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IMPLEMENTATION COMPLETION AND RESULTS REPORT

P130184

ON A

CREDIT

IN THE AMOUNT OF SDR 23.2 MILLION

(US\$35 MILLION EQUIVALENT)

TO THE

REPUBLIC OF BENIN

FOR A

WARCIP APL 1C - BENIN (P130184)

January 12, 2018

Transport & ICT Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 9, 2017¹)

Currency Unit = West African Franc (CFA)

585.98= US\$1

US\$ 1.38 = SDR 1

FISCAL YEAR

July 1 - June 30

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¹ Although the project closed on June 10, 2017, there was no calculation for SDR on that date. Therefore, the calculation for June 9, 2017 was selected.

ABBREVIATIONS AND ACRONYMS

3G	Third generation wireless mobile telecommunications technology
4G	Fourth generation wireless mobile telecommunications technology
ACE	Africa Coast to Europe
APL	Adaptable Program Loan
ARAP	Abbreviated Resettlement Action Plan
CAS	Country Assistance Strategy
C&MA	Construction and Maintenance Agreement
AID	Association Internationale de Développement
ARCEP	Autorité de Régulation des Communications Electroniques et de la Poste
BTSA	Bénin Telecom SA
BTI	Bénin Telecom Infrastructure
BTS	Bénin Telecom Service
ECOWAS	Economic Community of West African States
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESSAF	Environmental and Social Screening Assessment Framework
GIE	Groupement d'Intérêt Economique
Gbit/s	Gigabit per second
GDP	Gross Domestic Product
GoB	Government of Benin
ICT	Information and Communications Technology
IDA	International Development Association
IP	Implementation Progress / Internet Protocol
IRR	Internal Rate of Return
ISP	Internet Service Provider
ITU	International Telecommunication Union
IXP	Internet Exchange Point
Kbit/s	Kilobit per second
M&E	Monitoring and Evaluation
Mbit/s	Megabit per second
MCTIC	Ministère de la Communication et de Technologies de la Communication l'Information et de la Communication
MTR	Mid-Term Review
MENC	Ministère de l'Economie Numérique et de la Communication
NPV	Net Present Value
OP	Operational Procedures
ORAF	Operational Risk Assessment Framework
PAD	Project Appraisal Document
PDO	Project Development Objective
PIU	Project Implementation Unit
PRSP	Poverty Reduction Strategy Paper
PPA	Project Preparation Advance
PPP	Public-Private Partnership

QER DRAFT

RAP	Resettlement Action Plan
RIAS	Regional Integration Assistance Strategy
RMP	Revue à Mi Parcours
RPRSP	Regional Poverty Reduction Strategy
SAT-3	South Atlantic 3 fiber optic cable
SAT-3/WASC	South Atlantic 3/ Western Africa Submarine Cable
SDR	Special Drawing Rights
SPV	Special Purpose Vehicle
TA	Technical Assistance
WARCIP	West Africa Regional Communications Infrastructure Program
WBG	World Bank Group

TABLE OF CONTENTS

DATA SHEET	ERROR! BOOKMARK NOT DEFINED.
I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES.....	5
A. CONTEXT AT APPRAISAL.....	5
B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE).....	14
II. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME	16
A. KEY FACTORS DURING PREPARATION.....	16
B. KEY FACTORS DURING IMPLEMENTATION	18
III. OUTCOME	20
A. RELEVANCE OF PDOs.....	20
B. ACHIEVEMENT OF PDOs (EFFICACY).....	21
C. EFFICIENCY	26
D. JUSTIFICATION OF OVERALL OUTCOME RATING.....	29
E. OTHER OUTCOMES AND IMPACTS (IF ANY).....	29
IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME ..	30
A. QUALITY OF MONITORING AND EVALUATION (M&E).....	30
B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE	32
C. BANK PERFORMANCE.....	33
D. RISK TO DEVELOPMENT OUTCOME	34
V. LESSONS AND RECOMMENDATIONS	36
ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS.....	38
ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION	45
ANNEX 3. PROJECT COST BY COMPONENT.....	47
ANNEX 4. EFFICIENCY ANALYSIS	48
ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS ...	50
ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)	51



DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P130184	WARCIP APL 1C - BENIN (P130184)
Country	Financing Instrument
Western Africa	Adaptable Program Loan
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Ministry of Communications and Information Technologies	Project Coordination Unit within the Ministry of Digital Economy

Project Development Objective (PDO)

Original PDO

The project development objective for WARCIP 1-C are to contribute to increase the geographical reach of broadband networks and to reduce the costs of communications services in Benin.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IDA-51430	35,000,000	35,000,000	33,877,645
Total	35,000,000	35,000,000	33,877,645
Non-World Bank Financing			
Borrower	0	0	0
Total	0	0	0
Total Project Cost	35,000,000	35,000,000	33,877,645

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
12-Jul-2012	21-Mar-2013	15-May-2015	10-Jun-2017	10-Jun-2017

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	28-Jan-2013	Satisfactory	Satisfactory	0
02	30-Jul-2013	Satisfactory	Satisfactory	25.60
03	02-Jun-2014	Satisfactory	Satisfactory	29.70



04	25-Dec-2014	Satisfactory	Satisfactory	30.22
05	29-Jun-2015	Satisfactory	Satisfactory	30.29
06	15-Feb-2016	Moderately Satisfactory	Moderately Satisfactory	30.88
07	06-Aug-2016	Satisfactory	Satisfactory	31.40
08	23-Feb-2017	Satisfactory	Satisfactory	32.06
09	09-Jun-2017	Satisfactory	Satisfactory	33.88

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Information and Communications Technologies 100

Public Administration - Information and Communications Technologies 4

ICT Infrastructure 96

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3) (%)

Private Sector Development 86

Business Enabling Environment 24

Investment and Business Climate 4

Regulation and Competition Policy 20

Jobs 12

Job Creation 12

Public Private Partnerships 10

Regional Integration 40



Urban and Rural Development	24
Urban Development	12
Urban Infrastructure and Service Delivery	12
Rural Development	12
Rural Infrastructure and service delivery	12

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

Country context at appraisal:

1. Benin is a West African Country and a member of the Economic Community of West African States (ECOWAS). Benin's population was estimated at 9.6 million² at project appraisal (2011) and, it ranked in the lower income group with a per capita income of US\$780. Following fundamental political change in 1989, the country enjoyed relative political stability and a strengthened democratic system. However, poverty remained widespread and the undiversified economy was vulnerable to external shocks. The economy relied primarily on the agricultural sector, cotton, and on re-export and transit trade with Nigeria and other neighboring countries.
2. The Government's third Poverty Reduction Strategy Paper (PRSP) covering the period 2011 to 2015 aimed to pave the way for Benin to become an emerging economy by 2025. The PRSP highlighted the need for Benin to capitalize on its comparative advantages in agriculture and its position as a regional trading center to generate economic growth and increase its per capita GDP³. In addition, the 2009-2012 Country Assistance Strategy (CAS) for Benin, developed with the World Bank, aimed to help the country address key development challenges, including an unfavorable business climate, poor infrastructure, lack of economic competitiveness, lack of diversification of the economy, and low capacity for implementation. The CAS rested on three main pillars: accelerated growth; improving access to basic services; and promoting better governance and institutional capacity building⁴, all of which can be strengthened through the development of the Information and Communications Technologies (ICT) sector (also referred to as the digital technologies sector).
3. At the regional level, ECOWAS member states were collaborating to strengthen integration and improve economic growth in the region. In 2007, a joint Regional Poverty Reduction Strategy Paper (RPRSP) for West Africa emphasized the need for enhanced cooperation among West African countries and deeper regional integration to accelerate growth, reduce poverty, and improve performance on the Millennium Development Goals (MDGs). It proposed four strategic directions for regional intervention, including the aim to "develop and interconnect infrastructures", which encompasses regional telecommunications infrastructure.

Sector context at appraisal:

4. At appraisal, the telecommunications sector in Benin was relatively competitive, except for the national and international fixed infrastructure. There were five mobile operators and five main Internet Service Providers (ISPs) offering mobile and internet services. The roll-out of third generation (3G) services had just started in 2012 after MTN Benin was awarded the first universal license that is technology and service neutral. The government planned to award similar licenses to the other mobile operators, which had the potential to spur growth in the mobile broadband sector.
5. Benin Telecoms SA (BTSA), the owner and operator of national and international connectivity was wholly state-owned.

²<http://intranet.worldbank.org/WBSITE/INTRANET/INTCOUNTRIES/INTAFRICA/INTBENIN/0,,menuPK:322562~pagePK:145893~piPK:147168~theSitePK:322552,00.html>

³ ibid

⁴ ibid



The GoB had attempted to privatize BTSA at various intervals over several years but bids received were below expectations and the privatization was cancelled. At the time of project initiation, the GoB was also considering repositioning BTSA as a wholesale capacity provider. Benin Telecom was also operating the only international submarine cable, the South Atlantic 3/Western Africa Submarine Cable (SAT-3/WASC), linking Benin to the international Backbone since 2002⁵. National and international connectivity was leased to the mobile operators and ISP to provide internet and international communications services. Mobile operators also relied on their own microwave backhaul infrastructure for transmission capacity. At appraisal, the government was planning to give mobile operators the right to build their own fiber infrastructure where necessary. In addition, the new licenses issued to the ISPs in 2012 guaranteed their right to purchase international capacity from multiple sources and not exclusively through BTSA.

6. Benin was therefore dependent on a single submarine cable - SAT-3 - for its international capacity requirements. Benin Telecom was using about 2 Gbits of the total 10 Gbits capacity of SAT-3 for domestic use to its own Internet and voice customers, to the mobile operators and ISPs, as well as to Burkina Faso, Niger and Nigeria (300Mbps). However, this capacity use was relatively small, possibly because of the high prices of connectivity available through SAT-3 which were around US\$ 2500 per Mbps per month⁶. The Project Appraisal Document (PAD) and the Project Concept Note (PCN) highlight that Benin has the potential to become a regional hub for international connectivity⁷ when prices of international connectivity become more competitive and the backbone infrastructure more extensive and reliable.
7. Mobile service uptake increased in the years prior to project conception, reaching 79 percent penetration in 2010. At the same time, fixed line penetration was still limited at around 0.26 percent of households, and internet penetration was one of the lowest in the region at about 1.8 percent of the population. Growth in the Internet industry was therefore slow and constrained by cost, availability, and limited infrastructure. Mobile networks accounted for almost all internet connections. Fixed broadband was a service used by industry, government, and a privileged few at home and prevalent mostly in urban areas. This prevented Benin from reaping the benefits of the ICT revolution. Business users and private citizens had to pay US\$ 160 per month for fixed broadband Internet access, while consumers in Senegal and Ghana paid only US\$ 29 and US\$ 64 respectively, although international connectivity was also a monopoly of SONATEL in Senegal at that time.
8. According to the PAD, this was attributed to several factors such as (i) the high cost of international bandwidth, especially of the SAT-3/WASC cable system; (ii) the lack of an Internet Exchange Point (IXP) to reduce the cost of local Internet traffic⁸; (iii) a monopoly structure for access to international capacity; (iv) high level of theft of fiber and (v) limited regulatory activity to promote more competition or fair and equitable access to bandwidth. Some of these constraints were being tackled under the e-Benin Project (P113370), which was a World Bank technical assistance project without investment in infrastructure aiming to support the policy and regulatory environment of the ICT

⁵ International links to the global internet network can be deployed through satellite, submarine cable, or terrestrial optical fiber. Submarine fiber optic cables provide a resilient, high capacity and cheaper option for international communications and internet services to coastal countries.

⁶ There are contradicting information about the exact prices of international capacity at appraisal. Data provided in the PAD, in the ISRs and through the PIU are contradictory. This evaluation relies on the latest information provided by the PIU in the context of the interviews conducted for this evaluation.

⁷ Benin is just over 100km to Lagos by road from the capital, Cotonou, and 150km to Togo's capital, Lome. For the landlocked country of Niger to the north, Benin is the most direct route to the sea for both international telecommunication capacity, and for international exports and imports.

⁸ An Internet Exchange Point or IXP is the infrastructure that allows internet and content providers to interconnect with each other directly and without recourse to third party carriers. This has many advantages, but primarily it reduces the need to interconnect to the global network for local traffic, thus reducing costs and improving the quality of data and content exchange.



sector. However, at the time of the WARCIP project initiation, major sector and political economy issues hindered the further development of the market. These included the monopoly on the international connectivity, the weak legal and regulatory framework, the lack of regulation of access to bandwidth, and the delayed privatization of Benin Telecom.

Rationale for Bank Assistance:

9. The PAD conjectured that Benin Telecom’s total available capacity on SAT-3 would appear to offer plenty of room for growth without the need for a second international link. However, fueled by mobile broadband deployment and the expected price cuts on wholesale international capacity to less than US\$ 200 per Mbps per month, Benin’s requirement for international capacity was projected to grow to more than 50Gbps by 2022. This would exceed the available capacity through the existing submarine cable.
10. The demand from neighboring countries was also expected to increase due to Government plans of upgrade and investment in the fiber optic backbone network and transmission links to Niger, Burkina Faso and Togo. The PAD projected that Niger, Burkina Faso, Nigeria and Togo are all likely to route at least 20-40% of their traffic via Benin. With a competitive international connectivity in Benin and reliable backbone links, Benin’s capacity requirements were thus expected to increase rapidly due to increased demand from neighboring countries.
11. In addition, the PAD claims that, given earlier experiences Benin has had with service interruptions caused by cable cuts, providing Benin with diversity of access to international connectivity via different submarine cables, was vital to ensuring redundancy and reliability of service.
12. In summary, Benin needed to access a second higher capacity international link to meet existing and future demand for reliable and affordable internet bandwidth given the high cost of capacity, SAT-3’s approaching end of life cycle, the projected growth in usage, and potential disruptions from cable cuts. The analysis in the PAD presented several connectivity options including terrestrial optic fiber options and satellite links. The analysis found that an additional submarine fiber link with a domestic landing station was the best overall option for Benin in terms of long-term cost effectiveness, bandwidth availability, and quality of connectivity compared to terrestrial and satellite options.

The West Africa Regional Infrastructure Program (WARCIP) was well positioned to support Benin in improving its international connectivity. WARCIP is a US\$300 million program approved in January 2011 to provide a comprehensive solution to address connectivity gaps in West African countries. The WARCIP Adaptable Program Loan (APL) was in line with the 2008 World Bank Regional Integration Assistance Strategy for Sub-Saharan Africa (RIAS) and the 2010 West Africa Implementation Action Plan which sought to create economies of scale, facilitate intra-regional trade and exports and connect landlocked countries to regional and global trade routes. Therefore, in 2011, the GoB expressed interest in taking advantage of the opportunity of an infrastructure lending project through WARCIP and to join the Africa Coast to Europe (ACE) submarine cable while other countries were joining.

