

Establishment of Harmonized Policies for the ICT Market in the ACP Countries

Regulatory accounting and cost modelling in Sub-Saharan Africa

**West Africa
Country assessment**

HIPSSA Harmonization of
ICT Policies in
Sub-Saharan Africa



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Foreword

Information and communication technologies (ICTs) are shaping the process of globalisation. Recognising their potential to accelerate Africa's economic integration and thereby its greater prosperity and social transformation, Ministers responsible for Communication and Information Technologies meeting under the auspices of the African Union (AU) adopted in May 2008 a reference framework for the harmonization of telecommunications/ICT policies and regulations, an initiative that had become especially necessary with the increasingly widespread adoption of policies to liberalise this sector.

Coordination across the region is essential if the policies, legislation, and practices resulting from each country's liberalization are not to be so various as to constitute an impediment to the development of competitive regional markets.

Our project to 'Support for Harmonization of the ICT Policies in Sub-Sahara Africa' (HIPSSA) has sought to address this potential impediment by bringing together and accompanying all Sub-Saharan countries in the Group of African, Caribbean and Pacific States (ACP) as they formulate and adopt harmonized ICT policies, legislation, and regulatory frameworks. Executed by the International Telecommunication Union (ITU), co-chaired by the AU, the project has been undertaken in close cooperation with the Regional Economic Communities (RECs) and regional associations of regulators which are members of the HIPSSA Steering Committee. A global steering committee composed of the representatives of the ACP Secretariat and the Development and Cooperation – EuropeAid (DEVCO, European Commission) oversees the overall implementation of the project.

This project is taking place within the framework of the ACP Information and Telecommunication Technologies (@CP-ICT) programme and is funded under the 9th European Development Fund (EDF), which is the main instrument for providing European aid for development cooperation in the ACP States, and co-financed by the ITU. The @CP-ICT aims to support ACP governments and institutions in the harmonization of their ICT policies in the sector by providing high-quality, globally-benchmarked but locally-relevant policy advice, training and related capacity building.

All projects that bring together multiple stakeholders face the dual challenge of creating a sense of shared ownership and ensuring optimum outcomes for all parties. HIPSSA has given special consideration to this issue from the very beginning of the project in December 2008. Having agreed upon shared priorities, stakeholder working groups were set up to address them. The specific needs of the regions were then identified and likewise potentially successful regional practices, which were then benchmarked against practices and standards established elsewhere.

These detailed assessments, which reflect sub-regional and country-specific particularities, served as the basis for the model policies and legislative texts that offer the prospect of a legislative landscape for which the whole region can be proud. The project is certain to become an example to follow for the stakeholders who seek to harness the catalytic force of ICTs to accelerate economic integration and social and economic development.

I take this opportunity to thank the European Commission and ACP Secretariat for their financial contribution. I also thank the Economic Community of West African States (ECOWAS), West African Economic and Monetary Union (UEMOA), Economic Community of Central African States (ECCAS), Economic and Monetary Community of Central Africa (CEMAC), East African Community (EAC), Common Market for Eastern and Southern Africa (COMESA), Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC), Intergovernmental Authority on Development (IGAD), Communication Regulators' Association of Southern Africa (CRASA), Telecommunication Regulators' Association of Central Africa (ARTAC), United Nations Economic Commission for Africa (UNECA), and West Africa Telecommunications Regulators' Association (WATRA), for their contribution to this work. Without political will on the part of beneficiary countries, not much would have been achieved. For that, I express my profound thanks to all the ACP governments for their political will which has made this project a resounding success.

Brahima Sanou

BDT Director

Acknowledgements

The present document represents an achievement of a global activity carried out under the HIPSSA project (“Support to the Harmonization of ICT Policies in Sub-Sahara Africa”) officially launched in Addis Ababa in December 2008. Under this global activity, regional assessments were carried out and this is the report for West Africa Region.

In response to both the challenges and the opportunities of information and communication technologies’ (ICTs) contribution to political, social, economic and environmental development, the International Telecommunication Union (ITU) and the European Commission (EC) joined forces and signed an agreement aimed at providing “Support for the Establishment of Harmonized Policies for the ICT market in the ACP”, as a component of the Programme “ACP-Information and Communication Technologies (@CP-ICT)” within the framework of the 9th European Development Fund (EDF). i.e., ITU-EC-ACP Project.

This global ITU-EC-ACP project is being implemented through three separate sub-projects customized to the specific needs of each region: Sub-Saharan Africa (HIPSSA), the Caribbean (HIPCAR), and the Pacific Island Countries (ICB4PAC).

As members of the HIPSSA Steering Committee co-chaired by the African Union’s Commission (AUC) and the ITU, all the Regional economic communities (RECs) especially Economic Community of West African Countries (ECOWAS), Southern African Development Community (SADC), and Economic Community of Central African States (ECCAS), and East African Community (EAC) provided guidance and support to the consultants, Mr Alain Sawadogo, regional expert for West Africa who was responsible for the assessment and compilation of the regional report for West Africa under the guidance of Ms Saïda Ouederni.

ITU would like to thank all the Regional Regulatory associations in Africa and telecommunications ministries, regulators, academia, civil society, operators and the GSMA for their hard work and commitment in producing the contents of the final report.

Without the active involvement of all of these stakeholders, it would have been impossible to produce a document such as this, reflecting the overall requirements and conditions of the Sub-Sahara West Africa while also representing international best practice.

The activities have been implemented by Ms. Ida Jallow, responsible for the coordination of the activities in Sub-Saharan Africa (HIPSSA Senior Project Coordinator), and Mr. Sandro Bazzanella, responsible for the management of the whole project covering Sub-Saharan Africa, Caribbean and the Pacific (ITU-EC-ACP Project Manager) with the overall support of Ms. Hiwot Mulugeta, HIPSSA Project Assistant, and of Ms. Silvia Villar, ITU-EC-ACP Project Assistant. The work was carried out under the overall direction of Mr. Cosmas Zavazava, Chief, Project Support and Knowledge Management (PKM) Department. The document has further benefited from the comments of the ITU Telecommunication Development Bureau’s (BDT) Regulatory and Market Environment Division (RME), particularly Ms. Carmen Prado-Warner, Senior Programme Officer Economist. Support was provided by Mr Marcelino Tayob, Senior Advisor at the ITU Regional Office for Africa, and Mrs. Asenath Mpatwa, ITU Senior Adviser. The team at ITU’s Publication Composition Service was responsible for its publication.

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Introduction

This report sets out findings relating to individual countries in the West African subregion, based on an assessment of cost accounting and regulatory auditing carried out under the ITU-EC joint project for Harmonization of ICT Policies in Sub-Saharan Africa (HIPSSA). The aim of the project is to develop and promote harmonized policies and regulatory guidelines for the ICT market as well as building human capacity in the field of ICT.

Within the framework of its joint project with the EC, ITU is responding to the needs of HIPSSA beneficiaries by providing them with an up-to-date review of regulatory practices surrounding regulatory accounting and cost modelling in their respective regions. This identifies trends around which they can then build a common approach on regulatory auditing and cost modelling.

The assessment involved a review of the cost models and data used by each country, with the output being the individual country reports contained in this document. These country reports were subsequently consolidated into the regional assessment report. In due course, the various regional reports will be consolidated into a global assessment report for sub-Saharan Africa.

This report was intended to cover all 15 countries in the West African subregion. However, owing to the fact that no information could be obtained regarding Liberia, Mali and Sierra Leone, the assessment focused on the 12 countries for which information was available: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Niger, Nigeria, Senegal and Togo.

On the basis of the assessment findings, updated training material will be developed, delivered and integrated into the networks of regional associations of regulators and ITU Centers of Excellence, respectively, to ensure a sustainable mechanism for delivery.

This consolidated report has been prepared by Mr Alain Sawadogo. Special thanks go to Ms Saida Ouederni and the HIPSSA Project Team members, including Mr Sandro Bazzanella, Ms Carmen Prado-Wagner, Mr Marcelino Tayob, Ms Asenath Mpatwa, Ms Ida Jallow and Ms Hiwot Mulugeta, for the useful guidance, appropriate interventions and assistance they provided throughout the duration of the assessment.

