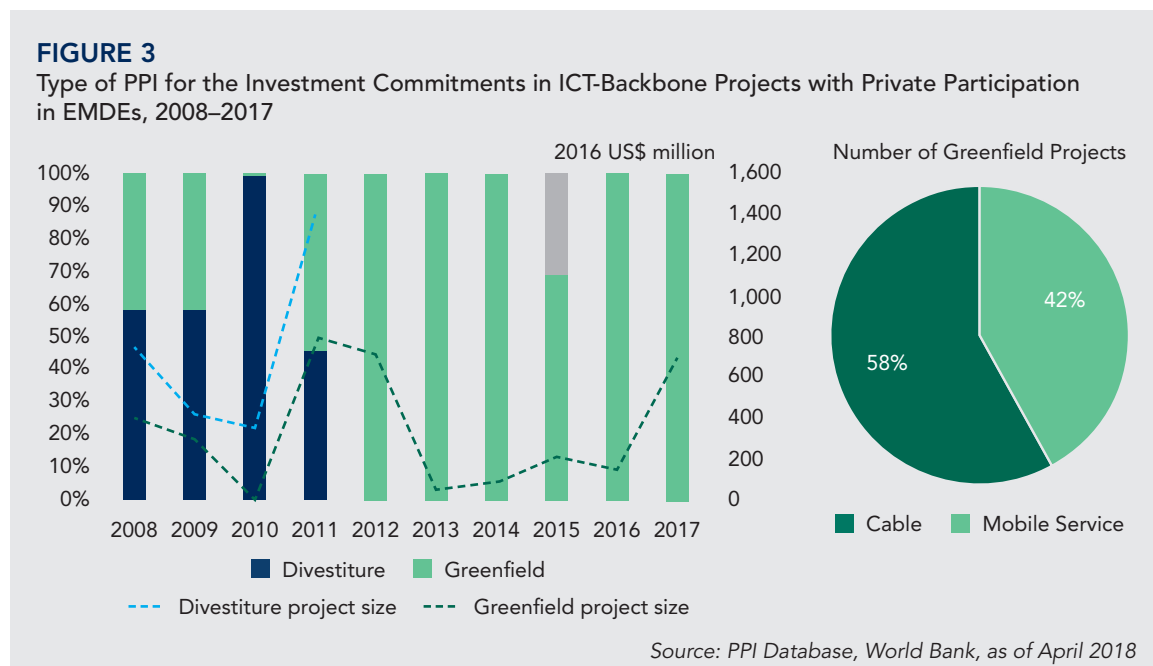
Over the previous 10 years, Europe and Central Asia (ECA) received ICT-backbone investments only in 2008 and 2011, corresponding to six percent and five percent of the regional PPI investments for those years.

In LAC, over the previous 10 years, an average of three percent of the regional annual investments can be attributed to the ICT sector. In 2008 and 2018, the ICT sector accounted for more than 10 percent of the total PPI investment amount in the Middle East and North Asia (MENA). South Asia (SA) had only one submarine cable project, in 2014.

3. Greenfield vs. Divestiture, 2008–2017

Unlike other infrastructure sectors, a significant part of ICT-backbone PPI investments in previous years was attributable to divestitures of state-owned telecom operators. Before liberalization, domestic telecom markets were fully controlled by national monopolies. Countries such as China, Russia and Brazil went through privatization processes in the 1990s and early 2000s.

Divestitures have been replaced by greenfield projects since 2012 (Figure 3). The total divestitures recorded from 2008 to 2011 amounted to US\$5.2 billion. Of this sum, US\$2.5 billion was distributed across five projects in the SSA region. The single biggest divestiture program was Ukrtelecom project in Ukraine in 2011, with US\$1.4 billion of investment.



4. Type of ICT-Backbone Project

4.A LAND/SUBMARINE FIBER-OPTIC CABLE PROJECTS

There were four fiber-optic cable projects in 2017, with a total PPI investment of US\$565 million. This marked a 67-percent increase (from US\$339 million) over the 2016 level and a 95-percent increase (from US\$289 million) over the previous five-year average.