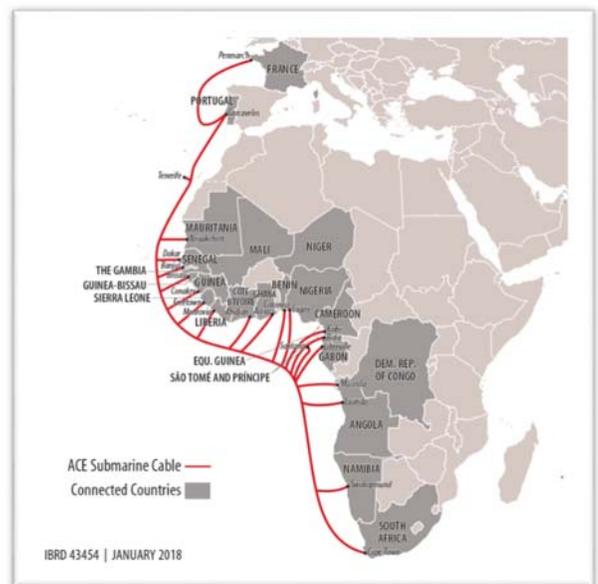


Figure 1



13. ACE is an optical fiber submarine cable system of approximately 17,000 km connecting South Africa to Europe, and up to 23 countries (see Figure 1), either directly for coastal countries or indirectly through terrestrial links. A due diligence analysis showed that ACE was the most economical option for Benin to access abundant international connectivity and secure redundancy route for connection to the global backbone.
14. The effective cost of capacity through investing in ACE was projected to be ten times cheaper than purchasing capacity on other African submarine cables linking to Europe and passing through neighboring countries through terrestrial links. The cost advantages of ACE were considered even greater when compared to satellite capacity, which were at least US\$ 4000 per Mbps per month. ACE was also recommended due to its advantage in terms of speed, quality of transmission. Combining ACE with a backup route via SAT-3 link would thus give Benin a highly reliable and competitive service, which, when combined with the upgrade of the national transmission capacity, would result in higher demand countrywide, and from across the nation's borders.
15. The Benin project was the third in the series of the first phase (APL1) of the WARCIP, following Liberia, Sierra Leone, The Gambia, Guinea, and Burkina Faso. WARCIP sought to contribute to increasing the geographical reach of broadband networks and reducing the cost of communications services in West Africa. The readiness triggers to join WARCIP were similar in most countries. In the case of Benin, they included: the GoB's commitment to liberalization and open access principles, the willingness to formulate a Public Private Partnership (PPP) and a Special Purpose Vehicle (SPV) to own and manage ACE, and the commitment to increased sector competition such as efforts to restructure BTSA and to strengthen the regulator. On the other hand, the effectiveness conditions and the covenants included: i) establishment of the SPV, ii) the execution and delivery of the Construction and Maintenance Agreement, iii) transfer of C&MA from BTSA to the SPV, iv) signatory of the agreement between the SPV and the ACE consortium, and v) adoption of the Project Implementation Manual.
16. Benin showed a strong commitment to opening the telecommunications market to competition and implementing sector reforms. The Government was engaged in significant sector reforms to implement its strategy in the sector through the e-Benin Project (P113370). Reforms consisted of the establishment of a permanent sector regulator, adoption of a new communications law, strengthening of regulatory capacity, adoption of a universal access policy along with a broadband strategy, and the development of regulatory tools to improve broadband access (including a licensing framework, price regulation, and facility sharing regulations). The country also aimed to significantly improve international, regional, and national connectivity in the coming years.
17. The Bank's assistance aimed at addressing connectivity gaps in Benin through financing access to a second submarine cable system. Voice communication and internet access were expected to become cheaper and more reliable. The project also aimed to strengthen other underlying factors in the enabling environment that could impact the diffusion and adoption of broadband services and complement the activities implemented under the e-Benin Project.

Theory of Change (Results Chain)

18. There is an underlying link between the outputs and the desired outcomes of the project. The connection of Benin to the ACE international fiber optic cable would provide operators with additional international capacity and a redundancy route to international connectivity. With more resilient and abundant connectivity and competition between cable providers, wholesale prices for international bandwidth decrease and therefore, the cost and quality of retail internet services are expected to improve. Thus, it is expected that more people would use internet services, which increases the geographical reach of broadband networks.
19. The design of a Public Private Partnership (PPP) model to own and manage the international connectivity on a fair and non-discriminatory basis (open access) aimed at ensuring that the improvements brought about by the



submarine cable are shared among all existing and new players in the market and consequently provided consumers with more competitive services. The project also intended to extend connectivity beyond the international cable by supporting improvements in the enabling environment and building capacity of various stakeholders.

20. The link to long-term development objectives has been analyzed in many empirical studies demonstrating that the increased adoption of broadband services is directly correlated with higher investment and economic growth. There is considerable body of evidence that links digital technologies, and the Internet to economic growth and welfare. At the micro level, digital technologies help market players overcome information barriers and lower the cost of market and non-market transactions among businesses, people, and the government. Access and diffusion of broadband services expand markets for businesses and present new income and job opportunities for individuals. Extensive adoption of digital technologies increases the efficiency and, therefore, the competitiveness of the private sector. ICT also fosters enhanced government services and, therefore, increases the level and efficiency of citizen participation in decision-making (World Bank Group, 2016b).
21. These micro level changes lead to a significant aggregate impact on the economy and contribute, directly and indirectly to economic growth, job creation and trade expansion:
- a) **Economic growth:** Qiang and Rossotto estimate that a 10-percentage point increase in broadband penetration is associated with a 1.38% GDP growth.⁹ Similarly Kongaut, Rohman and Bohlin found that an increase in broadband speed leads to an increase in GDP with higher impact in lower income countries.¹⁰ As a direct contributor to value added output, the ICT sector constitutes, on average, 5.5% of GDP in OECD countries¹¹ and around 4% in both Kenya¹² and Egypt,¹³ which are among the largest markets in Africa.
 - b) **Job creation:** ICT plays a more substantial role in creating transformational jobs through the multiplier effect in other sectors and the overall increased productivity of the economy. The Ministry of Communications in Egypt reports 2.8 indirect jobs created for every ICT job in the period 2008-2011.¹³ In the United States, each high-tech job creates 4.6 additional jobs in other sectors¹⁴ and M-pesa, the mobile payment system in Kenya, creates additional income for more than 80,000 agents¹². Moreover, recent studies are finding empirical linkages between high-speed broadband infrastructure such as fiber to the home and employment. Singer, Caves and Koyfman analyzed the impact of deploying fiber to the home technologies on employment in Canada and estimate that “fiber deployment to 100 percent of a region is associated with a statistically significant increase in employment of approximately 2.9 percent.”¹⁵
 - c) **Trade:** Internet enables firms to access more international markets. A 10 percent increase in Internet use in the exporting country yields an increase in the number of products traded by 0.4 percent.¹⁶ Similarly,

⁹ Qiang, C. and Rossotto, C. (2009). Economic impacts of broadband. In: Information and Communications for Development 2009: Extending Reach and Increasing Impact, 1st ed. Washington D.C.: World Bank Group, pp.35-50.

¹⁰ Kongaut, C., Rohman, I. and Bohlin, E. (2014). The economic impact of broadband speed: Comparing between higher and lower income countries. A paper presented at the European Investment Bank (EIB) Institute.

¹¹ OECD (2015). Digital Economy Outlook. Paris: OECD Publishing.

¹² World Bank Group (2016b). World Development Report: digital dividends. World Bank Group, pp.8-17.

¹³ Ministry of Communications and Information Technology, MCIT (2012). National ICT Strategy- Towards a digital society and knowledge-based economy. Cairo. Arab Republic of Egypt.

¹⁴ Moretti, E., and Thulin, P. (2013). Local Multipliers and Human Capital in the United States and Sweden. Industrial and Corporate Change 22 (1): 339–62.

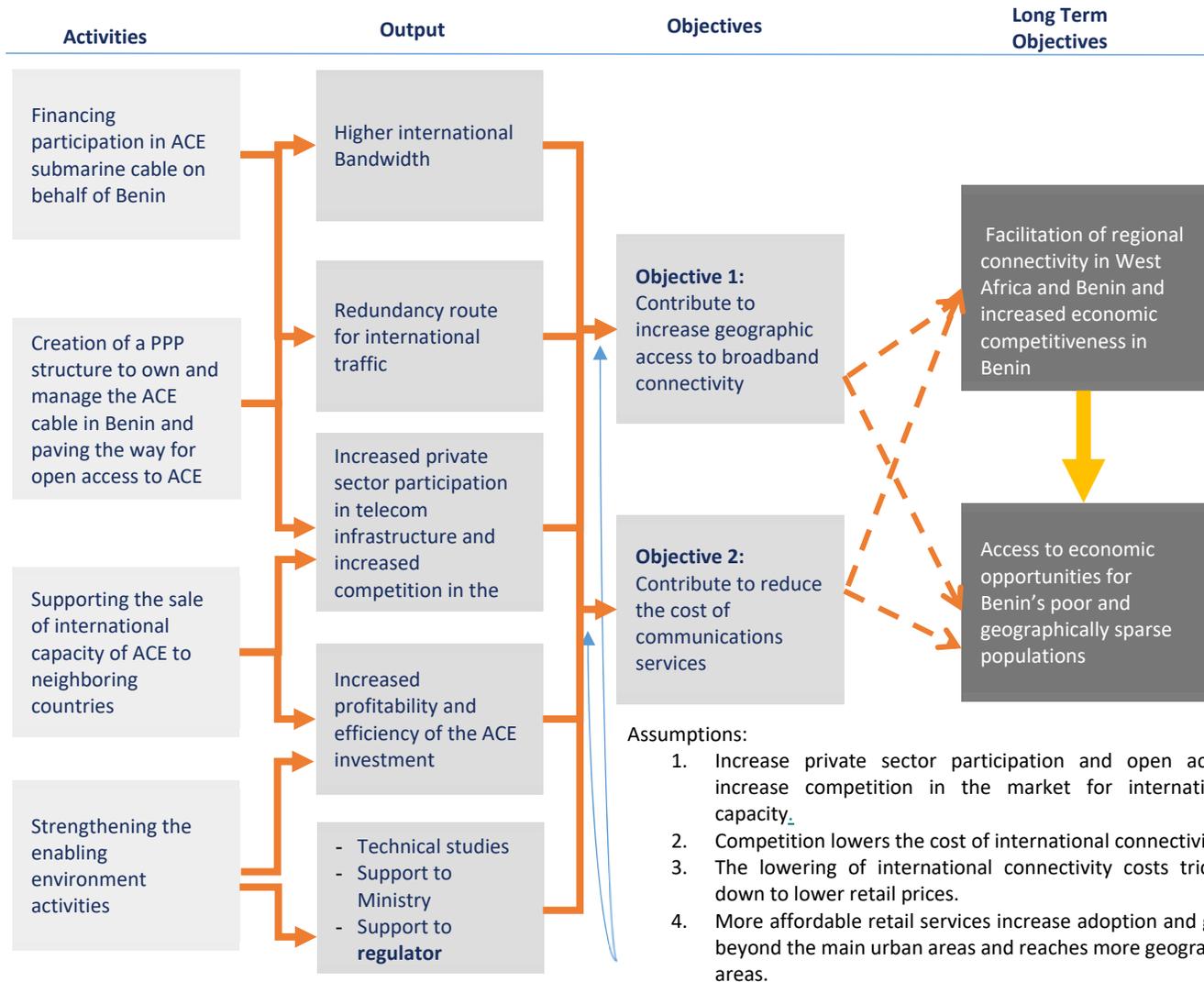
¹⁵ Singer, H., Caves, K. and Koyfman, A. (2015). The Empirical Link Between Fibre-to-the-Premises Deployment and Employment: A Case Study in Canada. Economists Incorporated.

¹⁶ Tan, Shawn W. (2015). The Effects of the Internet on Firm Export Behavior. Background paper for the World Development Report 2016, Washington, DC: World Bank Group.



the value of the traded products increases by 0.6% per product for every 10 percent increase in Internet use in the exporting country.¹⁶

Theory of Change Diagram:



Project Development Objectives (PDOs)

22. The PDOs for WARCIP 1-C are to contribute to increase the geographical reach of broadband networks and to reduce the costs of communications services in the territory of the recipient, i.e. Benin. The same PDO was adopted in the financial agreement between the two parties as well as in other WARCIP projects.

Key Expected Outcomes and Outcome Indicators

23. The PDO-level results indicators are (from PAD):

- a) **Indicator 1:** Volume of international traffic: international communications (internet, telecom and data) bandwidth per person, measured in Kbits per person. This indicator refers to the total utilized capacity for international communications, private data networks, and internet services. With the advent of the second submarine cable



capacity, the traffic of international services per person was expected to increase.

- b) **Indicator 2:** Access to internet services (internet users per 100 people) refers to the number of users of internet services over any given technology. This metric gauges the level of adoption of internet services. The advent of the submarine cable as well as other domestic infrastructure deployment and reforms were expected to contribute to the increase in the adoption of internet services.
- c) **Indicator 3:** Access to telephone services (fixed mainlines plus cellular phones per 100 people). This metric gauges the level of adoption of telecommunications services in general.
- d) **Indicator 4:** Average monthly price of wholesale international E1 capacity link from capital city to Europe. Capacity can be measured in different formats; in the case of this indicator, wholesale capacity is reported per E1, a digital transmission link with a 2Mbps dedicated capacity. The advent of the abundant and reliable international capacity through ACE and the competition with SAT-3, was expected to reduce the price of wholesale E1 capacity to Europe.
- e) **Indicator 5:** Direct project beneficiaries, of which female. Refers to the total number of users of telecommunications services in Benin.

24. The intermediate results indicators are (from PAD):

- a) **Intermediate results indicator 1:** Volume of available international capacity: International Communications (Internet, Telecom, and Data) bandwidth, measured in Gbits. Refers to the total available international capacity deployed to carry Internet, private network, and international voice traffic.
- b) **Intermediate results indicator 2:** Retail price of internet services (US\$ /Mbps/ month). the reduction in the cost of wholesale international capacity was expected to decrease the price level of retail internet services.
- c) **Intermediate results indicator 3:** Impact on telecom sector of World Bank technical assistance. This is a composite indicator that measures the level of progress as well as the impact of the projects on beneficiaries.
- d) **Intermediate results indicator 4:** Average monthly price of wholesale international E1 capacity link from Landing station to Niamey. Measured in 2Mbps per month, this indicator tracks the impact of opening the international capacity to neighboring markets.