1. BENIN

Country in brief

<p>Area: 114 763 km²</p> <p>Capital: Porto Novo Currency: XOF Population: 10 million GDP: USD 7.6 billion GDP growth: 5.3% Source data for indicators (2012): http://www.worldbank.org Fixed-telephone subscriptions per 100 inhabitants : 1.7 Mobile-cellular subscriptions per 100 inhabitants : 89.9 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0.1 Mobile-broadband subscriptions per 100 inhabitants: 0.3 Source for data indicators (2012): http://www.itu.int/net4/itu-d/ict/eve/CountryProfile.aspx</p>	
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Benin is a country in West Africa. It covers a total area of 114 763 km². Geographically uneven, it consists of a sandy coastal strip adjoined by two plateau areas, and an extensive mountain called Atacora in the north-west, from where all the country's rivers originate. It shares borders with Togo to the west, Nigeria to the east, Burkina Faso to the north-west, Niger to the north and the Atlantic Ocean to the south, with a coastline 121 km in length.

Economically, Benin's labour market is dominated by the informal sector (which, accounting for about 95 per cent of the workforce, represents a major source in terms of income generation). In 2010, economic activity was hampered by low agricultural and cotton yield, relatively low public investment and floods. The cost of these contingencies was estimated at 0.8 percent of growth. Some 8 percent of Benin's population, nearly one-third of whom make their living from agricultural activities, found themselves directly affected.

Socially, Benin ranks low on the human development scale, being placed 134th out of 169 countries on the 2010 United Nations Development Program (UNDP) Human Development Index (HDI), with a composite indicator of 0.435.

ICT sector overview

Policy and regulatory framework

In 1998, the Government of Benin undertook a reform of the telecommunication sector. This resulted in:

- Decrees 002-2002 and 003-2002 coming into effect; setting out the fundamental principles of telecommunication systems, and relating to the creation of the Regulatory Authority for Post and Telecommunications respectively.

- Liberalization of the mobile telephony segment; the granting (in 2000) of two licences to operate Global System for Mobile Communications (GSM) networks with obligations to private operators in addition to the incumbent; and, in 2003, the award of a third License to operate the GSM network
- Effective suspension, on 1 May 2006, of the Regulatory Authority for Post and Telecommunications installed on 15 March 2006
- Repeal of all matters arising from the implementation of Decrees 002-2002 and 003-2002 of 31 January 2002, relating to the fundamental principles of the telecommunication regime in Benin and the creation and implementation of the Regulatory Authority for Post and Telecommunications in Benin, respectively
- Establishment of a Transitional Authority of Regulation of Post and Telecommunications (ATRPT) in March 2007
- Granting of a new License, in August 2007, to the company GLO MOBILE BENIN SA to operate a mobile phone network according to the GSM standard
- Adoption the Policy and Strategy Document (Declaration de Politique Sectorielle¹ in French) on the Telecommunications Sector, ICT and Post, dated 10 December 2008
- Source: Revue de Performance du Secteur Des TIC Benin 2009/2010
- Incorporation of the additional Economic Community of West African States (ECOWAS) and West African Economic and Monetary Union (WAEMU) directives into a new draft code of electronic communications and postal services to be finalised.

Interconnection and cost control

In Benin, direct interconnection is mandatory between telecommunication operators that have been granted a License to operate. In July 2010, ATRPT launched a consultation process aimed at hiring a firm specializing in the building and implementation of a Long Run Incremental Cost (LRIC) model and the computational cost of networks. This project, designed to enable ATRPT to assess technical and price proposals submitted by various operators more effectively, provided ATRPT with a model for calculating costs and LRIC+² interconnection rates.

The Regulatory Authority

ATRPT is a public institution, having a legal identity and financial autonomy. It was created by Decree 209-2007 of 10 May 2007, which established its responsibilities, organization and functions.

Source: <http://www.atrpt.bj>

ATRPT's remit includes all aspects (i.e. legal, economic and technical) of the regulation of the telecommunication and postal sector.

Legal mission

ATRPT contributes to the development and evolution of the legal framework governing the telecommunication sector and postal services, by initiating draft laws, decrees and acts (orders). ATRPT is also responsible for conducting pre-trial proceedings and licensing, by way of competitive bidding. It is ATRPT that acknowledges receipt of prior statements and grants licenses for the operation of postal and telecommunication activities in Benin. It ensures compliance with the laws and regulations governing the postal and telecommunication sector.

¹ http://www.e-benin.bj/images/image_upload/DPS_DU_BENiN6.pdf

² LRIC+ : LRIC plus overheads mark-up

Economic mission

ATRPT is central to economic regulation within the post and telecommunication sector. It is ATRPT's duty to approve the technical and tariff proposals submitted by interconnected operators, and to recommend maximum rates for benefits related to universal service³. In addition, ATRPT enforces the rules of fair competition in the sector and intervenes to resolve associated disputes, including disputes related to interconnection between telecommunication operators.

Technical mission

On a technical level, ATRPT ensures compliance with specifications and business rules related to the approval of radio and terminal equipment (mobile hand set) intended for connection to a public telecommunication network.

ATRPT also manages the usage of the telecommunication sector's scarce resources: radio frequency spectrum and numbering.

Service provision

The mobile telephony market in Benin is composed of five operators:

- Benin Bell Communications (BBCOM);
- Benin Mobile Telecoms (LIBERCOM);
- Etisalat Benin SA (MOOV);
- Glo Mobile Benin (GLO);
- Spacetel Benin SA (MTN).

The year 2011 was marked by the growth of fixed telephony services, triggered by an increase in the number of users of such services owing to limited mobility technology (CDMA⁴). The number of mobile subscribers also continues to grow, reaching 7 765 200⁵ subscribers in December 2011, against 1 055 700 at the end of 2006, an increase of 636 per cent.

Internet services have performed well, with a 107 per cent increase in subscribers (19 362 subscribers in December 2009, against 9 355 in late 2008) thanks to the emergence of wireless Internet offerings, which now account for 84.3 per cent of total park users (number of subscribers) of the Internet in Benin.

Moreover, the growth of mobile Internet usage is helping ICT become more widely accessible.

Regulatory policies/legal and regulatory framework for tariff regulation

Strategy for regulatory intervention

Regarding Mobile Termination Rates (MTR), the type of price control used is benchmarking. The legal basis for regulatory principles is Act 002-2002 concerning telecommunications and its related texts.

Source: <http://www.atrpt.bj/>

³ Service that ensures coverage even in remote rural areas

⁴ Code division multiple access (CDMA) is a channel access method used by various radio communication technologies.

⁵ http://www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/WTI/CellularSubscribersPublic&ReportFormat=HTML4.0&RP_inYear=2011&RP_intLanguageID=1&RP_bitLiveData=False

A cost-accounting obligation is imposed in accordance with the terms and conditions of the License. This is mandatory for all operators. The data requested from the operators can be audited as stipulated in the specification provided to the operators.

ATRPT has encountered difficulties in collecting the data required to perform regulatory auditing; the challenge lies in obtaining relevant data from operators, and operators' unwillingness to provide the requested information.

The costing tool used is an LRIC+ bottom-up model (see § 1.5) with a top-down reconciliation module. This tool has been fully developed and customized to calculate the interconnection costs for all the operators' networks.

ATRPT selected the École Supérieure Multinationale des Télécommunications (ESMT) to build the LRIC+ bottom-up cost model and to calculate interconnection costs based on that model. Using such up-to-date tools, the ATRPT has been able to analyse and assess Reference Interconnection Offers (RIOs) made by the various operators, taking into account the following:

- setting efficiency principle;
- new technologies;
- sending the right long-run economic signal;
- enabling cost-oriented pricing;
- checking interconnection services costs (call termination, leased capacity).

The mobile voice termination rate in Benin is (in local currency per minute) FCFA 27.53 (USD 0.054).