Of the 38 unique ICT-backbone projects recorded since 2008, 15 were land/submarine fiber-optic cable projects³ in 23 countries. The cumulative cable length installed was more than 80,000 kilometers.⁴ The average commitment amounted to US\$332 million. Four shared-border projects were recorded across 16 countries:

1. The US\$731.8-million ACE (African Coast to Europe) submarine communications cable phase one, involving eight countries (Ghana, Gabon, Gambia, Côte d'Ivoire, Guinea, Liberia, Mauritania and Senegal), in 2012;
2. The US\$18.3-million Interchange Vanuatu to Fiji Cable, involving two countries (Vanuatu and Fiji), in 2013;
3. The US\$28-million DARE submarine broadband cable, involving five countries (Yemen, Djibouti, Somalia, Kenya and Tanzania), in 2016; and
4. The US\$57.4-million Tui-Samoa submarine cable, involving two countries (Fiji and Samoa), in 2017.

With the implementation of these fiber-optic cable projects, there have been various observable levels of improvement in terms of Internet-penetration rate in the participating countries. Figure 4 shows Internet-penetration rate trends at the country level, and the average cross-country level (for shared-border projects), preceding and following implementation of the four domestic cable-installation projects and two shared-border projects that have taken place since 2011. Projects recorded in 2016 and 2017 are excluded from this chart, because of data non-availability and their effective time being too short to observe measurable impacts. The colored boxes indicate the year in which the projects were implemented.

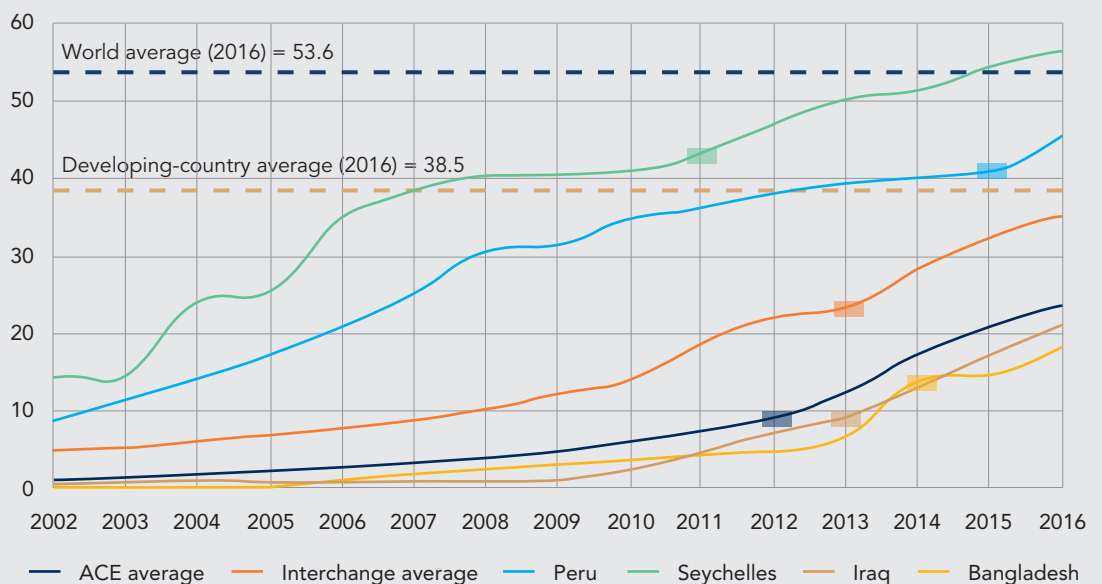
It can be observed that, in each case, there was a certain degree of improvement after the completion of the cable installation. Nevertheless, Internet-access gaps remain large in countries such as Iraq and Bangladesh, as well as most ACE-participating countries (with the exception of Gabon, which reached an Internet-penetration rate of 48 percent in 2016). More sectoral reforms are necessary to attract private capital to ICT-infrastructure projects that can close existing gaps.