25. The project's results indicators are relatively aligned with the development objectives and will be used in the assessment of the efficacy of the project in later section as follows:



Objective 1: Contribute to increase geographic access to broadband connectivity

- Intermediate results indicator 1: Volume of available international capacity: International Communications (Internet, Telecom, and Data) bandwidth, measured in Gbits.
- Indicator 1: Volume of international traffic: international communications (internet, telecom and data) bandwidth per person, measured in Kbits per person
- Indicator 2: Access to internet services (internet users per 100 people)

Objective 2: Contribute to reduce the cost of communications services

- Indicator 4: Average monthly price of wholesale international E1 capacity link from capital city to Europe.
- Intermediate results indicator 4: Average monthly price of wholesale international E1 capacity link from Landing station to Niamey.
- Intermediate results indicator 2: Retail price of internet services (US\$ /Mbits/ month)

Components

26. The adaptable program loan for WARCIP Benin was structured around three main components, as was the case with other WARCIP projects. In addition to the use of the WARCIP structure, the design of these components was also done with the e-Benin Project (P113370) in mind, which had already paved the way for the development of the ICT/telecom sector through studies, capacity building, and the preparation of a favorable enabling environment.

27. Component 1: Improving Connectivity:

- a) The highest cost activity, this component financed the international connectivity to the ACE submarine cable on behalf of the Government of Benin. The component was designed to finance Benin's participation in the ACE consortium, the construction of the cable and the landing station. The governance structure of the ACE submarine cable was designed as a Public Private Partnership (PPP) structure. The PPP intended to ensure a balance between private and public sector interests as well as the transparent and non-discriminatory access to the newly acquired international capacity (open access).
- b) Under the regional connectivity component, the project sought to support Benin in commercializing the excess international capacity available through ACE to neighboring countries. This activity was to supplement the reform and the investment that the GoB was planning in the national backbone infrastructure, including a project financed by Exim-Bank of China to complete the construction of the west link toward the Togo border, the link to Porga at the border with Burkina Faso, and the rehabilitation of the link to Niger.

28. **Component 2: Enabling environment for improved connectivity:** This component provided support to various stakeholders to put in place a sound enabling environment to ensure that the benefits of ACE were sustainable. The funding requirements for this component were not as high, as many related activities were already included in the e-Benin Project (P113370). Additional technical assistance under this component included support to:

- a) Optimize the governance, ownership and financing of the ACE PPP Special Purpose Vehicle (SPV)
- b) Develop the safeguards for open access to ACE capacity (open access ensures that any eligible operator, whether part of the PPP or not, can access and use the available capacity of the cable on a non-discriminatory and fair basis)
- c) Support ARCEP, the regulator, and the Ministry of Digital Economy and Communications in capacity building and

in complementing the policy and regulatory technical assistance of the e-Benin Project (P113370) to further promote competition and incentivize the use of ICT services

d) Reposition the government owned operator Benin Telecom in the market

29. Component 3: Project implementation, communications and M&E: This component supported project implementation, including the establishment of the Project Implementation Unit (PIU) and implementing the monitoring and evaluation, the fiduciary functions and the environmental safeguards. The table below lists the activities under each component with the projected cost at appraisal and the actual costs at closing. The difference between the costs listed below and the disbursement profile pertain to the fluctuation in the SDR exchange rate since the start of the project.

Table 1: List of activities by cost¹⁷

Activities	PAD		Client Information	
	At Appraisal (US\$ million)	% of the total amount at appraisal	At Closing (US\$ million)	% of the total amount at closing
Component 1: Improving Connectivity	30.5	87%	28.7	83%
<i>Financing Participation in ACE</i>	30.1	86%	28.7	83%
<i>Regional Connectivity</i>	0.4	1%	0	0%
Component 2: Enabling Environment for improved connectivity	3.25	9%	4.071	12%
<i>Finalizing PPP documents</i>	0.325	1%	0	0%
<i>Open access</i>	0.5	1%	0	0%
<i>Technical Redundancy study</i>	0.25	1%	0.06	0%
<i>Training and capacity building</i>	0.25	1%	0.55	2%
<i>Repositioning of Benin Telecom</i>	0.5	1%	0.48	1%
<i>Support to divestiture of Government shares to operators in neighboring countries</i>	0.35	1%	0	0%
<i>Initial Support to SPV (lawyer, business management and initial set up, rehabilitation offices)</i>	0.675	2%	0.541	2%
<i>Regulatory strengthening for regulatory authority</i>	0.2	1%	0	0%
<i>Support to Ministry of Digital Economy and Communications</i>	0.2	1%	0.5	1%
<i>Other activities added during the project implementation including:</i> - National Telecommunications Strategy - acquisition of IXP equipment - support to the new ICT commission (Agence numerique) - support to the implementation of e-government	0	0%	1.94	6%

¹⁷ % and numbers are approximations as provided by the PIU in Annex 6. These figures are approximations and subject to SDR fluctuations.

Component 3: Project implementation, communications, and M&E	1.25	4%	1.71	5%
<i>PIU set up, operating expenses</i>	<i>0.8</i>	<i>2%</i>	<i>1.3</i>	<i>4%</i>
<i>Communications, M&E, environmental studies, audit</i>	<i>0.35</i>	<i>1%</i>	<i>0.41</i>	<i>1%</i>
<i>Contingency</i>	<i>0.1</i>	<i>0%</i>		<i>0%</i>
Total	35	100%	34.8	100%

Source: PAD and PIU response to data request in Annex 6

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

Revised PDOs and Outcome Targets

30. There were no official revisions to the PDO during the project.

Revised PDO Indicators

31. There were no official revisions to the PDO level indicators during the project.

Revised Components

32. There was no official revision of components.

33. The three main components of the projects remained unchanged during the project lifespan. Within these components some activities were completed with costs below what was originally planned. This resulted in a balance that was reallocated to the support of the implementation of some activities under the e-Benin Project (P113370) as well as new technical assistance under component 2. The e-Benin Project ICR discusses this reallocation and the opportunity that WARCIP Benin provided for continued dialogue with the GoB.

34. The project therefore completed most activities initially planned except for four activities. These were under component 2 and constituted only a small percentage of the project cost, but were nonetheless important to fully achieve the desired outcomes. A more detailed analysis on the importance of these for the PDO can be found in the PDO achievement section.

Table 2: Unrealized Activities

Unrealized Activities	Cost at Appraisal (US\$ million)	Reason / comments
Regional Connectivity	0.4	A regional study has been carried out by the Government on its own resources, as part of its plan to expand the national backbone through the PDi2T project (mostly financed by Exim-Bank of China).
Finalizing PPP document.		The finalization of the PPP documents was achieved early in the project; however, these expenditures appear under the financing of the regional connectivity rubric.

Open access	0.5	<p>The project did not support the development of the legal and regulatory tools for open access to the ACE capacity. Working sessions were held with the Ministry of Digital Economy and Communications, ACE PPP members and ARCEP on the regulation of international capacity but no regulation were proposed or adopted.</p> <p>At the time of project preparation, all players in the market were included in the PPP structure of the ACE SPV. In addition, the ACE PPP shareholding agreement includes the obligation to allow new market players to enter the PPP structure. Therefore, the open access issue was not deemed as pertinent as all market players had entered the structure.</p> <p>As the market evolved, the issue of open access to the ACE capacity arose when new market players requested access to ACE capacity but were not part of the SPV and could not be part of the SPV given a minimum capital requirement.</p> <p>The issue of open access is also closely related to the legal form of the SPV. Within the current form of the ACE SPV (GIE), the ACE SPV does not and could not have a license to operate the international capacity independently of the operating license of its individual members (more on this later). Therefore, the regulation of the prices, quality and conditions of access to the international capacity through ACE was not possible. The project financed a study on the evolution of the ACE GIE into an LLC, but the report was finalized only weeks before the closure of the project so results are not yet apparent, but the report demonstrates the government’s commitment to moving this aspect forward.</p> <p>Given these difficulties, it is understandable why the implementation of open access regulation was difficult to achieve, however it is not clear why the WARCIP project did not finance the development of the open access framework to set the foundations for the future implementation of the regulation of access to the ACE capacity.</p>
Support to divestiture of Government shares to operators in neighboring countries	0.35	<p>No official studies were conducted for the government divestiture strategy. This was partly due to the slow development of the ongoing investment in the upgrade of the national backbone and to the slow evolution of the ACE SPV legal status and governance model. More details on the latter will be discussed in subsequent sections.</p>
Regulatory strengthening for regulatory authority	0.2	<p>Most activities revolved around capacity building and were included under the training and capacity building entry.</p>

Source: PAD and PIU response to data request in Annex 6

Table 3: Added Activities

Added activities	Cost at Closing (US\$ million)	Details
Other activities added during the project implementation	1.94	<ul style="list-style-type: none"> – Study on the feasibility of the western fiber loop – the ICT / Telecom Strategy Plan – support of privatization of Benin Telecom – improvement on the legal form of Benin ACE PPP structure – an audit for the benefit of the Directorate of the National Archives for the dematerialization of its processes



		<ul style="list-style-type: none"> – the acquisition of IP telephone and computer equipment for the benefit of the Digital Agency – the acquisition of equipment for the further deployment of the e-government pilot – acquisition of additional equipment for the IXP
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Source: PAD and PIU response to data request in Annex 6

35. The additional activities funded through WARCIP complemented the activities under component 2 and therefore helped WARCIP achieve its PDOs. The most important of these new activities were developing the telecom strategy, further studies on the improvement of the ACE PPP structure and governance model, and the follow up on the implementation of the e-Benin project (mainly e-education and e-government pilots). These additional activities were overall important to contributing to both geographic reach and affordability, the core project objectives.
36. On the other hand, the activities that were not realized (table 2) are important to the achievement of the PDO outcomes, project sustainability, and the efficiency of the project. While the government recently decided to finance its own regional study independently of the WARCIP project (the study on the western fiber loop to inform the October 2017 launched backbone project funded by the China Exim-Bank), some of the other unrealized activities have not materialized entirely. Further implications will be discussed at length in subsequent sections.

II. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

37. The project design and preparation reflected lessons learned from other World Bank financed ICT projects, particularly projects supporting governments to structure PPPs for international, regional and national connectivity. Specific experience from earlier PPP projects, mainly WARCIP APL 1A and 1B, CAB APL 2 and APL 4, and CARCIP, have been instrumental in shaping this operation and showed that the challenges in structuring PPPs included: (i) inadequate trust and cooperative relationships between government and private sector and between competitors, (ii) inability of governments to provide effective regulations, (iii) high cost of quality advisory services for the design and management of tenders and (iv) WBG support systems not ideally suited for PPPs (procurement, legal, disbursement).
38. The project addressed these challenges in the design and focused on putting in place all the conditions for efficient implementation during the preparation phase. These included:
- a) **Project Preparation Advance:** A Project Preparation Advance financing in the amount of US\$3 million was provided to WARCIP early on and prior to board approval. The PPA was granted to Benin to conduct initial project implementation and urgent project preparatory activities mainly the preparation for the implementation of the first component and the design and establishment of the ACE PPP.
 - b) **Close support by the Bank team in conducting the negotiations and a focus on securing private sector buy-in and commitment early in the process:** The Bank team supported the Ministry of Digital Economy and Communications in the establishment of the Special Purpose Vehicle (SPV) that owns and manages the ACE cable. This required negotiation with the different private sector players, at a time when there was considerable reluctance from the private sector to join this PPP venture. The Government was nonetheless able to secure the participation of six private sector players (mobile operators and ISPs) in addition to the Benin Telecom, Libercom (the mobile arm of Benin Telecom) and the GoB. Therefore, a PPP was created in December 2012 in the form of an Economic Interest Grouping, in French “Groupement d’Interet Economique”



(GIE). The participation of the private players ensured the viability of the PPP and the availability of the international wholesale capacity to all participants in the ACE GIE.

39. The PPP structure in other WARCIP projects was established as a commercial entity, such as a Limited Liability Company (LLC). Ideally, an LLC would make it easier to commercialize the capacity and separate the governance from the commercial functions of the company. This was not the case in Benin, where a GIE was established to manage the ACE capacity. A GIE is a consortium of companies that does not engage in commercial activities independent of its individual members. At the time of project preparation, the Bank team advocated for the establishment of a limited liability company, however the tight schedule imposed by the ACE consortium to start the construction of the cable acted against the establishment of an LLC, which would have entailed a lengthy and complex process. More so, the private sector players that were part of the ACE SPV strongly advocated for a GIE, which would prevent the full regulation of access to the ACE capacity and enable them to easily curb competition. Therefore, due to the tight schedule for project approval (and the urgency associated with joining the ACE consortium) and the preference of the interested stakeholders, a GIE was established instead. This has had important implications on the implementation of the project and the achievement of its object which are discussed in subsequent sections.
40. Project preparation also focused on ensuring that the Government complied with other effectiveness conditions and established the right conditions for project implementation. The Government demonstrated strong commitment to realizing these conditions through a rapid response under a relatively new institutional and legislative environment. Meeting the effectiveness conditions was also facilitated by the cooperation of Benin Telecom in transferring the ACE consortium signatory rights to the ACE GIE and providing it with the necessary initial logistical arrangements to start operation.
41. At the design level, the planned activities were aggregated into self-contained components to ensure a simple and streamlined monitoring and procurement process. The e-Benin Project (P113370) was already supporting major technical assistance activities in the enabling environment of the telecom sector, including the creation of the regulator, the development of national strategies and strengthening the capacity of the Ministry and the regulator. As such the second component of WARCIP was simple and included only a few complementary activities to reinforce the enabling environment.
42. From the technical standpoint, many elements of the project design were well conceived and provided for efficient utilization of the funds. Below are some of the design elements that stand out as particularly important for an efficient implementation:
 - a) **PPP model:** As stated before, it allowed all private sector players to participate and share the benefit of the new capacity.
 - b) **Open access principles:** The project design included support to policy makers and the regulator to ensure that the new ACE cable capacity would be open to all market players, whether part of the PPP or not. This principle aimed to ensure equitable access to this essential facility and boost competition among cable providers.
 - c) **Complementing other funded activities:** The project did not duplicate but supplemented other donor projects (at the time of project preparation, the Government was negotiating with the African Development Bank (ADB) and the Exim Bank-China for funding of the construction of fiber optic infrastructure linking Benin to Nigeria and Burkina Faso).
 - d) **Commercialization of the excess capacity:** The project planned to support a study on the potential sale of the excess capacity of ACE to neighboring countries, generating more revenues to the sector.



43. From the operational point of view, the Bank team assessed the capabilities of the implementing Ministry, and entrusted the implementation of the project to an already existing unit that was overseeing the implementation of the e-Benin Project (P113370). WARCIP supported the need to strengthen the capacity of this PIU, including the necessary incremental cost until the e-Benin Project closed (one year before WARCIP).
44. Project design was also reinforced through a system of focal point representatives from the Ministry of Digital Economy and Communications, Ministry of Finance, the newly established regulator ARCEP, Benin Telecom and the private operators participating in the ACE GIE. The focal point model aimed to provide better project coordination and guidance to the PIU in technical matters related to each beneficiary.
45. The project risks as well as the operational risks were candidly identified and the PAD included corresponding mitigation measures. The risks in the Operational Risk Assessment Framework (ORAF) were rated as moderate overall. The ORAF included the risks of the private sector not cooperating or participating in the PPP structure, political risks of government failure to commit to the project design, and risks of government corruption. The mitigation measures identified focused on an increased dialogue, participatory decision making with the private sector, and technical assistance to the Government.