Challenges

There have been no legal disputes concerning MTR setting, regulation or cost modelling.

Evolutions and challenges foreseen

A review of the law and the regulatory framework is in progress (before the parliament), and is expected to be passed into law and implemented shortly.

Cost-accounting regulation is planned for retail and wholesale services, using a bottom-up costing model.

Specific methods of control regarding roaming, broadband infrastructure, next generation networks (NGNs) and mobile payments have not yet been applied.

Cost accounting and regulatory auditing

Cost accounting

The process of collecting data from the operators will be carried out on an annual basis. Data collection took place once during the development of the model, in June 2011.

Costs and revenues per service, in coordination with operators, have been established.

The operators in question were provided with guidance on ways of aligning their internal data in order to comply with regulatory accounting requirements. The accounting system used for regulatory accounting is LRIC/LRAIC⁶; the cost base used is current cost accounting (CCA); and the concept of capital maintenance

⁶ Long-run average incremental costs

used is financial capital maintenance (FCM). The valuation methodology used is the absolute value (i.e. the current purchase price), while the depreciation method used is linear amortization. Standard duration economic lifetimes are applied to different assets. The allowed cost of capital is 12 per cent.

Regulatory auditing

The issues covered by regulatory auditing are:

- The costs included in, and extent of costs allocated to, the relevant service (wholesale)
- The methods used for cost allocation
- The methods used for capitalization, asset valuation and depreciation
- All matters pertaining to cost accounting.

Under the statutory auditing obligations, the operator in question is required to:

- Provide the auditors with access to all internal data and any required information support
- Respond within a preset time to any issue raised during the verification process.

The operating agreement and related specifications form the legal basis for the audit, which is carried out periodically and on demand; the last audit was conducted in 2009. The operator pays for the audit, and the agency responsible for conducting it is an independent body selected after a call for tender organized by the regulator.

Costing tools and cost modelling

Bottom-up

The model, which is already available and populated with each operator's data, was developed by consultants who worked closely with a senior manager from ATRPT. Data from each operator was collected via a specific request for information, and a hypothetical efficient operator is used for modelling. The duration of the License is ten years, and the demand level (i.e. volume of traffic) is based on a one-year forecast. In the model, the operator has an assumed market share of 30 per cent. The main cost drivers are:

- number of subscribers;
- traffic conveyed;
- average of current coverage by existing networks.

The methodology adopted for the design and dimensioning of the optimal network topology is 'scorched node', which keeps the current network topology and performs a partial optimization of the transmission part of the network.

ATRPT plans to make the model available to operators.

Top-down

In this model, operators' accounting information was obtained through published financial statements as well as specific requests for information. Mobile Network Operators (MNO) data were cross-checked with benchmark data from international operators to remove potential inconsistencies in operator performance.

Benchmarking

Price-setting was based on an average of all prices based on prices from all the different countries in WAEMU/UEMOA region. The method used to convert prices into local currency was on the basis of a one-year average exchange rate

2. BURKINA FASO

Country in brief

<p>Area: 274 200 km² Capital: Ouagadougou Currency: XOF Population: 16 million GDP: USD 10 billion GDP growth: 10% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants: 0.8 Mobile-cellular subscriptions per 100 inhabitants : 57.1 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0.1 Mobile-broadband subscriptions per 100 inhabitants: 0 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Burkina Faso is a landlocked country in West Africa, located between Mali (to the north), Niger (to the east), and Benin, Côte d'Ivoire, Ghana and Togo (to the south).

In 2010, economic growth accelerated, with the growth rate of real GDP rising to 5.7 per cent from 3.2 per cent in 2009. The economic outlook in 2011 and 2012 indicates further growth, at the rate of 6.5 per cent and 6.2 per cent respectively.

On a social level, indicators are improving, but poverty remains a concern. Moreover, the persistence of the crisis in Côte d'Ivoire continues to pose a risk to stability in the subregion.

ICT sector overview

Since 1991, Burkina Faso has embarked on a process of gradual liberalization of its economy, resulting in the divestiture of the telecommunication sector that can be better promoted by the private sector.

Telecommunication reform started in 1998 as one aspect of these dynamic economic reforms. This saw, on the one hand, the creation of a regulatory authority (Autorité de Régulation des Communications Electroniques et des Postes, known as ARCEP); and, on the other, consulted the private sector, during the review of the legal and regulatory framework in order to strengthen ARCEP's ability to regulate public sector operators, so that essential social goals can be met.

The reform process began with the adoption of Law 051-98 of 4 December 1998 on the reform of the telecommunication sector. Source: <http://www.arce.bf>

The telecommunication sector in Burkina Faso is represented by three players: the incumbent, partially state-owned operator ONATEL (Office National des Télécommunications), working in the field of fixed and

mobile telephony through its mobile subsidiary TELMOB; and Telecel and Airtel Burkina (previously Zain Burkina), both of which operate only in mobile telephony.

The period 1998-2005 was fixed as the timescale to prepare the end of ONATEL's monopoly. A new legal and regulatory framework was established, with the new law allowing a partial privatization of ONATEL. By December 2005, when ONATEL's monopoly came to an end, private operators were able to operate throughout the sector; for example, they acquired their own international gateway.

During the same process of sectoral liberalization, a regulatory agency for the telecommunication industry was created in December 1998, called ARTEL (National Agency for Regulation of Telecommunications). ARTEL was replaced by the Regulatory Authority for Electronic Communications (ARCE) on 29 July 2009.

On 25 May 2010, the National Assembly unanimously adopted a new telecommunication law on the general regulation of networks and electronic communications services in Burkina Faso. Source: <http://www.arce.bf>

This law extended the scope of regulation to the postal sector, by replacing the Regulatory Authority for Electronic Communications (ARCE) with the Regulation Authority for Electronic Communications and Post (ARCEP). ARCEP is an independent national institution acting as a legal entity with financial autonomy.

Legal and regulatory policies

In Burkina Faso, price control is exercised using the cost-oriented method for cost accounting. The legal basis is the Regulatory Law 061-2008 of 27 November 2008 on general regulations of networks and electronic communications services in Burkina Faso. Source: <http://www.arce.bf>

This law states that cost accounting is mandatory for all operators. A cost audit is included among the License specifications for all operators. The goal is to ensure that rates are based on actual costs.

For all operators, the tool used to determine the cost of providing the service is an LRIC hybrid model (bottom-up with top-down reconciliation).

Mobile voice termination rate is 25 XOF per minute (0.05 USD), while the retail mobile voice off-net tariff is 90 XOF per minute (0.18 USD).

Challenges

No legal disputes have arisen concerning MTR regulation or cost modelling.

Evolutions and challenges foreseen

Specific methods or strategies to control roaming services, broadband infrastructure, NGNs and mobile payments are under consideration. There is a strong will to orient rates more closely towards costs in order to avoid operators setting tariffs arbitrarily, and in so doing to promote the development of related services.

Interconnection and cost control

Act 061-2008, relating to the general regulation of networks and electronic communication services in Burkina Faso, states that:

ARCEP will encourage, regulate and facilitate adequate access and interconnection and interoperability of services and promote economic efficiency, to sustain competition, thereby providing the maximum benefit to the end user.

Source: <http://www.arce.bf>

Given that, in the absence of effective competition, operators are likely to keep their prices high, ARCEP has the power to impose obligations on them relating to cost recovery and price controls, for the provision of specific types of interconnection and/or access. However, ARCEP takes into account any investments made by the operator and allows a reasonable return on such investments, given the risks involved.

In the case of mandatory cost orientation, it is up to the company to prove that their fees/prices are based on costs, taking into account the need for a reasonable return on investment. ARCEP may use cost-accounting methods independent of those used by the company if appropriate.

Law 051-1998 of 4 December 1998 on telecommunication sector reform establishes that:

- Public Telecommunications Operators of public networks shall give rights, based on objective, transparent and non-discriminatory conditions, to interconnection requests from any operator as well as from telecommunications service providers.
- The interconnection request cannot be refused, if reasonable, based on the demand of the requesting party and the capabilities of the providing party.