³ Includes the cross-border Tonga-Fiji Connectivity Cable project, which is recorded as a divestiture, because Digicell bought a 16.6-percent share of the project from the government for US\$4 million in 2017.

⁴ No information on cable length was available for three projects.

FIGURE 4

Internet-Penetration Rate for Countries with Investment Commitments in Fiber-Optic Cable Projects with Private Participation



Source: ITU Database, 2018

4.B NETWORK INFRASTRUCTURE-DEVELOPMENT PROJECTS

Another segment of ICT-backbone projects is comprised of network infrastructure-development projects. The two mobile-network development projects in 2017 attracted a total of US\$2.4 billion of PPI investment. These projects accounted for 22 percent of the total PPI investment in network infrastructure-development projects over the previous 10 years.

A total of 23 network infrastructure-development projects were completed from 2008 to 2017, with a cumulative investment amount of US\$11.5 billion. LAC, with US\$3.4 billion worth of investment, accounted for the highest share of PPI investment in network infrastructure projects, at 30 percent. Nearly half of this amount, or US\$1.6 billion, came from Brazil.

ECA was next with US\$3.0 billion, or 26 percent of total PPI investment being allocated to network infrastructure-development projects. SSA and MENA received investment worth US\$2.5 billion and US\$412 million respectively in network infrastructure development.

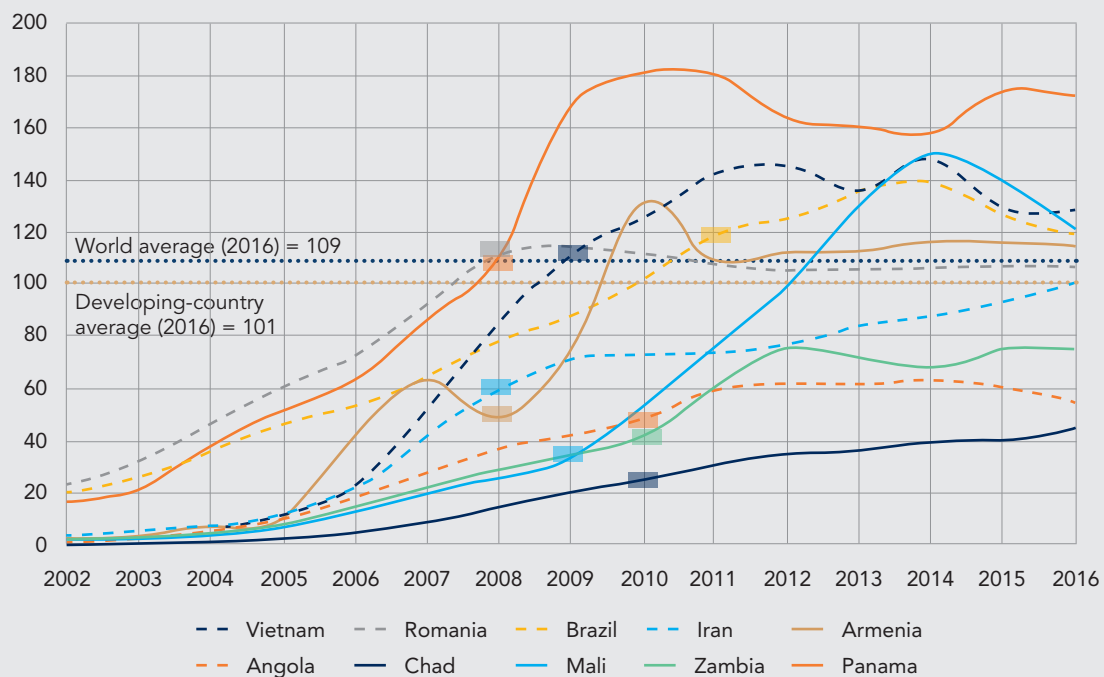
The impact of the mobile-network infrastructure-development projects can be assessed by looking at quantitative indicators, such as the number of mobile cellular subscribers (per 100 people) in the participating countries. It can be observed that most of the countries with higher investment shares relative to GDP experienced a dramatic increase in the number of subscribers since their project implementation years. For example, Mali, which had a project in 2009 whose investment corresponded to four percent of GDP, witnessed a 140-percent increase in subscriber growth rate afterward. On the other

hand, countries with relatively smaller project sizes have experienced a lower impact in terms of the number of mobile cellular subscribers.