B. KEY FACTORS DURING IMPLEMENTATION

46. Project implementation proceeded generally in a satisfactory way, reaching a disbursement rate of 97% by project closing. Most planned activities were completed per Bank rules and procedures and to the satisfaction of the recipient.
47. The biggest project component was the financing of the ACE consortium membership fees which represented around 87% of the total project cost. This component was particularly facilitated by the establishment of the ACE GIE during project preparation. The implementation of this component was also accelerated by the treatment of this activity as non-procurable, like other WARCIP projects.
48. The ACE cable membership fees and landing costs were directly paid to the ACE consortium in April 2013. Despite this prompt payment, the consortium required additional fees to account for the late participation and the remobilization of the cable boat before placing an order with the provider. The late payment fees amounted to US\$5 million and were paid in January 2014. These additional costs were not observed in other WARCIP ACE participation projects.
49. Despite payment of the fees on time, the landing of the cable in Cotonou was delayed, which prompted the project to support further discussions between the GoB and the ACE consortium. The new timetable proposed the cable arrival before the end of 2014.
50. Other factors that delayed the arrival of the cable were the construction of the cable landing station in Cotonou, which fell under the purview of the GoB and of the ACE GIE. The delay stemmed from disagreements among the GIE members on the selection process of the company in charge of construction. Before the arrival of the cable, the station was nonetheless successfully built and equipped.
51. The country became connected to the ACE submarine cable in February 2015. In 2016, the available capacity on the ACE cable was upgraded from 190,840 Miu to 5,049,328 Miu¹⁸ (equivalent to 110 to 150 Gbits, depending on

¹⁸ 1XSTM16 (2,5Gbits) Cotonou-Sesimbra Full Circuit = 3 739 680 MIU*Km



the distance of the transit capacity used) at cost of USD 4 million¹⁹. Half of this cost was financed by three operators (Isocell, Canal Box and Moov) and the other half by the all GIE members. With that, Benin became the second largest shareholder of the ACE consortium after Orange. Around 20% of this capacity is currently activate for use by various operators. In addition, some market operators are still using SAT-3 capacity for either primary or redundancy purposes.

52. Today the stakes in the Benin ACE GIE are split between the government (46%) and the private operators (54%, including the state owned Libercom and Benin telecom) after the upgrade and the redistribution of shares. The biggest private sector shareholder is Canal box with 14% share, then Isocell 11%, MOOV 9%, MTN 8% and finally the smallest shareholders are Univercel, OTI at approximately 6% shares²⁰.
53. After the arrival of ACE and during the second part of the project, the PIU was tasked with implementing the activities under component 2. These activities strengthened the enabling environment and provided for a better implementation of ACE connectivity. However, the implementation of some key activities and aspects of the project design were affected by the following factors:
 - a) **The evolution of the ACE GIE legal form:** The legal form and governance of the PPP have not yet matured enough to ensure that the international connectivity market is competitive with minimal barriers to entry. The GIE also lacks maturity to ensure that ACE capacity is efficiently managed and available to all players at the same terms and conditions. The ACE GIE is not a commercial entity; currently each stakeholder uses the capacity that corresponds to its share in the capital of ACE. In addition, joining the ACE GIE requires a minimum capital of 6 to 7% which constitutes a considerable barrier to new and small entrants. This barrier to entry is exacerbated by the lack of regulation of access to the ACE capacity. At the governance level, the presidency of ACE Benin GIE rotates among its different members, which gives each operator the power to dictate to the GIE its own mode of governance. The separation between the governance of the ACE GIE and its commercial operation will support a more efficient use of the capacity, enable access by operators that are not part of the SPV on a non-discriminatory basis and allow the regulator to better regulate the wholesale prices. The Bank team, in most aide memoires and specifically in the mid-term review report, recommended the speedy establishment of a wholly-owned commercial corporation, such as a limited liability company. However, the transformation to the LLC proved more complex than anticipated, especially when the interest of private operators is to retain the GIE model and to avoid regulation. This allows members to easily curb competition in the international connectivity segment. The Government has recently announced its intention to enforce the transformation of GIE into a commercial entity; however, no changes have happened to date.
 - b) **The lack of operating license for ACE:** A key element that has and is still affecting the implementation of an enhanced PPP model and of open access principles is the delay in the provision of an operating license to the ACE GIE. This is mostly dependent on the transformation of the GIE into a commercial entity that can operate in the market independently of the operating license of its individual members.
 - c) **Reimbursement of the private capital share:** The project directly funded the participation fees in the ACE consortium on behalf of the Government of Benin. The design intended to have the private sector reimburse the Government the cost of their shares in the SPV. To this end, the Government through the "Caisse Autonome d'Amortissement" negotiated an agreement with private operators to reimburse their shares based on a loan extending till 2025, with a grace period of 18 months and a low interest rate.

¹⁹ Source: interview with GIE and Aide memoires

²⁰ Approximate figures, source: interview with GIE



Currently around 3 % of the loan has been paid. Therefore, the private sector has also benefited from a lenient loan to finance their participation in ACE²¹.

54. Regarding the restructuring of the Incumbent operator, the project closely supported the Government in the process of splitting BTSA into two distinct operators, one present on the retail and the other on the wholesale market. The international consulting firm, Sofrecom, was hired through project funding to support the Human Resources Audit of the operation; however, there were major delays in the delivery of the final reports. The process of opening the capital of the newly created entity to private investment was on track during project implementation but was later suspended and was not achieved by project closing.

III. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

Rating: High

55. The PDOs for WARCIP Benin are to contribute to increase the geographical reach of broadband networks and to reduce the costs of communications services in Benin. These objectives were to be achieved through the financing of access to a second international submarine cable (ACE) and strengthening the related enabling environment. The PDOs and the associated outcomes were relevant at the time of project preparation, as highlighted in the context section, and remain so today with respect to the country, region and Bank priorities.

56. Most World Bank-Government of Benin strategies and partnership initiatives point to the same key long-term development challenges for Benin, and the ways to address them, that were highlighted in the Country Assistance Strategy of 2009.

- a) For instance, the Country Partnership Framework for 2013-2017 sustained the emphasis on the importance of the telecommunication sector for Benin, highlighting Benin's potential to become a supplier of international capacity to its landlocked neighboring countries.
- b) The 2017 Benin Systematic Country Diagnostic Concept Note (currently under preparation) mentions weak infrastructure services and constraints to trade and competitiveness as some of the main challenges that hinder the progress towards inclusive growth.

57. Better access to ICT infrastructure and services remains core to addressing these challenges, revealing that the objectives of WARCIP are still relevant to the development objectives of Benin today. And although the WARCIP Project helped Benin increase the resilience of its international capacity and reduce prices, important constraints to internet accessibility services remain. Internet is only offered in major cities because the national telecommunications infrastructure including the backbone, the backhaul and last mile, is outdated, in bad condition, and insufficient to meet clients' needs and current industry standards. The absence of proper maintenance and investment over decades in the poorest regions of the country leaves a large part of the population in mostly rural communities without access to the internet, e-government services, or e-agriculture.

58. The PDOs of this projects are also relevant to the World Bank regional strategy for Africa. ICT is one of the key sectors

²¹ Source: Interview with GIE



that can promote the region's economic and social development particularly through increasing competitiveness, employment and improving public sector efficiency. The key role that ICT plays in the economic and social development of emerging economies was also the topic of the 2016 World Development Report, which refers to the transformative powers of digital technologies and connectivity.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

Rating: Substantial

59. The WARCIP Project was completed by the foreseen closing date and most activities specific to the project were delivered. Details about the list of unachieved and added activities can be found in section I. Partially implemented activities (e-government pilots, IXPs) are activities of the former e-Benin Project (P113370) that were transferred to the WARCIP Project given the savings made in the latter. The physical execution rate was 97% as of May 31, 2017. The disbursement rate was also 97% at project closing.

Assessment of achievements of activities and output:

60. The biggest component of the project was the financing of the ACE consortium membership fees which represented around 87% of the total project cost. This activity and others under the enabling environment were successfully achieved. The introduction of increased capacity to Benin through a second submarine cable was an important step to lay the ground for improved broadband access. Still the evaluation found that two aspects of the design were not fully realized. These are:

- a) **Regional connectivity and divestiture of government shares:** With two landlocked countries as neighbors, namely Burkina Faso and Niger, and Benin being the shortest route to the sea, Benin is ideally placed to provide international service capacity for both countries. Benin is also well placed to provide transit capacity to Togo and Mali. In addition, the capacity of ACE is abundant; it is estimated that currently only around 25% of available capacity is being used²². Therefore, the strategy of making Benin a hub for international capacity is important to pursue, especially since the Government of Benin has embarked on a loan to finance ACE. The resale of excess capacity to neighboring countries is contingent on the on-going construction of the west link toward the Togo border, the link to Porga at the border with Burkina Faso, and the rehabilitation of the link to Niger financed by Exim-Bank of China and planned by the end of 2018. The regional connectivity study was not conducted through WARCIP, rather carried out by the government on its own resources.
- b) **Open access:** The open access policy is critical to ensure fair and non-discriminatory access to the ACE capacity and is a key principle upon which the WARCIP program is based. The current shareholder agreement includes an obligation for stakeholders to accept new participants in the consortium. The requirement also includes a major investment of a minimum of 6 to 7% of ACE capital²³, which might be considerable for smaller market participants. Currently market players who are not part of the ACE consortium can either negotiate access to the ACE capacity on an individual basis with any of the shareholders or purchase capacity from Benin Telecom on SAT-3. Given the private player interest to curb competition, providing access to ACE on a fair basis to third parties is unlikely and has not been observed in the market yet. As such, the capacity provided through ACE, whether for primary or for redundancy purposes, is only available to participants in the ACE GIE consortium. The provision of open access intended to provide for a reasonable regulation of the capacity to ACE, i.e. regulation of the conditions and tariffs

²² Source: Interview with GIE members

²³ Source: Interview with GIE members



of wholesale capacity. When access to the ACE capacity is regulated on an open access basis, wholesale prices and conditions are regulated and the entry barrier for new internet service providers is lowered. The benefit of both wholesale price regulation and increased competition can then trickle down to more prevalent and affordable services. Discussions were held between the various stakeholders on the possibilities of regulation of access to ACE. No formal studies have yet been done or decisions made on open access policies; this leaves access to the wholesale capacity contingent on the terms and conditions of the major market players that are shareholders in ACE. This restrictive behavior by the GIE continues to hinder the maturity of the telecommunications industry in Benin and, if it continues, is expected to remain a major obstacle to increased participation of newcomer ISPs in the sector and overall end-user connectivity.

61. It is important to note that open access and its implementation is, in part, contingent on the legal form of the ACE GIE and has been hindered by the lack of an operating license (the ACE GIE, as a non-commercial entity, still has no operating license to date at the time of the preparation of this report). The Bank team has repeatedly highlighted the importance of the transition of the GIE model to a commercial one to the sustainability of the key development outcomes beyond the end of the project, and continues to support the client in accelerating this reform.

Assessment of achievement of objectives:

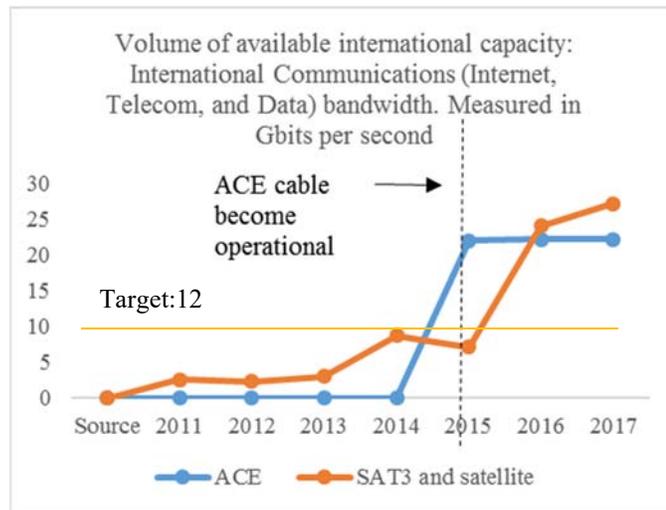
62. To assess whether the operation's objectives were achieved, one can look at the different results indicators, their improvements over the life of the project and whether the set targets were met. Establishing attribution is however more complex and this pertains to three factors:
- a) Unlike other WARCIP projects, for instance in The Gambia and Guinea, Benin already had access to a submarine cable – the SAT-3 cable. The connection to the ACE submarine cable intended to increase competition among cable providers and provide Benin with a more robust redundancy route for international connectivity. Thus, ACE's arrival as the country's second cable has had a less differential impact than the landing of cables in other WARCIP projects.
 - b) The impact of additional international capacity as well as that of improving the regulatory environment on the market is a long-term project outcome and is difficult to measure in the short term. The expectation is that Benin will continue to see improvements in the long term as not all impact will be captured in the five-year span of this evaluation.
 - c) In addition to the arrival of the ACE cable in Benin, other developments in the market may have also contributed to the observed improvements in the results indicators. This includes the deployment of mobile broadband (3G and to a limited extent 4G) infrastructure and services, increased investment in the backbone, the lower cost of smartphone ownership and the decrease in prices of the international capacity of the other submarine cable SAT-3 (which can be partially attributed to the threat of competition from ACE).
63. This evaluation found weaknesses in the reporting on the results framework indicators in both ISRs and client reports; this included values that did not change over time and values that are not in line with reports from other industry sources. All industry sources, such as GSMA intelligence and TeleGeography, used in the assessment are considered industry leaders with established methodologies and indicators. More details can be found in the M&E section. To that end, this section uses when possible indicators from other sources. However, given that certain data is not widely available, the analysis was not able to accurately assess the extent of the achievement of all indicators. Below is a breakdown of indicator per objective.
64. There is no indicator in the results framework that directly measures the first objective of the project, the contribution to the expansion of the geographical reach of broadband networks. Several indicators, however, can be used as a



proxy to assess the achievement of this objective:

65. The direct result of the connection to the submarine cable is the increase in the volume of international capacity for all international communications (intermediate indicator 1). After upgrades were made to the ACE cable landing station as part of the initial ACE rollout plan, the international capacity available in Benin has increased to 22 Gbit/s in 2017 (as reported in the final ISR), and has surpassed the initial target of 12 Gbit/s. The analysis of further information provided by the PIU in the context of this evaluation reveals that the total capacity reported in the ISR pertains only to the ACE cable; and that another 27 Gbits is used through the SAT-3 cable and through satellite. As shown in Figure 1, the capacity available through SAT-3 and satellite have also increased after the arrival of ACE.