Source: <http://www.arce.bf>

Cost accounting and regulatory auditing

Cost accounting

Collecting data from operators is carried out on a monthly basis. The last collection took place on 30 November 2011.

To date, no relevant categorization of cost and revenue has been established in consultation with the operators concerned. Specifications on how the operators concerned should restate their internal data in order to comply with regulatory accounting requirements have not been imposed. However the principles of cost causality are specified in the License agreement.

The accounting system used for regulatory accounting is LRIC/LRAIC. The size of the increment represents the increase in the marginal cost after the introduction of a service unit. The cost base used for regulatory cost accounting is CCA, and the concept of capital maintenance used is FCM.

The lifetime (in years) assumed for different types of asset is:

- civil works/buildings: 25;
- supply equipment: 10;
- License: 10.

The methodology used to calculate the appropriate rate of return is the weighted average cost of capital (WACC).

Regulatory auditing

The issues covered by regulatory auditing are:

- Reconciliation between the cost model and statutory accounts
- Methodologies used for costing and cost allocation
- Methods used for capitalization, asset valuation and depreciation.

Under statutory auditing obligations, the operator in question is required to:

- Provide the auditors with access to all internal data and any required information support
- Respond within a preset time to any issue raised during the verification process.

The legal basis and/or regulatory obligations supersede Law 061-2008 of 27 November 2008.

Source: <http://www.arce.bf>

Regulatory auditing is carried out periodically. Independent auditors are responsible for doing this, and the controller pays for the audit. The last audit performed was paid for by the regulator.

Costing tools and model development

Bottom-up

The cost model used is publicly available and shared with the operators.

The strategy for implementation is consultant-based. The consultants who developed the model were the World Bank and TELECOM ParisTech. The consultant commissioned to implement it is Laurent Gilles from TELECOM ParisTech.

Operators' data, gathered from records obtained through periodic data collection, were used to calculate the costs. The operator in the model is the incumbent operator. The level of demand (i.e. customers, volume of traffic) used is a one-year forecast based on extrapolation. The main cost drivers are:

- traffic;
- network equipment cost (operating expenditure (OPEX) and capital expenditure (CAPEX));
- network topology;
- the cost of capital.

The coverage modelled is an update of existing network coverage, and the market share assumed for the modelled operator is 25%.

The methodology adopted for designing the optimal network topology is scorched node.

OPEX is modelled using a mark-up as a percentage of the network assets. The figures (marked up or otherwise) used to model OPEX were fixed using data from the operators as a basis.

Top-down

This cost model and its associated input are publicly available and shared with all operators.

Operators' accounting information was obtained through data collection templates filled out by the operators.

MNO data were checked for accuracy and to remove potential inconsistencies in operator performance. The key information used to check for potential inaccuracies was the reconciliation of traffic between operators.

The main cost factors in this model are:

- number of subscribers;
- traffic;
- network architecture;
- unit cost of equipment;

- cost of capital.

Benchmarking

No benchmarking of costs is carried out to check the result of cost calculations obtained using an alternative tool.

3. CAPE VERDE

Country in brief

<p>Area: 4 033 km² Capital: Praia Currency: Cap Verdean Escudo (CVE) Population: 0.5 million GDP : 1.9 billion GDP growth: 4.2% Source of data indicators (2012): http://www.worldbank.org Fixed-telephone subscriptions per 100 inhabitants : 13.9 Mobile-cellular subscriptions per 100 inhabitants : 84.2 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 3.8 Mobile-broadband subscriptions per 100 inhabitants : 22.5 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Located some 450 km from the West African coast, the archipelago of Cape Verde consists of ten main islands of volcanic origin, of which nine are inhabited; they are grouped as follows:

- Barlavento islands to the north (Santo Antao, Sao Vicente, Santa Luzia, Sao Nicolau, Sal and Boa Vista)
- Sotavento islands to the south (Maio, Santiago, Fogo and Brava).

The service sector accounts for three-quarters of the Cape Verdean economy. Foreign exchange inflows are mainly in the tourism sector, which represents about 10 per cent of GDP. Agriculture and fishing offer only limited prospects. Cape Verde continues to import about 80 per cent of the food it needs. The tourism industry is looking for export opportunities. Also, the country is outsourcing activities in the manufacturing industry (shoes, clothing, electrical).

ICT sector overview

In June 2007, Cape Verde moved from being among the countries defined by the United Nations as least developed, to the group deemed to have reached an intermediate stage of development. It was the second country in the world to achieve this, after Botswana in 1994.

The ICT sector has played an important role in this progress. In 2005, the Cape Verdean government liberalized the ICT sector and took steps to encourage competition. The incumbent operator, Cabo Verde Telecom (CV Telecom), was partially privatized in 1995. Since then, government-owned shares have gradually been sold off, so that today only 3 per cent of them remain in state hands. CV Telecom is the country's leading Internet service provider. As in many countries, the number of fixed telephone lines in Cape Verde has hardly changed in recent years, while the number of mobile subscribers has increased by almost 40 per cent in just one year. There are now two mobile operators in the country: CV Telecom and T+, the latter being part of Teylium Telecom, a telecom group active throughout West Africa. T+, which began serving the main island of Santiago in 2007, has plans to extend its services throughout the

country. The islands of the Cape Verdean archipelago are connected by a modern fibre-optic backbone, which was completed in 2001. This backbone is connected to a submarine cable, Atlantis II, which carries the bulk of international traffic using two Intelsat earth stations.

Decree 7-2005 of 28 November 2005 established the legal base applicable to telecommunications networks and services, and electronic resources and related services in Cape Verde, and defines the powers of the Agência Nacional de Comunicações (ANAC). [Source: http://www.anac.cv](http://www.anac.cv)

It is the main regulatory framework for interconnection and access as there is no specific regulation covering interconnection.

ANAC must, in accordance with regulatory objectives: *encourage, regulate and facilitate adequate access and interconnection and interoperability of services and promote economic efficiency, to sustain competition thereby providing the maximum benefit to the end user.*

ANAC is responsible for:

- Imposing obligations related to access and interconnection of networks and on companies that provide electronic communications services
- Intervening on its own initiative where justified, including regarding agreements already concluded between certain parties or, in case of lack of agreement between companies, at the request of either party to ensure that the objectives set out are met in accordance with the provisions of the Decree (7-2005 of 28 November 2005).

Operators must comply with the obligations in the form, manner and time determined by ANAC.

When market analysis indicates that a lack of effective competition is allowing operators to keep prices too high, or reduce prices to the detriment of end users, ANAC may impose obligations around recovery costs and price controls, concerning cost-accounting systems for the provision of specific types of access or interconnection.

By imposing the obligations referred to above, ANAC must:

- Take into account the investment made by the operator, allowing him a reasonable rate of return on capital employed, and considering the risks associated with these interconnection obligations .
- Ensure that mechanisms for introducing cost-recovery methods or obligatory prices promote efficiency and sustainable competition and maximize consumer benefits.

This decree (7-2005 of 28 November 2005) defines which operators and which markets are subject to price controls, including the cost orientation of prices and the obligation to separate accounting for interconnection and access purposes. It also takes into account the investment and return on capital opportunity, and the need to adopt a methodology that promotes efficiency, sustainability and competition for the benefit of the consumer. [Source: http://www.anac.cv](http://www.anac.cv)

The SMP operators subject to cost-oriented prices and must demonstrate that their charges are derived from their costs, factoring in a reasonable rate of return on investment.

ANAC may require an operator to provide full justification for its prices and, where appropriate, may determine the scale of any adjustment required.

To calculate the cost of efficient service delivery, ANAC may use cost-accounting methods different from those adopted by the SMPs.

All Operators are required to adopt cost-accounting systems and must make their system public, describing at least the main categories under which costs are grouped and the rules used for cost allocation.