According to the ITU database, the number of mobile subscribers in several African countries, including Chad, Angola and Zambia, are still far below the global average and the average for all developing countries. Even in Mali, after a considerable improvement in 2009, the number of subscribers dropped 17 percent after 2014, partially due to the saturation of the 2G market and the technology transition in adopting 3G and 4G services. But as the 2009 intervention shows, private-sector expertise and investment in developing mobile-network infrastructure can be helpful in increasing mobile penetration.

FIGURE 5

Mobile Cellular Subscribers (per 100 people) for Countries with Private Investment Commitments in Mobile Network Infrastructure Projects



Colored boxes: Year when projects were implemented

Solid lines: Countries with significant investment in mobile-network development relative to GDP

Dotted lines: Countries with a lower share of network investment to GDP

Source: ITU Database, 2018

5. Sources of Financing

5.A FINANCING MIX

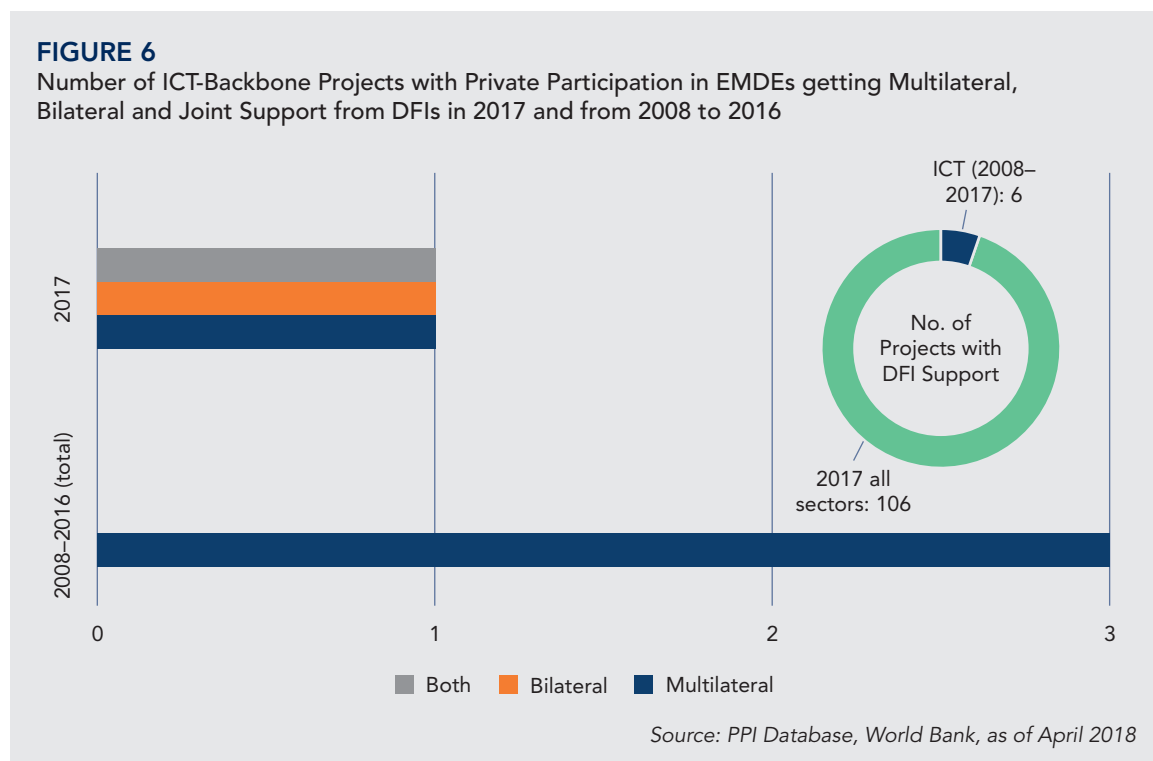
Detailed financing information was available for seven of the 37 projects from 2008 to 2017. The combined investment commitment to fiber-optic cable projects amounted to US\$1.1 billion, not including government fees.