Figure 1: Volume of International Capacity



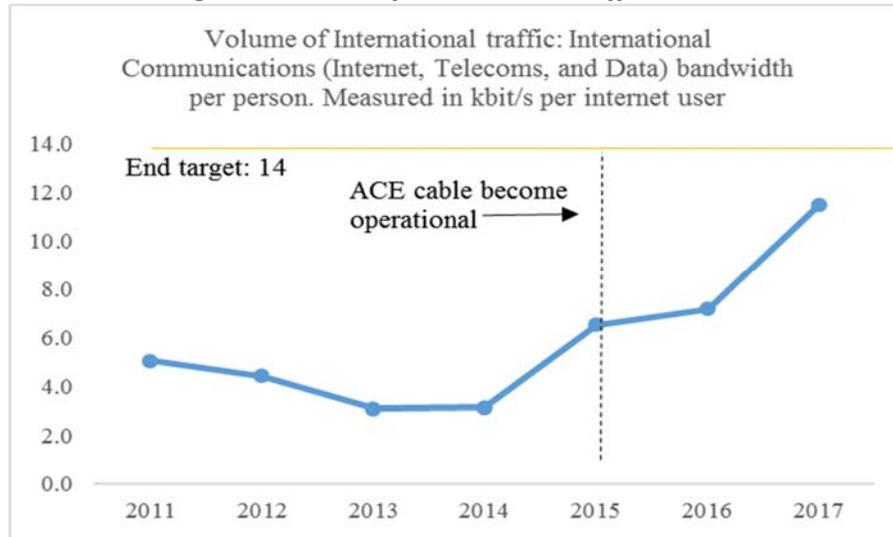
Sources: Implementation supervision reports – various years, monitoring and evaluation report, client completion report, and PIU response to request

66. This new available capacity has had an impact on the international traffic in Benin. The volume of international traffic (PDO Indicator 1) that Beninese citizens and businesses are using has increased from the baseline in 2011 of 5 kbit/s per unique internet subscriber to 11.5 kbit/s in 2017²⁴ (based on data from TeleGeography since the data reported in the ISRs and the client ICR report has not changed over time). The arrival of the international cable station has evidently made available more bandwidth to users. However, the target set at approval has not been met (even when considering different variations of this indicator such as international traffic per population rather than per internet user). This shows that even when total capacity in the country has increased the usage level on average per individual has not increased as much as it should have. This report could not identify the exact underlying factors behind not achieving the target; however some factors could include: i) the artificial limitation of supply by the owner and manager of the ACE international capacity due to lack of effective competition between the different stakeholders and the lack of regulation of access to the capacity, ii) other supply factors affecting the connections from the international landing station to the end user, or iii) limited demand which is outside the scope of this project.

²⁴ The exact wording of the PDO indicator one in the PAD is: Volume of International traffic: International Communications (Internet, Telecoms, and Data) bandwidth per person. It was not possible to determine whether the PIU has measured this indicator based on the population or users. This evaluation uses “internet user “ as the denominator for the volume of international traffic, since it is a better measure of the higher usage of bandwidth.



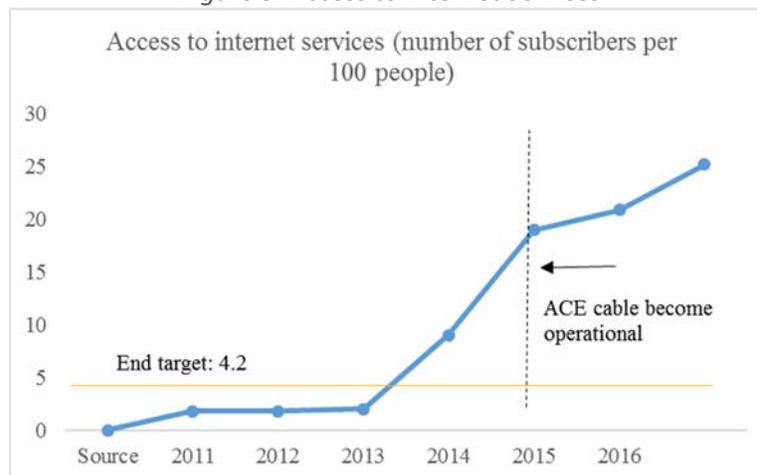
Figure 2: Volume of International Traffic



Sources: TeleGeography and GSMA intelligence, 2017

67. The contribution to the increase in the geographical reach of broadband networks can also be assessed indirectly through the percentage of the population with access to internet services, PDO indicator 2. The share of population with access to internet services surpassed its target and reached 25% penetration in 2017 showing that ACE has had at least some impact on the adoption of internet services and therefore has contributed to the increase of the geographical reach. The caveat in this approximation remains that the increase in the subscriber base might be concentrated in urban areas in the first stages of the development of the market. It is important to note here that some industry reports still point at a divide between rural and urban access to services, however this divide is affected by several factors both on the supply and the demand side that go beyond the international connectivity part of the broadband value chain.

Figure 3: Access to Internet Services



Sources: GSMA intelligence, 2017

Contribute to reduced cost of international communications:

68. This objective can be assessed against two factors: the price of wholesale capacity and the retail prices of internet



services.

69. The arrival of ACE has directly impacted wholesale capacity prices. An assessment of trends in the wholesale prices of ACE was not possible given that there are no wholesale services yet offered by the ACE GIE. However, the prices of international wholesale capacity of SAT-3 were reduced by 40% since 2013 and reached 1,391,000 CFA francs, equivalent to US\$ 2500 per E1 per month²⁵. This was a direct impact of the threat of competition coming from ACE. This has not however reached the target of US\$180 per E1 per month set in the PAD²⁶.
70. Comparison of these values with other international capacity wholesale prices is not readily available. Prices of international connectivity vary widely between countries and depend on route length, competition in the market, alternative routes available in each country, and the available infrastructure and domestic demand. While there are no readily available updates of benchmarks on international capacity prices, the latest estimate available for 2014 (**Error! Reference source not found.**) shows that Africa to Europe E1 prices in 2014 ranged from US\$1,630 to US\$ 3,078, showing that on average international connectivity through SAT-3 (US\$2500 per E1) in Benin is in line with prices seen elsewhere in Africa. Yet competition between two cable providers was expected to have a greater impact on international wholesale prices.

Figure 5: Prices of International Capacity (USD, 2014, median prices over the last three months)

Route	E-1 (2 Mbps)	DS-3 (45 Mbps)	STM-1 (155 Mbps)	E-1 (2 Mbps)	DS-3 (45 Mbps)	STM-1 (155 Mbps)
Africa-Asia						
Johannesburg – Singapore	\$2,679	\$13,125	\$26,250	\$0.249	\$0.054	\$0.032
Africa-Europe						
Abidjan – London	\$3,078	\$13,233	\$27,790	\$0.482	\$0.092	\$0.056
Johannesburg – London	\$1,630	\$7,500	\$15,000	\$0.145	\$0.030	\$0.059
Lagos – London	\$2,914	\$13,404	\$28,350	\$0.467	\$0.096	\$0.063
Europe-Middle East						
Dubai – London *	\$1,173	\$5,750	\$11,500	\$0.099	\$0.022	\$0.012
Jeddah – London *	\$591	\$2,894	\$5,787	\$0.100	\$0.022	\$0.013
Marseilles – Fujairah **	\$518	\$2,537	\$5,074	\$0.083	\$0.018	\$0.011
London-Mumbai	\$969	\$4,750	\$9,500	\$0.097	\$0.021	\$0.012

Notes: * = City center to landing station, ** = Landing station to landing station

Source: TeleGeography Research

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71. Another indicator that is featured in the WARCIP Benin Project results framework and that can gauge the price of international connectivity is intermediate indicator 4: the average monthly price of a wholesale international E1 capacity link from the landing station to Niamey. The price of this connectivity has dropped from US\$1300 per month to US\$960 per month but did not reach its intended target of US\$250 per month.

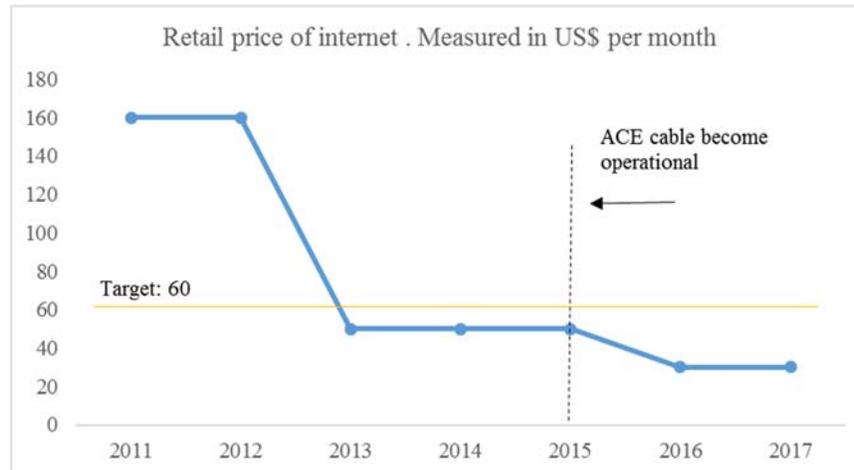
²⁵ Source: PIU response to ICR team data request.

²⁶ Indicator 4 should be a straightforward measure of the price of wholesale capacity. However, after careful examination, this evaluation opted not to use this indicator since there are no real offers of wholesale capacity on ACE currently available in the market. In addition, the values for this indicator in the final ISR are not reliable, the baseline in the PAD is reported as US\$2500 and the target at closure set at US\$180, while the final ISR reports a value of US\$19. The PIU, in its response to the ICR team’s data request, claims that 1) the baseline was not correct but should have been US\$5000 and 2) that the prices of this international capacity stand at US\$4000 in 2017.



72. At the retail level (intermediate indicator 2), the price of 1 Mbit/s per month decreased by 81% from US\$160 to around US\$30 and exceeded its target (as reported by the ISRs). The drop-in prices happened in 2013 and after the arrival of the ACE submarine cable in 2016. It was not possible to assess how much of this reduction in prices can be attributed to the arrival of ACE given that there are no set prices for ACE international connectivity. However, by approximation from the SAT-3 prices, it is estimated that a maximum of 40% (the reduction in prices for SAT-3) can be attributed to the arrival of the ACE cable.

Figure 6: Retail Prices of Internet Services



Sources: Implementation supervision reports – various years, monitoring and evaluation report, and client completion report

Justification of Overall Efficacy Rating

73. The project’s outcomes and objectives were both partly achieved. In terms of output, the open access policies and the commercialization of the ACE excess capacity were not realized, which will continue to be problematic to the evolution of Benin’s telecom sector and sustainability of the project’s existing achievements. The use of the PPP model through the GIE was innovative for Benin, and changes have been observed in the market because of the introduction of the PPP. However, now that new ISPs hope to potentially join the ACE GIE, there has been continued push back on the part of the GIE members to decrease the minimum investment needed to join the ACE GIE. Meanwhile, the GIE members continue to restrict access to the non-member operators. This is exacerbated by the absence of regulation of access to the ACE capacity and the lack of an operating license to the ACE SPV. In terms of PDOs, the objectives of the projects have improved since the arrival of the ACE capacity in Benin. The volume of traffic and the number of subscribers have increased and prices for international capacity and the retail price of internet have both dropped yet the results indicators show that the improvements are not all at the level the project aimed to achieve. This is particularly important for the prices of wholesale capacity and the used international traffic indicator.

C. EFFICIENCY

Assessment of Efficiency and Rating

Efficiency of Design: Modest



74. From the technical standpoint, many elements of the project design were well conceived and aimed at a more efficient utilization of the funds. Below are some of the design elements that stand out as particularly important for an efficient implementation:
- a) PPP model: As stated before, it allowed all private sector players to participate and share the benefit of the new capacity.
 - b) Excess capacity: The project planned to support a study on the potential sale of the excess capacity of ACE to neighboring countries, generating more revenues for the sector.

Efficiency of implementation:

75. The cost of the implementation of the project amounted to US\$1.71 million which is 5% of the total project cost (component 3). This was slightly more than the initial predicted implementation cost that was estimated at around US\$ 1.25 million. This cost is in line with other regional infrastructure projects (WARCIP and RCIP), namely Liberia (8% of project cost), Sao Tome and Principe (3.6% of project cost) Madagascar (11.7% of project cost) and Guinea (6.3% of total project cost). This demonstrates the efficiency of the implementation, facilitated particularly by a capable PIU that was already implementing the activities of the e-Benin Project.

Efficiency of investment:

76. In the PAD for WARCIP Benin, the ACE submarine cable was recommended as an additional route to the global backbone for Benin. This was in lieu of terrestrial links to other countries' submarine cables or satellites due to the advantage of ACE in terms of independence of access, long-term cost effectiveness and bandwidth availability. The PAD analyzed the advantages of ACE compared to satellites and terrestrial and other submarine cables.
77. In terms of bandwidth, at the time of project preparation, the capacity on SAT-3 was 10 Gbps. The PAD estimated that capacity requirements would expand dramatically in the next few years. This has proved to be true. Currently the country's international capacity stands at 13 Gbps²⁷, which exceeds the available capacity provided by SAT-3.
78. In terms of cost, the effective cost of capacity through investing in ACE was expected to be on the order of ten times cheaper than purchasing capacity on other African submarine cables linking to Europe, which is on average \$500/Mbps/month. The cost of terrestrial transit to a neighboring country would need to be added, which, aside from the sovereignty issues, could cost as much, if not more than the capacity on the submarine cable. The cost advantages of ACE are even greater when compared to satellite capacity costs, which are at least US\$4000/Mbps/month. Aside from low bandwidth costs, the high quality (low latency) of fiber bandwidth was also a factor that must be considered in comparing fiber with satellite options. As mentioned in the efficacy section, the current prices of wholesale international capacity remain stand at US\$2500 per E1 /month (for SAT-3) which is US\$1750/Mbps/month.
79. The financial analysis developed during project preparation showed that ACE would break even in 2017/2018 with:
- a) an IRR of 44.5% and NPV of US\$90.5 million assuming an average bandwidth sale price of \$80/Mbit/s/month, or
 - b) an IRR of 38.4% and NPV of US\$62.5 million assuming an average bandwidth sale price of \$60/Mbit/s/month.
 - c) The final break-even year would depend on actual capacity uptake and the wholesale price of bandwidth. After 2019 at the latest, the project would be cash-flow positive and substantial revenues would be made if these wholesale pricing levels were maintained. Investment data was calculated based on a discount rate of 15%.
80. The financial model has been revised with the latest data and estimates available for prices and usage levels. Given

²⁷ Source: TeleGeography, 2016



that the SPV is not a commercial entity, i.e. wholesale services are not provided on a transparent basis rather each shareholder uses its own capacity, ACE GIE did not provide revenue or tax data. The updated model uses an estimate of revenues based on the market prices of SAT-3 provided by Benin Telecom. Other assumptions are detailed in Annex 4.