Regarding electronic communications, ANAC is responsible for imposing obligations related to access and interconnection, as needed, on companies that control access to end users, especially those who operate cable distribution networks to interconnect their networks.

Conclusions of the Legislative Decree (7-2005 of 28 November 2005)

Companies are permitted to negotiate and agree on technical and commercial arrangements for interconnection and access; however ANAC may intervene if necessary.

ANAC can intervene on its own initiative, including regarding agreements already concluded or, if there is no agreement between the companies, at the request of either party to resolve, through a binding decision, any dispute relating to obligations.

The pursuit of efficiency, sustainable competition and greater benefit to end users is prescribed in the law.

Where a lack of effective competition allows operators to maintain or enforce high prices, ANAC may impose cost-recovery and price controls, including the obligation to take cost guidance or to follow a system of cost accounting.

ANAC is considering imposing price controls on Movel CV (an operator identified as having significant market power (SMP) in call termination on mobile networks), including obligations to target prices and apply cost-accounting systems.

Finally, the law specifies that ANAC or another independent entity designated by it, is responsible to conduct an annual audit of the Operators' accounting system in order to verify compliance and to ensure price control (as related to the verification of interconnection and access cost) and to publishes the statement(s) arising from the audit.

Legal and regulatory framework for tariff regulation

Strategy for regulatory intervention

The types of price control used in Cape Verde are cost orientation and benchmarking.

Applicable law, the Legislative Decree 7-2005, licences, and any concession contract with the incumbent operator make up the underlying legal and regulatory basis. Source: <http://www.anac.cv>

The reason for imposing price controls on the given service is that, as interconnection is mandatory by law, controlling wholesale prices creates competition and brings retail prices down.

Cost-accounting obligations are not currently imposed, however, plans are under way to implement such obligations.

Data requested from the operators is and can be audited (in accordance with applicable law, Legislative Decree 7-2005 and relevant licences). All operators are involved, particularly those with SMP. At times, some operators have difficulty in providing some of the required data.

ANAC is now developing a bottom-up costing tool to establish the cost of providing voice and data service by mobile operators. All mobile operators are concerned.

Mobile voice termination rate is 10 CVE (0.12 USD), while retail off-net national mobile voice service (in local currency per minute) is 33 CVE (0.39 USD).

Fixed operators developed their own top-down costing model in 2004 for voice service.

Challenges

There have been no recorded legal disputes regarding MTR tariff regulation or cost modelling.

Evolutions and challenges foreseen

No reviews of the telecommunication law and regulatory framework, that could impact the regulation of MTR, are expected to take place.

The following table sets out services for which cost accounting, regulatory auditing and costing tools are implemented, according to ANAC.

	Cost accounting	Regulatory auditing	Costing tool
Retail fixed voice	Yes	Yes	Top down
Retail mobile voice	Yes	Yes	Bottom up
Retail fixed data	Yes	Yes	Bottom up
Retail mobile data	Yes	Yes	Top down
Fixed interconnection	Yes	Yes	N/A
Local loop unbundling	Yes	Yes	Top down
Leased lines	Yes	Yes	Top down

ANAC is considering applying specific regulatory models or strategies regarding these services:

- roaming;
- broadband infrastructure;
- NGNs.

Cost accounting and regulatory auditing

Cost accounting

Data on cost accounting is collected from operators on an annual basis. Such data was last collected in May 2011. Data from 2009 was also available.

Prior to collecting the data, ANAC established relevant cost and revenue categorization in consultation with the operators concerned. It also specified how these operators should reprocess their internal data so as to comply with regulatory accounting requirements.

These requirements cover the following principles: cost causality; cost preparation methodologies (e.g. cost base, valuation and allocation methodologies, treatment of shared and common costs); basis on which assets are valued (i.e. asset lives and depreciation methods); methodologies used to attribute revenues, costs, assets, capital employed; basis used to set internal transfer charges; and handling of costs that are not attributed to the services undergoing evaluation.

The main principle used to allocate network costs, License costs and other costs between voice and data is the cost causality principle.

For mobile services, the allocation methodology used is LRIC/LRAIC. Fully distributed costs (FDC) or fully allocated costs (FAC) methodologies are used for fixed network services.

The size of the relevant increment used is an average increment.

The cost base used for regulatory cost accounting is historical cost accounting (HCA). The capital maintenance concept ANAC uses is operational capital maintenance (OCM).

A straight-line depreciation method is used for regulatory accounting purposes. ANAC applies the following lifetimes (in years) to the different asset types:

- civil works/buildings: 25;
- power equipment: 8;
- access telecommunication equipment: 8;
- core network telecommunication equipment: 8;
- backhaul/backbone transmission equipment: 8;
- License: 15.

ANAC allows operators a rate of return on capital employed to deliver the service. The rate of return allowed is 12.2 per cent for the incumbent; it is not yet applicable to the other operators.

The methodology ANAC uses to calculate the appropriate rate of return is WACC. ANAC estimates the cost of equity using the capital asset pricing model (CAPM).

Regulatory auditing

The issues covered by the regulatory audit are:

- Reconciliation between the cost model and statutory accounts
- Scope of costs included in and allocated to the relevant service
- Methodologies used for cost valuation and allocation
- Methodologies used regarding cost capitalization, asset valuation and amortization
- Transfer charges in separated accounts.

Operators subject to regulatory auditing are required to:

- Provide the auditing body with all the internal supporting data and information it requires
- Respond within a predefined timeframe to any question arising during the audit process.

The underlying legal and regulatory framework for the above obligations is Legislative Decree 7-2005.

Source: <http://www.anac.cv>

Regulatory auditing takes place periodically and is conducted by an independent auditor; the most recent audit was conducted in May 2011. This audit gave rise to certain recommendations, such as the exclusion of donations and of any networks not in use. The financial impact (i.e. cost) of the audit on operators and regulators, taking into account the internal human resources required to conduct it, equates to approximately 30 000 EUR. The cost of the audit is paid for by the regulator.

Costing tools and cost modelling

Bottom-up

A consultant, Omar de Leon, was appointed to develop a bespoke bottom-up cost model. ANAC requested data from existing operators specifically for the purpose of carrying out the modelling. All the existing operators were modelled.

In the model, the timeframe used for recovering costs is 15 years, in line with the standard duration of licences in Cape Verde. The model is calculated using current levels of demand and current market share for the relevant operator.

The key cost drivers are based on volume of traffic, and coverage is an average of the current coverage offered by existing networks.

The level of coverage provided in terms of population and territory is:

- population: 85 per cent (mobile networks);
- territory: more than 80 per cent.

The methodology adopted to design the topology of the optimal efficient network was scorched node. ANAC derived the figures (marked up or otherwise) using actual data obtained from operators and used them to model OPEX.

The key cost drivers of the model are the number of subscribers and volume of traffic.

Top-down

ANAC's top-down model and its associated input dataset are not publicly available at present, owing to the fact that some of this information is confidential and for internal use only. However, ANAC has plans to make this information public as it is a legal requirement to do so.

ANAC obtained operators' accounting information by specific request.

Routing/apportionment factors are used to determine the relative usage of network by the various services (voice, data).

Benchmarking

To check costing outcomes against those obtained using an alternative costing tool, ANAC uses the benchmarking method.

ANAC selected 15 countries for its benchmarking assessment, choosing them on account of their similarity to Cape Verde in terms of population size and density, topography and mobile market. It set the benchmark price based on the five most optimized, regarding their similarity with Cape Verde among the 15 tested.

Prices were converted into the national currency using the latest rate of exchange.

4. Côte d'Ivoire

Country in brief

<p>Area: 322 463 km² Capital: Yamoussoukro Currency: XOF Population: 19.8 million GDP: USD 24.7 billion GDP growth: 9.4% Source of data indicators (2012) : http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants: 1.3 Mobile-cellular subscriptions per 100 inhabitants : 96.3 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0.2 Mobile-broadband subscriptions per 100 inhabitants : 0 Source for data indicators (2012): http://www.itu.int/net4/itu-d/ict/eve/CountryProfile.aspx</p>	
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Côte d'Ivoire, a country in West Africa, is a member of both ECOWAS and the African Union. It is bordered by Burkina Faso and Mali to the north, by Guinea and Liberia to the west, by Ghana to the east and by the Atlantic Ocean to the south. Côte d'Ivoire's political and administrative capital is Yamoussoukro (Abidjan remains the economic capital), and its official language is French.