Of the US\$1.1 billion, 35 percent (US\$363 million) was raised from public sources. Sixty-one percent (US\$646 million) came from private sources, and four percent (US\$41 million) was provided by development finance institutions (DFIs).

Of the US\$174 million in total equity, 89 percent, or US\$174 million, was financed by private sponsors. Debt provided by international debt providers accounted for 80 percent (US\$689 million) of the total investment. Local financing was used for three projects in Indonesia. Commercial banks provided US\$489 million in debt across four ICT projects in the previous 10 years. Public banks, mainly from Indonesia, contributed US\$345 million of debt.

5.B DFI SUPPORT

In 2017, three projects were supported by DFIs—one each from bilateral and multilateral institutions, as well as one jointly supported project. This represented half of the projects with DFI support in the previous 10 years (Figure 6).



Overall, from 2008 to 2017, four projects received multilateral support, one received bilateral support, and one shared-border project received joint DFI support. Five out of six projects were greenfield projects—these comprised one mobile-network development project and four fiber-optic cable projects. The only divestiture project that received an IFC loan was the Ghana Telecom Second Divestiture (Vodafone Ghana) in 2008.

Compared to other sectors, DFI support in the ICT sector was minimal. For the 11 ICT-backbone projects for which detailed debt information was available, DFIs contributed just US\$106 million, or two percent of the total investment. This amounted to nine percent of the total and 27 percent of the international debt raised.

6. Government Support

Government support falls into two categories—direct and indirect. Direct government support includes government liabilities that are certain to occur, because they directly cover project costs, either in cash or in-kind. Indirect government support is provided either through contingent liabilities or through government policies that support investment.

Compared to other sectors, ICT received the least government support. In 2017, only one project, the shared-border project in Samoa and Fiji, received government support. Only three other ICT-backbone projects received direct government support from 2007 to 2016. Details of the three projects are listed in Table 1. The mobile-network project in Ethiopia was under a two-year management contract. Two records in Iraq accounted for one project, with reinvestment due to re-routing of the cable network.

On the other hand, three ICT projects received indirect government support. All three of these occurred within a framework of the Palapa Ring project, which aims to connect the whole archipelago of Indonesia with a broadband fiber-optic network. The Indonesian government guaranteed the project's availability payments through a state-owned financing guarantee company.

TABLE 1: DIRECT GOVERNMENT SUPPORT FOR ICT-BACKBONE PROJECTS, 2008–2017

Region	Country	Project Name	Investment Year	ICT Type	Direct Support	Total Investment (US\$ mil)
SSA	Ethiopia	Ethio Telecom	2010	Mobile network	Capital subsidy	N.A.
MENA	Iraq	IQ Networks	2013	Land-based cable	In-kind	103.0
EAP	Samoa/Fiji	Tuli-Samoa submarine cable	2017	Submarine cable	In-kind	57.4

About the Private Participation in Infrastructure Projects Database

The Private Participation in Infrastructure Database is a product of the World Bank Group's Infrastructure, PPPs and Guarantees team. Its purpose is to identify and disseminate information on private participation in infrastructure projects in low- and middle-income countries. The database highlights the contractual arrangements used to attract private investment, the sources and destination of investment flows, and information on the main investors. The site currently provides information on more than 8,000 infrastructure projects dating from 1984 to 2017. It contains over 50 fields per project record, including country, financial closure year, infrastructure services provided, type of private participation, technology, capacity, project location, contract duration, private sponsors, debt providers, and development bank support.

For more information, please visit: [**ppi.worldbank.org**](https://ppi.worldbank.org)

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