81. Given that today's prices for wholesale capacity have not reached the desired level, and that the terms of the loan are advantageous to both the private and public sectors, the updated model's findings:
- a) All cash flows are positive, since 2015 when ACE's capacity started to be used by operators
 - b) The NPV for private operators stands at 630 million from 2015 to 2034
 - c) The NPV for the public sector stands at 566 million from 2015 to 2034
 - d) Given that all cash flows are positive, IRR is not possible to calculate
82. These findings show that given today's high prices for international capacity, the return on the ACE investment is high, particularly for the private sector.
83. The efficiency of investment is also affected by the following factors:
- a) The Government of Benin received a loan of US\$35 million at a concessionary rate of 0.75% over a period of forty (40) years with a delay of ten (10) years. At the same time, the design aimed to have all private sector investment reimbursed to the Government within five years. The Government of Benin has therefore benefited from a substantial loan to repay only over the long term and therefore can further invest in the ICT/telecom sector.
 - b) The efficiency savings from selling the excess capacity have not materialized yet. The financial evaluation in the PAD expected that Niger, Burkina Faso and Togo, even when they had alternative neighbors from which to obtain international capacity, would likely still route at least 20-40% of their traffic via Benin to maintain their restoration links.
 - c) ACE investment participation costs are US\$30 million, which is US\$5 million more than the US\$25 million required by the other ACE participants due to the late signing of the Construction and Maintenance Agreement and thus the extra cost entailed in the return of the cable laying ship.

Economic Analysis: impact on GDP growth:

84. An economic analysis of the impact of the ACE connectivity was not included in the initial economic and financial analysis of the PAD. However, the economic returns to the Beninese economy are considerable and should be accounted for in the assessment of the efficiency of the investment. For instance, per World Bank research, each 10-percentage point increase in broadband penetration increases overall GDP growth in developing countries by 1.38 percentage points²⁸.
85. To estimate the project's impact on GDP, both during the life of the project and projected through 2029, mobile internet penetration rates were estimated with and without the project. Internet penetration rates were calculated based on assumption of market growth in similar countries and at different points of market maturity (see Annex C). Internet penetration rates without the project were calculated using a linear growth model based on the three years prior to the operation of ACE.
86. Based on this analysis²⁹, it is estimated that the project had contributed more than US\$200 million to Benin's GDP

²⁸ Qiang, Christine Zhen-Wei, Carlo M. Rossoto, and Kaoru Kimura. 2009. "Economic Impacts of Broadband." In Information and Communications for Development 2009: Extending Reach and Increasing Impact, chap. 3. World Bank.

²⁹ Given that establishing attribution and forecasting the counterfactual scenario are complex, the impact on GDP is only a high



during the project's lifetime (2013-2016). Projecting to 2029, the yearly impact on GDP could reach an average of US\$350 million per year.

Justification of Overall Efficiency Rating:

Rating: Modest

87. This evaluation was not able to replicate the financial analysis of the PAD; however, the analysis of multiple factors shows that there was no major shortcoming in the efficiency of the investment and that it is most likely like other operations in the sector.

88. Moreover, it is expected that more benefits from the arrival of the ACE capacity will materialize in the medium to long term making the benefits of the project substantial compared to the cost incurred.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Satisfactory

89. This rating is affected by the shortcoming in the achievement of the PDOs and the lack of substantial evidence to corroborate the efficiency of the investment

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender:

90. The digital technologies sector is enabled by pervasive and affordable access to internet services and can help improve economic growth, jobs, transparency, accountability, and social inclusion, which in turn impact poverty reduction and sustainable development. Vulnerable groups benefit the most from greater access to communications means, including the women, the poorest and people living in remote areas.

91. With the contribution to the increased geographical reach and reduced cost of communications, the arrival of ACE has contributed (and is likely to contribute more in the future as explained previously) to the inclusive development of these vulnerable groups. There were not, however, adequate indicators to measure the impact of ACE on women and poverty reduction. The results framework included an indicator on the percentage of female beneficiaries, however it reported on systematically and has not changed in the ISR.

Institutional Strengthening:

92. The project contributed to institutional strengthening through capacity building of multiple stakeholder institutions. For example, during the early stages, the task team facilitated knowledge exchange visits between the emerging GIE and other PPP structures in existing WARCIP countries. The PIU notes that staff from various government institutions (the Ministry and PIU) were given training and development opportunities in multiple key skill development areas including: project management for sustainable development, public finance, public budgeting for results, administrative ethics, technical documentation drafting, and general administrative support. They were also provided with thematic training opportunities on topics that range from digital economy, broadband infrastructure, human

level estimation.



resources, and change management. In terms of training delivered, the PIU estimates that the project trained approximately 160 individuals at a cost of \$500,000 across various stakeholder institutions.

- 93. Also of note, the capacity building training sessions funded by the project systematically trained all women working in the ICT sector within the Ministry as well as all female secretaries working in the services and management of the Ministry. A total of 24 female members were trained.
- 94. Furthermore, the PIU noted that the development of the PPP structure obligated the various private and public sector stakeholders to communicate and collaborate toward the achievement of a common goal, which was as form of strengthening to these institutions. Per the PIU, even the simple existence of the WARCIP Benin Project, which required rigorous monitoring and reporting against clearly defined objectives and results, indirectly contributed to institutional strengthening across both private sector and government agencies. The PIU is hopeful that the culture of collaboration and results-based performance could become mainstream and continue in future institutional operations.

Mobilizing Private Sector Financing:

- 95. The project had, as its core, the objective of mobilizing private sector investment and enabling a sound regulatory environment in line with the World Bank cascade approach. The project could increase private sector participation in the international connectivity sector. This was originally achieved through the PPP structure that included all major telecom market players and therefore increased private sector financing and participation compared to when BTSA was the sole provider of international capacity.
- 96. The participation of the private sector ensures that there is a balance between private and public interest, making the investment more sustainable in the long run. This partnership has reduced the risk on the private sector and ensured that the public interest is preserved, while at the same time bringing in the expertise and the commercially-driven efficiency of the private sector.
- 97. However, it is important to note that the current legal form of the GIE and the lack of regulation of access to the ACE capacity act against the participation of more players in the telecom market, and as result, restricts the mobilization of more private sector financing.

Poverty Reduction and Shared Prosperity:

- 98. Same as the impact on gender analysis.

Other Unintended Outcomes and Impacts:

- 99. Not Applicable.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

- 100. The overall design of the M&E framework, which was a common design element among WARCIP operations, was



adequate for the WARCIP Benin APL. The results framework included a well-defined and measurable set of indicators. Nonetheless, some refinement could have made the evaluation of the achievement of the PDO more accurate. These include:

- a) Including a more direct indicator to track the achievement of the first part of the PDO, i.e. increasing the geographical reach of broadband networks. Other results indicators such as the share of population with access to internet services act as a proxy to track this objective, however they do not fully capture the desired outcome, particularly when the increase in the number of subscribers can be concentrated in urban areas. For instance, the M&E can include surveys on the use of internet outside of the main cities.
- b) Including the retail price of internet services as a main results indicator. This indicator was included in the intermediate results, yet it is a direct measure of the second part of the PDO, i.e., lowering the cost of communications and is essential to gauge the impact of the project on the internet retail market and the overall project beneficiaries.
- c) Including an indicator on the quality of internet services to complement the indicators on access and prices.

101. The PIU was required to have a part-time M&E specialist and to establish standard formats and guidelines for data collection and reporting. The main data used for the monitoring and evaluation of the outcome indicators was collected from the private sector operators by the Regulator ARCEP and was based on data used by operators and international organizations. The third component of the project also allocated funds for capacity building for the M&E specialist and for regular Monitoring and Evaluation reports.

M&E Implementation

102. Since the PIU was already managing the e-Benin Project, an M&E specialist was on staff from project onset. This evaluation, however, found that the WARCIP Project suffered from weak implementation of the M&E framework. Reports and annual progress reports were not generated as per the provisions of the Project Implementation Manual and PDO indicators were not regularly and consistently reported on (as explained in the assessment of the achievement of the PDO section).

103. Some of the shortcomings in the implementation of the results indicators include:

- a) The PDO indicator 1 did not change over time in the ISRs. More so the values reported in the client ICR are in a disaggregated format and cannot be compared to previous yearly values or to values reported by other industry sources.
- b) There were inconsistencies between the ISRs, the client ICR and the responses received from the PIU for this evaluation, for instance for PDO indicator 4.

M&E Utilization

104. The PIU and the Bank team recommended corrective actions to the indicators and data collection to improve the evaluation process during the midterm review. However, these improvements did not materialize.

Justification of Overall Rating of Quality of M&E

Rating: Modest



105. As discussed above, there were minor shortcomings in the M&E design and significant ones in its implementation. These weaknesses hindered the assessment of the achievement of the stated objectives and the establishment of links in the results chain.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Safeguards:

106. The project was rated category B for safeguards, triggering social and environmental safeguards policies. Due to the nature of the project, however, safeguards risks were assessed as short-term and reversible as connection to ACE cable entailed little disruptive impact to the surrounding environment. The GoB prepared an Environment and Social Management Plan (ESMP) for the project and in every case, mitigation measures were designed to reduce the negative impacts. The Government also prepared an abbreviated Resettlement and Compensation Plan (RAP) as some land acquisition and/or resettlement was anticipated for the construction. By April 2, 2015, the date that ACE landed on the Benin coast, the GoB had executed all social and environmental plans satisfactorily, including adequate information sharing and compensation of all individuals and businesses along the cable route.

Procurement:

107. As the PIU of the project was already the PIU of an ongoing Bank funded operation, e-Benin (P113370), the PIU was already staffed by a Project Coordinator, a Procurement Specialist, a FM Specialist, and an M&E Specialist. An assessment was carried out in March 2012 and the overall procurement risk rating was assessed as moderate. Due to the additional procurement workload anticipated for the PIU under WARCIP, the PIU was strengthened through the PPA in several ways, including: the advance review of procurement plans by the World Bank, the recruitment of a Procurement Assistant, and the preparation of procurement sections in the project operational and administrative manual.

108. IDA funding for component 1a (US\$30.1 million) on international connectivity did not go towards a procurable item subject to compliance with World Bank procurement guidelines. These funds covered membership fees (paid in a series of installments) against a set of rights, including use of a certain amount of capacity at preferred rates and a share of ownership of an indivisible cable infrastructure asset. For other project components (US\$4.9 million on components 1b, 2, and 3), IDA procurement guidelines applied. The disbursement of the funds for these components (\$4.9 million on components 1b, 2, and 3) progressed without incident, but with notable delays. For example, between 2013 and 2014, delays in the progress of conducting studies under the project's second component were noted. Although implementation of these components was far less costly than the landing of ACE (component 1a), these components were considerably more difficult to implement.

109. Implementation of Component 2 concerning the organizational structures of the PPP and the development of the enabling environment for connectivity required lengthy coordination between multiple stakeholders. Although some cost savings were noted as the GoB implemented certain activities at a cost that was less than the initial estimate, some studies (the regional studies) were not achieved. The combination of the dropped studies and the cost savings led to an undisbursed amount of approximately US\$0.8 million prior to closing even after the funding of new activities. Transitions in the Government and the restructuring of the Ministry of Communications and Information Technologies (now known as the Ministry of Digital Economy and Communications) also caused some delays and revisions to procurement plans particularly from 2015-2017.

Financial Management:

110. The financial management assessment of the implementing agency at the time of appraisal concluded that the MCICT of Benin met the Bank's minimum requirements under OP/BP10.02. The PIU of this project was already the



PIU of an ongoing Bank funded operation, e-Benin (P113370), at the time of the WARCIP Benin Project appraisal. e-Benin had achieved satisfactory performance, had already hired an FM specialist for its staff, was already using an adequate multi-project accounting software, and was in full compliance with Bank FM requirements. Since existing arrangements for staff and accounting software were in place within the implementing agency, a Project Preparation Advance (PPA) was used to strengthen the PIU's financial management. These strengthening activities consisted of ensuring the involvement of an IDA-suitable external auditor, customization of e-Benin accounting software, and the preparation of the financial sections of the project accounting and administrative manual. The overall fiduciary risk rating was therefore assessed as moderate.

111. The financial management of the project progressed smoothly with satisfactory ratings every year of implementation. A World Bank team travelled to Benin in April 2017 to conduct the final financial management support mission. The mission report rates the performance of the financial management during the supervised period as satisfactory. Per the FM supervision report, the PIU maintained accurate accounts and statements for the project, consistently submitted satisfactory interim reports on time, and, particularly in the final year, adequately implemented recommendations of previous supervision missions, particularly related to delays in disbursement. Financial audits were done in a timely manner and without qualification.

C. BANK PERFORMANCE

Quality at Entry

112. The PAD discussed all major issues and considerations for the project preparation and implementation plans. However, this evaluation found that there remained some weaknesses in the presentation of the rationale for project implementation. For instance, it was not clear why Benin was not able to reap the benefits of the digital economy despite having a submarine cable, a backbone (although weak) and a significant number of operators/ISPs. Similarly, the comparison between the different options for additional capacity did not include, for instance, the option of liberalizing access to SAT-3, upgrading SAT-3, or reinforcing the sector through legislation and regulation that could contribute to strengthening the enabling environment for private sector participation. These aspects point to the opportunity to strengthen the rationale for investing in a second submarine cable, especially since Benin is a small country of 9 million people where alternative options may have existed at the time of project preparation.
113. According to the borrower and implementing agency, the Bank team provided all necessary support to the Government for project preparation. As described in the PAD, Benin formally requested admission into ACE after the cable laying boat had passed the coast of Cotonou. To meet the firm deadlines associated with Benin's admission to ACE, the Bank responded quickly and intensively. The project was prepared under a tight timeline to mobilize the necessary funds to allow Benin to actualize the ACE opportunity. Nevertheless, the tight deadline did not compromise quality. The Bank ensured that the project design was solid and recommended adequate measures to strengthen the experienced PIU to ensure the success of the project.
114. The project benefitted from the Bank's extensive prior experience working with PPPs. Investment in fiber optic cables, facilitated through a public-private structure, attracts significant private capital, is often completed relatively quickly, and tends to be more successful due to the joint public and private ownership and accountability structure. As this was the third in a series of multiple WARCIP projects (covering five West African countries), the GoB and the project design also benefited from this great wealth of knowledge on PPPs in the regional setting of ECOWAS countries. This was true during implementation and not just at entry. Fiduciary, safeguards, and procurement aspects of the operation were prepared based on thorough assessments of the capacity of the institutions and arrangements were made to strengthen capacity in both the short and long term to ensure the success and sustainability of the



project.