The economy is primarily focused on the production of coffee and cocoa. During the first two decades after independence, it enjoyed exceptional growth, making Côte d'Ivoire a leading country in the West African subregion. This period (1960 to 1980) became known as the 'Ivorian miracle'.

Côte d'Ivoire nevertheless retains strong economic assets. It continues to benefit from infrastructure it developed thanks to the Ivorian miracle: the second largest port in sub-Saharan Africa and an extensive road network. The country is the largest producer of cocoa in the world, holding nearly 40 per cent of the market, and is one of Africa's leading countries for many other agricultural exports (bananas, cashew nuts, coffee, cotton, Kola nut, palm oil, pineapples and rubber). It has also been operating gas and oil fields for several years, allowing it to export electricity and crude oil as refined products.

Côte d'Ivoire accounts for over one-third of WAEMU GDP, and for nearly two-thirds of WAEMU exports. However the political crisis that began in the country in 2002, and an associated decline in production, has significantly weakened its economy.

ICT sector overview

The telecommunication sector in Côte d'Ivoire has undergone several changes over the past two decades: the Post and Telecommunication Office (OPT) became the National Telecommunications Office (ONT) in 1985, and then CI TELECOM in 1991. These different structures were all state institutions. From 1995, the state initiated a number of reforms to regulate the industry, but also to expand it. The following actions were carried out accordingly:

- creation of regulatory bodies;
- privatization of CI TELECOM;
- authorization of GSM operators;
- authorization of Internet Service Providers (ISP);
- authorization of operators of Very Small Aperture Terminal (VSAT) data transmission or radio.

Law 526-95 of July 1995 was established for the creation of a new telecommunication code, providing for the following bodies to be put in place:

- The Agency for Telecommunications of Côte d'Ivoire (ATCI), responsible for regulation within the sector
- The Telecommunications Council of Côte d'Ivoire (SITC), which acts in the first instance in case of dispute.

Source: http://www.droit-afrique.com/images/textes/Cote_Ivoire/RCI%20-%20Code%20telecommunications.pdf

The new legal framework for telecommunication established three legal policies depending on the nature of the activity, namely:

- exclusive rights or franchise;
- the system of regulated competition or authorization;
- free competition.

Facing enormous economic difficulties that prevented it from developing its obsolete telecommunications network, the government decided to privatize the national telecommunications company, CI TELECOM. Following an international tender, France Telecom acquired a 51 per cent stake in the company, which became Côte d'Ivoire Telecom (CIT) on 3 February 1997.

Five telephone operators share the market:

- Côte d'Ivoire Telecom ;
- Green ;
- KOZ ;
- MTN ;
- Moov.

Legal and regulatory policies

Strategy for regulatory intervention

The types of price control used are cost orientation and price cap.

The legal and regulatory framework in force comprises the regulations developed by ATCI (NRA of Côte d'Ivoire). These incorporate an obligation for cost accounting and a statutory audit. Only fixed network operators are implicated.

Any difficulties encountered in collecting data from operators are due to reluctance among operators to provide such information.

A costing tool to determine the cost of providing the service, using the bottom-up cost model, is in development. However, the following is currently used:

- Mobile voice termination rate (local currency per minute) is 35 XOF (0.07 USD),
- While retail mobile off-net national call rate (local currency per minute) is 100 XOF (0.2 USD).

Evolutions and challenges foreseen

A review of the law and the regulatory framework for the telecommunication code has been completed.

Cost accounting and regulatory auditing

A relevant categorization of costs and revenue has already been established in consultation with the relevant operators.

Specifications on how the operators concerned should restate their internal data in order to comply with regulatory accounting requirements have been imposed. These requirements are based on the principles of cost causality, methodologies of cost treatment, and asset value.

At present, methods used to allocate revenue, costs, assets and capital employed do not include the handling costs of the services under evaluation.

The main principles used to allocate the categories of costs between voice and data are:

- applying a routing matrix;
- using a mark-up for common costs management.

The accounting methodology used is LRIC/LRAIC. The size of the increment is based on the increase in the total cost following the introduction of a service. The cost base used for accounting for regulatory costs is CCA.

The purchase price of the current network equipment is used to provide a valuation of assets (investments).

The depreciation method used is economic annuity.

The lifetimes (in years) applied for different types of asset are as follows:

- civil engineering: 14;
- equipment supply: 7;
- access telecommunication equipment: 7;
- main network telecommunications equipment: 7;
- transmitting equipment, backhaul/backbone: 7;
- License: 10-20.

Operators are granted permission to use a rate of return on capital employed to provide the service. The methodology used to calculate the appropriate rate of return is WACC.

Costing tool and model development

Bottom-up

The cost model (and associated input data) is available and shared among the operators. It is not intended to be made accessible to the public.

Consultants have been recruited to develop and implement the cost model. To do so, they used data obtained from operators by specific request. All operators were modelled.

In the model, the timescale used for cost recovery is the duration of the License. The level of demand (customers, volume of traffic) is calculated using future-based extrapolation. The main cost drivers are traffic and coverage. Existing coverage is modelled using the current average coverage of existing networks.

The methodology adopted for designing the optimal network topology is scorched node. This method was chosen, given the actual number of nodes that already exist across the network. OPEX is modelled using mark-ups as a percentage of CAPEX.

Benchmarking

Benchmarking is used as a complementary tool to check the result of alternative costing tools. Eighteen countries were included in the benchmark base. These were selected based on whether the country had developed and had related cost models.

The price was fixed based on access cost, taking into account findings from the benchmarking exercise. The latest exchange rate was used to convert costs into the national currency.

5. GAMBIA

Country in brief

<p>Area: 11 295 km² Capital: Banjul Currency: Gambian Dalasi (GMD) Population: 1.8 million GDP: USD 917 million GDP growth: 6% Source of data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants :3.5 Mobile-cellular subscriptions per 100 inhabitants :83.6 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0 Mobile-broadband subscriptions per 100 inhabitants :1.2 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteve/CountryProfile.aspx</p>	
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The Gambia is located in West Africa. With the exception of its Atlantic Ocean coastline to the west, it is surrounded entirely by Senegal. Merging with the valley of the River Gambia (from which it derives its name), this country is one of the smaller African states. The capital, Banjul, which is located on the west coast at the mouth of the river, is the country's only major city and has its only seaport.

Of The Gambia's 1.7 million inhabitants, 44 per cent are aged under 15 years. Population density has reached 153 inhabitants per km², with an average annual growth rate of 2.79 per cent. The estimated GDP in GMD is 29.7 billion GMD in 2011, 27.5 per cent of which is derived from agriculture. This sector is employing 70 per cent of the workforce. The industry, secondary sector accounts for only 15.5 per cent of GDP, and suffers from limited power supplies and a slowdown in construction due to reduced remittances from migrant workers affected by the global crisis.

The service sector, fuelled by ICT, including mobile telephony, accounts for 57.1 per cent of GDP. Tourism (mostly tourists from United Kingdom and Germany) accounts for 19 per cent of this sector.

The main economic drivers are:

- the agricultural sector, which accounts for 30 per cent growth;
- the tourism sector;
- telecommunications.

ICT sector overview

The Gambia Public Utilities Regulatory Authority (PURA) is a multi-sector regulator established under The Gambia Public Utilities Authority Act of 2001, which came into force in the latter part of 2003. Under the Act, PURA is mandated to regulate the following sectors:

- broadcasting;
- electricity;
- telecommunications;
- transportation;
- water and sewage sectors;
- other public utilities as subsequently prescribed by the Gambian Government.

Source: <http://www.pura.gm>

The national fixed-line operator, Gamtel, was established in 1990 and has since undergone several capital structure changes. Following financial difficulties, it was privatized in 2007 and then re-nationalized in 2008.

In the field of mobile telephony, four operators share the market:

- Gamcell has been the incumbent GSM company since 2001. It is fully owned by Gamtel and serves 360 000 customers.
- Africell, a subsidiary of Lebanese Lintel, is the market leader with 700 000 customers.
- Commium serves 200 000 customers.
- Qcell, the most recent entrant into the market, has 130 000 customers and is enjoying strong growth.

Legal and regulatory framework for tariff regulation

Strategy for regulatory intervention

The underlying legal and regulatory basis is the ICT ACT of 2009. Source: : <http://www.pura.gm> has difficulties in collecting data from operators, which is mostly owing to reluctance among operators to provide such data. The operators involved are those with SMP and the incumbent, the latter having a monopoly on the fixed network.

Retail off-net national mobile voice service (in local currency per minute) is 3 GMD (0.10 USD).

Challenges

PURA has not yet faced any legal disputes regarding MTR tariff regulation or cost modelling.

Evolutions and challenges foreseen

The following table presents services for which cost accounting, regulatory auditing and costing tools have been implemented or are foreseen:

	Cost accounting	Regulatory auditing
Retail fixed voice	-	Planned
Retail mobile voice	-	Planned
Retail fixed data	Planned	Planned
Retail mobile data	Planned	Planned
Fixed interconnection	Planned	Planned
Bit stream access	Planned	Planned
Local loop unbundling	Planned	Planned
Leased lines	Planned	Planned

	Cost accounting	Regulatory auditing
Access to IGW ⁷	Planned	Planned
Access to IXP ⁸	Planned	Planned

Roaming charges are a major concern for The Gambia, and there are plans to conduct a detailed study on this topic. Strategies related to broadband infrastructure, mobile payments and, particularly, NGNs, are all under consideration. Almost all the country's operators use NGNs.

Cost accounting and regulatory auditing

Cost-accounting obligations are provided for within the law but have not yet been imposed. PURA plans to impose cost-accounting obligations only after undertaking the required market analysis and are in the process of appointing a consultant to carry it out.

In the interim, it has been decided to use benchmarking to control prices. This has greatly helped in ensuring competition and has resulted in almost uniform tariffs across the board. Where cost-accounting obligations are to be implemented, operators with SMP would be affected.

Costing tool and model development

Owing to lack of resources, PURA is not using or developing a costing tool to establish the cost of providing the service, nor is it using or planning to use a cost model (bottom-up or top-down).

⁷ International gateway

⁸ Internet exchange point

6. GHANA

Country in brief

<p>Area: 238 537 km² Capital: Accra Currency: Ghanaian Cedi (GHS) Population: 25.4 million GDP: USD 40.7 billion GDP growth: 7.9% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants: 1.1 Mobile-cellular subscriptions per 100 inhabitants : 100.3 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0.3 Mobile-broadband subscriptions per 100 inhabitants : 33.3 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Ghana is an Anglophone enclave set among French-speaking countries: Burkina Faso to the north, Côte d'Ivoire to the west and Togo to the east. To the south it is bordered by the Atlantic Ocean.

In macroeconomic terms the country has recorded positive economic and financial results since the beginning of the decade, marked by mainly sustained and stable economic growth (5 per cent per year since 2000, with the exception of 2009 when the economy felt the impact of the global economic crisis).

Ghana's economy remains dependent on agriculture (accounting for 60 per cent of the workforce), focused on cocoa production, which has risen to reach 703,000 tons (i.e. around 10.8 per cent, second in the world) in 2011. The secondary sector is dominated by extractive industries: gold (Ghana being the second largest African producer) and, to a lesser extent, diamonds, manganese and bauxite. The manufacturing industry remains small, although it is cited as a national priority. Services are derived from the re-export business and tourism. The contribution to the economy made by Ghana's powerful diaspora, estimated at 2 to 4 billion GHS, is also important. Recently Ghana has become an oil producer.

ICT sector overview

Ghana has witnessed an improvement in the penetration of telecommunication services due to liberalization and the Accelerated Development Plan (ADP) framework for telecommunications, which encouraged the establishment of private networks and saw even large corporate organizations set up their own networks. For instance, the Volta River Authority, the nation's flagship energy producer, set up its own network to promote effective communication among subsystems.

The regulatory agency is the National Communications Authority (NCA), which is backed by Act 524-1996. Source: www.nca.org.gh

It has had its ups and downs, but has largely promoted competition through the regulation of cable, radio, television, satellite and other similar technology to bring about the orderly development and operation of efficient communication services in Ghana. NCA achieved this feat by establishing certain objectives, including the protection of operators and consumers from unfair conduct by other operators with regard to the quality of communication services and payment of service tariffs. NCA also:

- grants licences;
- allocates and regulates the use of frequencies in conformity with international standards;
- provides guidelines on tariffs;
- advises on policy formulation and development strategies for the communication industry.

Telecommunications services available in Ghana include fixed telephony, mobile/cellular, data, private networks and other value-added services. There is a new submarine fibre-optic cable from Voltacom, in addition to Vodafone's SAT3 cable and, the most recent arrival, Glo's submarine cable. Two more fibre-optic facilities will be added very soon; these will help create competition, ending the monopoly enjoyed by the current provider (Vodafone Ghana) on international bandwidth, and will support the ongoing convergence of technologies.

With an accelerated growth pace in market penetration, and given the country's poorly developed fixed-line infrastructure, opportunities exist for the provision of basic voice services as well as Internet access through mobile networks. Liberalization has made mobile phones very attractive to many Ghanaians, who want to enjoy flexibility in communication.

Ghana has a competitive telecommunication market. It has five mobile operators:

- Airtel Ghana;
- Espresso Telecom Ghana;
- MTN Ghana (the dominant operator);
- Tigo Ghana;
- Vodafone Ghana.

Six products were analysed during this assessment. Airtel Ghana is the cheapest operator in the country and slightly reduced its tariffs between January and February 2011 by reducing off-peak, on-net prices. MTN Ghana, the dominant operator, after reducing the Talk-a-lot on-net price between March and April 2011, increased it again in July 2011. However, one month later, in August, tariffs dropped again with the introduction of My Zone. Then, between November and December 2011, MTN Ghana introduced a flat rate for the Talk-a-lot service, reducing off-net prices to the same level as on-net prices. Tigo Ghana dropped its prices between October and November 2011, when it launched a flat pre-paid tariff. Vodafone Ghana is the most expensive operator in the country and did not change its tariff plan during 2011.

The Electronic Communications Act 775-2008 regarding interconnection and tariffs establishes that:

- A network operator shall in addition to the obligations contained in its license or under this Act, provide interconnection of its electronic communications network with the network of another operator.
- A service provider shall be subject to the obligations contained in its license or under this Act, provide for the transmission and routing of the services of other operators or service providers, at any technically feasible point specified by the Authority.
- A request by a network operator to another network operator for interconnection shall be

- (a) In writing, and
- (b) Responded to in writing within fourteen days after receipt.
- A request for interconnection, transmission and routing of service may only be refused on reasonable technical or financial grounds which must be stated in writing.
- The NCA shall promptly decide on an interconnection dispute referred to it within fourteen days after the referral.

An interconnection agreement concluded,

- (a) shall be made available for public scrutiny at the office of The Authority, or
- (b) may be reproduced by the Authority at the request of a member of the public on payment of the prescribed fee, but those parts of the agreement which in the opinion of the Authority contain the commercial strategy of the parties shall not be made available or be reproduced.
- A network operator or service provider who has significant market power shall
 - (a) Disaggregate its network or (and) its service on a cost-oriented basis specified by the Authority for individual elements and offer the elements at the established prices to other operators and service providers,
 - (b) Publish, in the manner specified by the Authority the prices, technical, commercial and other terms and conditions pertaining to its offer for elements of interconnection, and
 - (c) Permit other network operators and service providers to have equal access to directory listing, operator services, directory assistance and directory listing without unreasonable delay, in accordance with requirements specified by the Authority.