115. The project design also benefited from the Bank's regional perspective for West Africa. The WARCIP program was fully aligned to the World Bank's Partnering for Africa's Regional Integration Assistance Strategy for Sub-Saharan Africa (RIAS) and the World Bank's strategy for Africa, both of which recognized the key role that ICTs play in regional integration and increasing competitiveness in African economies.

116. Overall, project design at entry proved robust and appropriate. The PPP-based model ensured participation from all stakeholders and paved the way for increased private sector participation and competition in Benin's telecom sector. As discussed in prior sections, the results framework could have benefited from more in-depth initial analysis of indicators and target values. However, many of the indicators presented a relatively good framework to monitor the project components and objectives (minor shortcomings are listed in the section on M&E design).

Quality of Supervision

Rating: Satisfactory

117. The Bank team closely supervised the project during and in between missions. The frequency of supervision was adequate, averaging two missions per year, and was supplemented by remote support by the task team. While there were three changes in project TTL during implementation, the borrower and implementing agency noted that World Bank support was suitable and that transitions between project TTLs were exceptional due to well-planned handover missions and arrangements. Additionally, the final project TTL was a core member of the e-Benin Project (P113370) from its inception. According to project records, project ISRs and aide memoires were filled comprehensively and filed on time.

118. During implementation, the Bank team and government institutions worked together to address most issues as they arose. For example, the Bank team and the implementing agency were flexible in making logical adjustments to the design and cost of activities within each component, which allowed the PIU to deliver best on the overall component objectives.

Justification of Overall Rating of Bank Performance

Rating: Satisfactory

119. As discussed in the prior section and throughout this report, the Bank team provided consistent and suitable preparation and implementation support to the GoB throughout the project lifespan. The World Bank ensured continuity among changing demands internal and external to the project. The overall World Bank performance at entry and during supervision is rated as satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

120. The main component of the project, the connection of Benin to the submarine cable ACE, has provided Benin with a redundancy route, abundant capacity and therefore a more robust international connectivity. However, some risks persist and threaten the sustainability of the impacts of the project. These include:

- a) **The legal form and the governance of Benin ACE GIE:** The current legal form of ACE GIE does not incentivize the transformation of the ACE submarine cable into a standalone entity that can compete with BTSA, which manages the SAT-3 capacity. Similarly, the governance model of a rotating presidency does not act in the best interest of the market and the consumer in general. To preserve the spirit of the



WARCIP design and enable a competitive environment in the provision of international wholesale capacity, it is important that the ACE GIE transition to a commercial entity where shareholding is separate from the commercial activities of access to capacity. The Guinean model of governance and management of the ACE PPP presents an example of a better format for the SPV.

- b) **Open access to ACE:** The ACE submarine cable capacity is managed by GIE and operators have access to capacity based on their respective shares in the SPV. There was no indication from the reports consulted nor the interviews conducted that the regulator ARCEP is considering regulating access to this international capacity. Further market analysis is required to study the need for regulating access to ACE, however given that the Government has majority shares in ACE GIEGIE and that the capacity is not yet commercialized, there is a need for ARCEP to consider different options for regulating the wholesale prices of ACE. This will ensure that the capacity is priced reasonably and is open on a non-discriminatory basis to all players including ones that are not part of the ACE GIE, thereby ensuring that the benefits of this capacity trickle down to end users.
- c) **Lack of divestiture of government shares in ACE GIE:** The Government of Benin still retains 46% (21% for BTSA, 8% for Libercom and 17% for the Government) in the ACE GIE. The project design stipulated that the GoB divest its remaining shares to operators in neighboring countries and other domestic new participants. Also, other WARCIP projects included the provision that no one shareholder has the right to hold more than 25% of the shares in the SPV to ensure that no one operator or shareholder can control the capacity of ACE and therefore impact market competition. The divestment plan has not been implemented yet. Among other factors, this divestment depends on the capacity of the private sector to invest more in the SPV. However medium- to long-term plans should account for divestment, including the option of opening the capital of the ACE GIE to players outside the telecommunications market in case capital within it is limited.
- d) **Risk of having a more consolidate market position for BTSA:** BTSA has now a majority stake in international connectivity, in ACE through a majority shareholding and in SAT-3, which it solely owns and manages. This, compounded with the current legal form of the ACE GIE and the lack of regulation of access to wholesale capacity, presents a big concern in the market, since BTSA is more dominant now than it was before the arrival of ACE. Tackling this dominance through a divestment plan, ex-ante regulation or restructuring is crucial for market development.
- e) **Not leveraging Benin's geographic position as a hub for international transit:** As previously discussed, the initial design of the WARCIP Project intended to leverage Benin's geographic position to provide transit capacity to neighboring countries. This is contingent on several factors, most importantly the existence of an extensive and reliable fiber backbone transit network that can carry the capacity from Cotonou to neighboring countries. The development of such a network will greatly improve the ability of Benin to offer capacity to other countries, especially since the international capacity currently available to Benin is underutilized. Even through the demand for bandwidth is expected to increase, the sustainability and efficiency of the investment in ACE still hinges on the ability of Benin to commercialize its excess capacity in the medium term.
- f) **Vision for BTSA:** WARCIP supported the development of the strategy to reposition the Government-owned incumbent operator BTSA. The restructuring and privatization of BTSA has been subject to several debates over the past decade. Currently, the Government is considering restructuring BTSA into three separate entities, including a wholesale operator. Delays in repositioning will play against BTSA and the market as the market becomes more dynamic and complex. As the sole owner and operator of a



backbone network and majority owner of international capacity, BTSA needs to be transformed into a dynamic state of the art wholesale operator to achieve optimal impact on the expansion of internet and communications services as well as on retail prices.

V. LESSONS AND RECOMMENDATIONS

Project design and preparation

121. Using a PPP model for the ownership and management of the ACE cable in Benin contributed to the successful implementation of the project, specifically since it addressed the challenge with high upfront costs of investments in essential infrastructure, such as in submarine cables, which are often prohibitive to individual private sector players. In the absence of a PPP model, when governments invest in essential infrastructure on their own, there are risks of poor governance and/or weak operation that might prevent its efficient use. PPP arrangements, such as that deployed in Benin for the ACE cable, bring together all actors and provide a balance between public and private interests. Specifically, in Benin, the ACE consortium included at the onset the main telecommunications operators and service providers for international and internet services. This arrangement made the investment in the ACE cable consortium possible and allowed Benin to acquire abundant international capacity.
122. However, the PPP model by itself does not guarantee competition and the use of this essential infrastructure by all market players. The PPP structure, as currently the case in Benin, is restricted to the existing shareholders and presents a barrier to entry to new or smaller service providers. The experience of the WARCIP Benin shows that the PPP structure should be complemented by:
 - a) A commercial form for the SPV: To lay the foundation for fair and equitable access to the international capacity, the legal form of the ACE SPV should be set as a commercial entity independent of the commercial activities of the individual shareholders.
 - b) Provision of an operating license. The provision of an operating license would make sure that the ACE SPV is under the jurisdiction of the regulator and is the first step to ensure that the international market is regulated.
 - c) Regulatory safeguards for open access. These include the appropriate monitoring by the regulator of the terms and conditions of access to the international capacity to ensure that prices are appropriately set, that there is no collusion between the shareholders and that the terms of access are non-discriminatory to all players. It is important that future PPP projects support the development of open access policies as a priority for the sector to be realized early in the project, and include in their design support to the implementation of such policies.
123. Government commitment to the development objectives and to enhancing the enabling environment is often cited as a major success factor to effective implementation. The triggers for the client readiness in WARCIP Benin included: (i) government commitment to liberalization and open access principles, (ii) existence of a PPP framework, and (iii) government commitment to increased sector competition as evidenced by pro-competitive policy and regulatory frameworks. Although the GoB at that time showed signs of strong commitment to implementing these triggers, some of the foundational reform elements remain unaddressed due to the political economy of the sector. Chief among them is the adoption of an LLC model for the ACE SPV, the licensing of the ACE SPV, and the adoption of open access principles. To



that effect, only stated commitments may not be enough to catalyze the adoption of important pro-competition decisions and regulatory tools. One of the possibility that future projects can implement is the inclusion of key reform elements in the World Bank financing agreement as legal covenants. These may include the establishment of a commercial entity as SPV and providing it with an operating license. The current legal effectiveness conditions and covenants of the WARCIP Benin only include the obligation to establish an SPV but do not specify that it should be of a commercial nature. In most cases these conditions seems to be realistic and may not unnecessarily delay the implementation of the project. In the case of Benin, the team is of the view that although a fast implementation of the readiness conditions was important to ensure Benin can join ACE, the impact of a GIE model has proved to be a major constraint to the reduction in prices, to improving competition in the international capacity and more generally the achievement of the Project objectives. In sum, it seems that both the establishment of an SPV as a commercial entity and providing it with an operating license are elements that could be considered as legal effectiveness conditions in future projects.

124. Backbone infrastructure is critical to the effective use of the international capacity both domestically and for resale to neighboring countries. The experience of Benin and other WARCIP projects shows that the rehabilitation of the backbone has impeded the country from taking full advantage of the abundant capacity provided through ACE. In the case of Benin, the rehabilitation and construction of the missing backbone links was financed by other sources, however its slow implementation has impacted the achievement of the project objectives. To that end, and although coordination with other donors and financing partners for projects conceived at later stage is difficult, the constraints of the backbone network should be highlighted more in the conception of an International connectivity project, and the interdependence between the two infrastructures is an important element to focus on and strengthen during project implementation.
125. The Government's ownership of the majority of the GIE consortium's shares (including the shares of Libercom and Benin telecom) points to another element that can be improved through a better design in similar projects. The project planned for the Government's shares in GIE to be divested, but this has not been achieved. Whereas the control of the Government on the operation of GIE does not seem to pose problems for the other private shareholders, limiting the Government shares at the onset to less than 25% seems to be a better way of increasing private participation and safeguarding competition. The limitation of Government stakes depends on the available financing by other private sector players; however, the design of similar PPP projects can include the provision of seeking all possible sources of private financing whether from within or outside of the sector.
126. Compared to other sectors, such as health and education, telecommunications markets evolve more rapidly, largely due to the fast pace of development of the underlying technologies. As such, it is difficult to accurately predict the evolution of certain market indicators. This is the case for the WARCIP targets for Benin (and other WARCIP projects) set at project approval, most notably the percentage of population with access to internet services. These targets were surpassed by the second half of the project, partly due to the project outputs and partly due to other domestic and international factors such as lower cost for network rollout and more affordable end user handsets. In this sense, indicators in ICT projects must be revised more often and reassessed against current market development trends.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Increased geographical reach of broadband networks.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Access to Telephone Services (fixed mainlines plus cellular phones per 100 people)	Number	79.00 01-Dec-2011	87.00 21-Jun-2012		88.78 02-Jun-2017
Comments (achievements against targets): Exceeded initial target by 2.04%.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Access to Internet Services (number of subscribers per 100 people)	Number	1.80 01-Dec-2011	4.20 21-Jun-2012		25.17 02-Jun-2017
Comments (achievements against targets): Exceeded initial target. Underestimated target at approval.					



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volume of international traffic: International Communications (Internet, Telecoms, and Data) bandwidth per person	Number	7.50 01-Dec-2011	14.10 21-Jun-2017		7.50 02-Jun-2017

Comments (achievements against targets): The values of this indicator did not changed in the Bank ISRs through out he life of the project. However, other industry sources and the client ICR show that the volume of international traffic has increased from the 2011 baseline. More information can be found in the achievement of PDO and the M&E sections.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	7.90 01-Dec-2011	8.70 21-Jun-2012		8.20 02-Jun-2017
Female beneficiaries	Percentage	40.00 01-Dec-2011	46.00 21-Jun-2012		40.00 02-Jun-2017

Comments (achievements against targets): This indicator has almost reached its target. More information can be found in the achievement of PDO and the M&E sections.

Objective/Outcome: Reduce the cost of communications services in the territory of the recipient.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Volume of international traffic: International Communications (Internet, Telecoms, and Data) bandwidth per person	Number	7.50 01-Dec-2011	14.10 21-Jun-2017		7.50 02-Jun-2017
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Comments (achievements against targets): The values of this indicator did not changed in the Bank ISRs through out he life of the project. However, other industry sources and the client ICR show that the volume of international traffic has increased from the 2011 baseline. More information can be found in the achievement of PDO and the M&E sections.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average monthly price of wholesale international E1 capacity link from capital city to Europe	Amount(USD)	2500.00 01-Dec-2011	180.00 21-Jun-2012		19.00 02-Jun-2017

Comments (achievements against targets): The values reported in the final ISR are not correct. The data received from the client show that this indicator is considerable above target. More information can be found in the achievement of PDO and the M&E sections.

A.2 Intermediate Results Indicators

Component: Supporting Connectivity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Retail Price of Internet	Amount(USD)	160.00	60.00		30.00



Services (per Mbit/s per Month, in US\$)		01-Dec-2011	21-Jun-2012		02-Jun-2017
Comments (achievements against targets): Exceeded initial targets, with value half as expensive as initial target.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Impact on Telecom sector of World Bank Technical Assistance (composite score: 1- low impact to 5-high impact)	Number	0.00 01-Dec-2011	3.00 21-Jun-2012		4.00 02-Jun-2017
Comments (achievements against targets): Exceeded initial targets by 25%.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average monthly price of wholesale international E1 capacity link from Landing station to Niamey	Amount(USD)	1300.00 11-Dec-2011	250.00 21-Jun-2012		960.00 02-Jun-2017
Comments (achievements against targets): The price of this connectivity has dropped from 1300 USD per month to 960 USD per month but did not reach its intended target of 250 USD per month.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised	Actual Achieved at Completion
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				Target	
Volume of available international capacity: International Communications (Internet, Voice) bandwidth	Number	2.30 01-Dec-2011	12.00 21-Jun-2012		22.17 02-Jun-2017
Comments (achievements against targets): Exceeded initial target by aprox 85%					

Component: Creating an enabling environment for connectivity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Retail Price of Internet Services (per Mbit/s per Month, in US\$)	Amount(USD)	160.00 01-Dec-2011	60.00 21-Jun-2012		30.00 02-Jun-2017
Comments (achievements against targets): Exceeded initial targets, with value half as expensive as initial target.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Impact on Telecom sector of World Bank Technical Assistance (composite score: 1- low impact to 5-high impact)	Number	0.00 01-Dec-2011	3.00 21-Jun-2012		4.00 02-Jun-2017



Comments (achievements against targets): Exceeded initial targets by 25%.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average monthly price of wholesale international E1 capacity link from Landing station to Niamey	Amount(USD)	1300.00 11-Dec-2011	250.00 21-Jun-2012		960.00 02-Jun-2017

Comments (achievements against targets): The price of this connectivity has dropped from 1300 USD per month to 960 USD per month but did not reach its intended target of 250 USD per month.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volume of available international capacity: International Communications (Internet, Voice) bandwidth	Number	2.30 01-Dec-2011	12.00 21-Jun-2012		22.17 02-Jun-2017

Comments (achievements against targets): Exceeded initial target by aprox 85%



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Increased geographical reach of broadband networks	
Outcome Indicators	<ul style="list-style-type: none"> • PDO Indicator 1: Volume of international traffic • PDO Indicator 2: Access to internet services (internet users per 100 people)
Intermediate Results Indicators	<ul style="list-style-type: none"> • PDO Intermediate results indicator 1: Volume of available international capacity
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<ol style="list-style-type: none"> 1. Component 1 2. Component 2
Objective/Outcome 2: Reduce the cost of communications services in the territory of the recipient	
Outcome Indicators	<ul style="list-style-type: none"> • PDO Indicator 4: Average monthly price of wholesale international E1 capacity link from capital city to Europe.
Intermediate Results Indicators	<ul style="list-style-type: none"> • PDO Intermediate results indicator 4: Average monthly price of wholesale international E1 capacity link from Landing station to Niamey. • PDO Intermediate results indicator 2: Retail price of internet services.
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<ol style="list-style-type: none"> 1. Component 1 2. Component 2 2. Increased private sector participation and market competition (Component 2) 3. Increased profitability and efficiency of telecom services in Benin, particularly of the ACE investment (Component 2)



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Boutheina Guermazi	Task Team Leader
Claudia M. Pardinás Ocana	Senior Council
Laurent Basencon	Team Member
Doyle Gallegos	Team Member
Marc Jean Yves Lixi	Team Member
Alain Hinkati	Financial Management Specialist
Africa Eshogba Olojoba	Senior Environment Specialist
Aissatou Diallo	Senior Finance Officer
Michel Rogy	Team Member
Mathais Gogohounga	Procurement Consultant
Michele Ralisoa Noro	Senior Program Assistant
Supervision/ICR	
Marc Jean Yves Lixi	Task Team Leader(s)
Mathias Gogohounga	Procurement Specialist(s)
Alain Hinkati	Financial Management Specialist
Jerome Bezzina	Team Member
Fatoumata Diallo	Social Safeguards Specialist
Abdoulaye Gadiere	Environmental Safeguards Specialist
Marolla Haddad	Team Member and ICR Author
Christine Howard	Team Member and ICR Contributor



B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY12	13.025	120,803.20
FY13	1.100	5,918.26
Total	14.13	126,721.46
Supervision/ICR		
FY13	2.409	35,439.61
FY14	8.430	88,152.15
FY15	4.875	49,864.97
FY16	20.525	127,862.15
FY17	17.789	90,945.53
FY18	4.300	18,632.36
Total	58.33	410,896.77



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$M)	Actual at Project Closing (US\$M)³⁰	Percentage of Approval (US\$M)
Supporting Connectivity	30.50	28.7	94%
Enabling environment for improved connectivity	3.25	4.071	132%
Implementation support	1.25	1.71	137%
Total	0.00	34.481	99%

³⁰ Differences due to fluctuations in SDR exchange rate since the start of the project.



ANNEX 4. EFFICIENCY ANALYSIS

Financial Analysis:

Assumption	Units	2011	
GOB total ACE Investment	\$	28,741,660	
GOB interest rate	%	0.75%	
GoB payment period	years	30	
GoB grace period	years	10	
Private sector ACE investment	\$	15,609,596	
Private sector interest rate	%	2%	
Private sector payment period	years	10	
Private sector grace period	years	2	
Starting payment year for Private sector	year	2015	
GoB market share in ACE	%	46%	
Incorporation of ACE GIE into a commercial entity	year	2018	
ACE cable life	years	20	
Opex as percentage of capex	%	6%	
Amount operators already paid for ACE	%	3%	
Taxes	%	18%	
Rate of wholesale price decrease per year (2018-2034)	%	30%	
Rate of used bandwidth increase per year (2018-2014)	%	20%	
% of revenues from wholesale international services	%	20%	
		2017	2034
% of capacity on ACE	%	40%	80%
		2017	2034
Price of wholesale capacity (E1 to Europe based on SAT-3 prices)	\$	2,494	5.8



Results:

	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
CAPEX																					
GOB Loan payment to w/B related to ACE cable	\$																				
Private sector payment to GoB related to ACE cable	\$	(\$312,192)	(\$312,192)	(\$312,192)	(\$2,411,869)	(\$2,411,869)	(\$2,411,869)	(\$2,411,869)	(\$2,411,869)	(\$2,411,869)	(\$2,411,869)										
Operations and Maintenance OPEX																					
GoB Opex	\$	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)	(\$787,924)
Private sector Opex	\$	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)	(\$508,654)
Revenue																					
GoB Revenues	\$	48,345,903	53,129,220	67,939,852	71,336,844	59,322,949	50,335,277	50,737,959	42,619,886	35,800,704	35,084,690	29,471,140	24,755,757	23,765,527	19,963,043	16,766,956	14,085,923	11,632,175	9,939,027	8,348,783	7,012,978
Private sector revenues	\$	57,466,973	63,152,724	80,757,569	84,795,448	71,228,176	59,831,668	60,310,321	50,660,670	42,554,963	41,703,863	35,031,245	29,426,246	28,249,196	23,729,325	19,932,633	16,743,412	14,064,466	11,814,151	9,923,887	8,336,065
Income Tax Paid																					
GoB Taxes Paid	\$				(\$12,840,632)	(\$10,786,131)	(\$9,060,350)	(\$9,132,833)	(\$7,671,579)	(\$6,444,127)	(\$6,315,244)	(\$5,304,805)	(\$4,456,036)	(\$4,277,795)	(\$3,593,348)	(\$3,016,412)	(\$2,535,466)	(\$2,129,792)	(\$1,789,025)	(\$1,502,781)	(\$1,262,336)
Private sector Taxes Paid	\$				(\$15,263,181)	(\$12,821,072)	(\$10,769,700)	(\$10,855,858)	(\$9,118,921)	(\$7,659,893)	(\$7,506,695)	(\$6,305,624)	(\$5,296,724)	(\$5,084,855)	(\$4,271,278)	(\$3,587,874)	(\$3,013,814)	(\$2,531,604)	(\$2,126,547)	(\$1,786,300)	(\$1,500,492)
Terminal Value																					
Terminal value (GoB)	\$																				38,892,696
Terminal value (private sector)	\$																				63,269,191

FCF	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FCF (GoB)	\$m	47.6	52.3	67.2	57.7	48.3	40.5	40.8	33.1	27.5	26.9	22.3	18.4	17.6	14.5	11.9	9.7	7.8	6.3	5.0	42.8
Cumulated FCF (GoB)	\$m	47.6	99.9	167.1	224.8	273.1	313.6	354.4	387.5	415.0	441.9	464.2	482.6	500.3	514.8	526.7	536.4	544.2	550.5	555.5	598.3
FCF (Private sector)	\$m	56.6	62.3	79.9	66.6	55.5	46.1	46.5	38.6	32.0	31.3	28.2	23.6	22.7	18.9	15.8	13.2	11.0	9.2	7.6	69.6
Cumulated FCF (private sector)	\$m	56.6	119.0	198.9	265.5	321.0	367.2	413.7	452.3	484.3	515.6	543.8	567.4	590.1	609.0	624.8	638.1	649.1	658.3	665.9	735.5

NPV (GoB)	\$m	566
NPV (Private sector)	\$m	630
IRR (GoB)	\$m	#NUM!
IRR (private sector)	\$m	#NUM!



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)

Client ICR:

This document will be uploaded as a separate PDF. Please see supporting attachments.

Client Response to Request/ Client Provided Information:

Eléments de réponse aux questions posées

Tableau 1:

Activités	Total (US\$ million)	Actuel – Juin 2017 (US\$ million)	Produits clés
Component 1 : Connectivite	30.5	28,7	
<i>Paie ment au consortium ACE</i>	30	28,7	- paie ment des droits pour l'atterrisse ment du câble sous-marin - paie ment des coûts supplé mentaires liés aux travaux d'atterrisse ment
<i>Renforcement de liens avec pays voisins</i>	0.5	0	- Il n'y a pas eu un investissement particulier de WARCIP en ce qui concerne cette activité. Par contre des échanges et réunions ont eu lieu sur la question au Niger, au Togo et au Burkina. Ces activités ont été financées par le Ministère et par Benin Telecom. D'autre part, la station de Cotonou étant une station agrégats, le Niger étant membre du consortium ACE il dispose de capacités qu'il déporte.
Component 2 : Environnement favorable	3.25	4,071	
<i>Finalisation des documents PPP</i>	0.325	00	- Documents pour établisse ment du GIE
<i>Cadre réglementaire pour accès ouvert</i>	0.5	0	- Il n'y a pas eu d'étude sur accès ouvert. Par contre des séances de travail ont eu lieu avec le Ministère, les membres du GIE et l'ARCEP sur la réglementation et la régulation du câble.
<i>Etude Technique de redondance</i>	0.25	0,06	- Etude technique liée à l'interconnexion entre les câbles sous-marins
<i>Renforcement de capacités</i>	0.25	0,55	- voir tableau 2
<i>Support au Repositionnement de Benin Telecom</i>	0.5	0,48	- organisation du forum sur le repositionnement de Bénin Télécoms SA -accompagnement commercial de Bénin de Bénin Télécoms -appui à la mise en œuvre de nouvelle orientation de



			développement de Benin Télécoms SA
<i>Support pour l'investissement des parts de l'Etat dans la structure de portage</i>	0.35	0	<i>Cette activité n'a pas été réalisée. Par contre il y a eu des activités non prévues qui ont été réalisées.</i>
<i>Support initial pour la structure de portage</i>	0.675	0,541	- prise en charge pour 12 mois les émoluments du personnel recruté ; aménagé le local qui abrite le siège du GIE, doté le GIE en matériel informatique, mobilier et matériel de bureau, assuré le câblage réseau -doter la structure de portage de moyen roulant -assistance pour la formulation d'avis juridique sur les dossiers du GIE -assistance pour la conception architecturale des équipements ACE vers les opérateurs
<i>Support pour Autorité de régulation</i>	0.2	0	- Le support de l'autorité de régulation s'est essentiellement traduit par des renforcements de capacité. Ceci est inclus sous la rubrique des renforcements de capacités ci-dessus
<i>Support pour le Ministère</i>	0.2	0,5	- Il s'agit essentiellement de renforcement de capacité des cadres du Ministère.
<i>Autres activités initialement non prévues</i>	0	1,94	<i>Etudes sur :</i> - la faisabilité de la boucle ouest (SOFRECOM) - le plan directeur TIC/Telecom (TACTIS) - accompagnement de PDI2T/BTI (SOFRECOM) -la forme juridique de Bénin ACE GIE (PHP AUDIT) - un audit au profit de la Direction des Archives Nationales en vue de la dématérialisation de ses processus -l'acquisition de téléphone IP et de matériel informatique au profit de l'Agence du Numérique -l'acquisition de matériel pour la poursuite du déploiement des pilote d'e-gouvernement -Honoraires de déploiement de pilote d'e-gouvernement -acquisition équipements complémentaires pour le IXP
Component 3 : Project implémentation, communications, and M&E	1.25	1,71	
<i>Gestion du projet</i>	0.8	1,3	<i>Salaires, frais de fonctionnement, etc..</i>
<i>Communications, suivi et évaluation, audit et mise en œuvre des études environnementales</i>	0.35	0,41	<i>S&E et communication</i>



Contingente	0.1		
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Tableau 2 :

Type de renforcement de capacité	Institutions/ Bénéficiaires	Nombres de personnes	Coûts (US\$ million)
UCP	Personnel	9	0,12
Ministère	Cadres des directions	150	0,43

Point global sur les renforcements de capacité (Thème, nombre de participants et lieux)

N°	THEME	NOMBRE DE PARTICIPANTS	LIEU
1	Bonne gouvernance et gestion des programmes et projets axés sur les résultats de développement durable	7	Paris
2	Bonne gouvernance et gestion des programmes et projets axés sur les résultats de développement durable	2	Dakar
3	Bonne gouvernance et gestion des programmes et projets axés sur les résultats de développement durable	6	Lomé
4	Budgétisation publique, LOLF et budget par résultats	1	Canada
5	Contrôle interne au sein des projets	2	Lomé
6	Déontologie administrative et respect de la hiérarchie fonctionnelle et technique de la rédaction et du suivi de dossier	21	Grand-Popo
7	Economie numérique	20	Bohicon
8	Fibre optique	2	Niamey
9	Formation et immersion sur les enjeux de l'économie numérique, le PAG et la DPS	52	Grand-Popo
10	Gestion administrative, comptable et financière des projets et décaissement	4	Dakar



11	Gestion des projets financés par la Banque mondiale	4	Abidjan
12	Ingénierie pédagogique et management de la formation	5	Dakar
13	Les contrats FIDIC	3	Tunisie
14	Les reseau d'accès large bande radio et cables	5	Lomé
15	Management stratégique et opérationnel des ressources humaines	2	Abidjan
16	Management stratégique, leadership et conduite du changement	3	La Rochelle
17	Management stratégique, leadership et conduite du changement	1	Canada
18	Passation de marchés, procédure Banque mondiale	5	Dakar
19	Perfectionnement sur le logiciel SUCCESS	1	Abidjan
20	Planification et le contrôle informatisé en contexte de projets multiples	2	Canada
21	Processus d'élaboration de la loi des finances et chaines d'exécution des dépenses publiques	6	Abidjan
22	Rôle des secrétaires et assistante dans la gestion, l'organisation administrative d'un secrétariat et gestion électronique des documents	1	Paris
23	Rôle des secrétaires et Assistantes dans la mise en œuvre du plan de passation de marchés et le classement des dossiers et gestion électronique de documents et de données	2	Dakar
24	Technique de rédaction et de suivi de dossier secrétaire	2	Lomé
	TOTAUX		



1. La répartition des capacités. Quelle est la répartition des parts à présents ? le rapport d'achèvement souligne les parts comme de-dessous, mais cela ne reflète pas l'upgrade de la capacité effectuer par MOOV, ISOCEL et canal box.

Les capacités actuelles à considérer sont les capacités après l'upgrade.

2. Comment vous avez obtenu le prix de la connectivité internationales (UsD 4000/ E1/ moi) sachant qu'il n'y a pas de produits pareil commercialise par ACE GIE ?

La valeur de cet indicateur est fournie par l'ARCEP. La valeur de 4000 est la valeur actuelle pratiquée. Elle s'applique uniquement au SAT-3 le GIE ne commercialisant pas ce type de produit.