Where a network operator or service provider has significant market power and fails to comply with its obligations, the Authority may notify the network operator of a deadline within which it has to comply and if the operator fails to comply, the Authority may apply to the Courts for an order to compel it to comply.

Source: www.nca.org.gh

The Authority may classify a network operator or service provider as dominant if individually or jointly with others, the network operator or service provider enjoys a position of economic strength that enables it to behave to an appreciable extent independently of its competitors and users.

In making the classification, the Authority shall take into consideration the following:

- (a) The relevant market,
- (b) Technology and market trend,
- (c) The market share of the operator or service provider,
- (d) The power of the operator or service provider to introduce and sustain a material price increase independently of competitors,
- (e) The degree of differentiation among networks and services in the market, and
- (f) Any other matter that the Authority considers relevant.

The Authority may only classify or declassify a network operator or service provider as dominant, if it first publishes the intention to do so in the Gazette and on its website.

Tariffs for electronic communications services (except those that are regulated by the Authority), shall be determined by service providers in accordance with the principles of supply and demand.

The Authority may establish price regulation policy, which may include the setting, review and approval of prices by Regulation, where

- (a) There is only one network operator or service provider that has significant market power,
- (b) A sole network operator or service provider with significant market power and cross-subsidies another electronic communications network or service, and
- (c) The Authority detects anti-competitive pricing or acts of unfair competition.

A service provider shall provide rates that are fair and reasonable and shall not discriminate among similarly situated persons, including the service provider and any corporate body with which it is affiliated except as otherwise provided in this Act.

The Authority may prescribe a method to regulate the cost of the service for any public electronic communications service in which a service provider is dominant by establishing a ceiling on the cost, or by other methods that it considers appropriate.

A service provider shall publish the prices, terms and conditions for its public electronic communications services in the terms and in the manner that the Authority shall specify and the prices, terms and conditions shall, be the lawful prices, terms and conditions for the services subject to this Act and the conditions of the license.

Legal and regulatory framework for tariff regulation

Strategy for regulatory intervention

The types of price control used in Ghana are cost orientation and benchmarking. The underlying legal and regulatory basis is the (Electronic Communications Act 775-2008).

Source: <http://www.nca.org.gh/>

The reason for imposing price controls on the service (i.e. the purpose for setting the MTR), is to establish fair and equitable interconnection rates for use by network operators in Ghana, and to ensure such rates are based on the costs associated with the provision of the interconnection services.

Cost-accounting obligations are imposed. The underlying legal and regulatory basis for this is the Ghanaian License for mobile/cellular operation. All operators are implicated.

Data requested from the operators can be audited, in accordance with the terms of the mobile License for mobile operations in Ghana, under information requirements. As before, this applies to all operators.

NCA has no difficulty in collecting data from operators and is using a costing tool to help establish the cost of providing the service. The type of costing tool applied is the bottom-up LRIC+ model. As regards its level of development, InterConnect Communications (the UK consultancy firm appointed to develop the model) has so far run two major interconnection pricing models for Ghanaian networks: 2008-11 and 2012-14. These take all operators into account.

The on-net mobile voice termination rate is 0.0001 GHS, while the retail off-net national mobile voice service (in local currency per minute) is 0.0003 GHS.

Evolution and challenges foreseen

The table below presents the services for which cost accounting, regulatory auditing and costing tools are implemented or foreseen:

	Cost accounting	Regulatory auditing	Costing tool if used or planned (please specify)
Retail fixed voice	-	-	LRIC
Retail mobile voice	Yes	-	-
Retail fixed data	Yes	Yes	-
Retail mobile data	Yes	Yes	-
Fixed interconnection	Yes	Yes	-
Bit stream access	Yes	Yes	-
Local loop unbundling	Yes	Yes	-
Leased lines	Yes	Yes	-
Access to IGW	Yes	Yes	-
Access to IXP	Yes	Yes	-

Cost accounting and regulatory auditing

Cost accounting

Data is collected from operators as follows.

- Frequency and deadline: Monthly, quarterly and annually, depending on the nature of reports
- Actual figures and period covered: Monthly, quarterly and annually, depending on the nature of reports
- Forecast figures and period covered: Quarterly and annually, depending on the nature of reports
- Date of most recent data collection: November 2011.

NCA has already established a relevant cost and revenue categorization in consultation with the relevant operators, and has imposed specifications as to how these operators should restate their internal data in order to comply with regulatory accounting requirements.

The following issues were specified:

- principles of cost causality;
- cost preparation methodologies, e.g. cost base; valuation and allocation methodologies; treatment of shared and common costs;
- basis on which assets are valued: asset lifetimes and depreciation methods;
- attribution methodologies used to attribute revenues, costs, assets and capital employed;
- basis used to set internal transfer charges;
- handling of those costs not attributed to the services under evaluation.

The following principles were used to allocate the cost categories between voice and data.

- Network costs are determined through WACC, LRIC and benchmarking.
- License costs are determined through LRIC, historical cost accounting and benchmarking.

NCA uses the LRIC/LRAIC accounting system for regulatory accounting. The cost base used is HCA and the capital maintenance concept is OCM.

The depreciation method used is economic depreciation. The following lifetimes (in years) are applied to the different asset types:

- civil works/buildings: 10;
- power equipment: 7;
- access telecommunication equipment: 10;
- core network telecommunication equipment: 10;
- backhaul/backbone transmission equipment: 8;
- License: 15.

NCA does not allow operators a rate of return on capital employed to deliver the service.

Regulatory auditing

Operators subject to regulatory auditing are required to:

- Provide the auditing body with access to all internal supporting data and information required
- Respond in a predefined timeframe to any question arising during the audit process.

The underlying legal and regulatory basis for the obligations above is the License for Mobile/Cellular Operations in Ghana, which falls under the NCA Act. Source: <http://www.nca.org.gh>

Regulatory auditing is carried out periodically and on demand. NCA is the body in charge of conducting the audit, the costs of which are covered by the License fees.

Costing tools and cost modelling

Bottom-up

The bottom-up cost model (skeleton, mechanics and associated input dataset) is not publicly available; it is intended for internal use only. While no soft copy of the model is provided to operators, knowledge is shared with them in the form of meetings and a Microsoft PowerPoint presentation on sensitivity analysis. NCA plans to make this presentation publicly available. NCA's strategy is to continue using and updating the existing (bottom-up LRIC) cost model.

To develop the model, the NCA used data obtained from operators by specific request and consultation data template. The modelled operator is a hypothetical efficient operator.

In the model, the timescale used for recovering costs is ten years, while the levels of demand (i.e. customers, volume of traffic) used are based on historic and current levels. The market share assumed for the modelled operator is 25 per cent. The key cost drivers are the number of subscribers and volume of traffic. The level of coverage is an average of the coverage currently provided by the existing network.

The methodology adopted to design the topology of the optimal hypothetical efficient network is scorched node.

OPEX is modelled using a mark-up on network assets. The figures (mark-ups or otherwise) for the OPEX model are derived from operators' data.

Benchmarking

Benchmarking was used as a complementary costing tool, and involved 35 countries.

The basis on which the price was set was a single efficient network model approach, as this is supported by the economic principles of behaviour and trends in competitive markets.

The method used to convert prices into the national currency was the average exchange rate over one year.

7. GUINEA-BISSAU

Country in brief

<p>Area: 36 125 km² Capital: Bissau Currency: XOF Population: 1.7 million GDP: USD 897 million GDP growth: -1.5% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants : 0.3 Mobile-cellular subscriptions per 100 inhabitants : 69.4 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0 Mobile-broadband subscriptions per 100 inhabitants: 0 Source for data indicators (2012): http://www.itu.int/net4/itu-d/ict/eve/CountryProfile.aspx</p>	
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Guinea-Bissau, in West Africa, is bordered by the Atlantic Ocean to the west, by Senegal to the north, and by the Republic of Guinea to the east and south. Although the country is Lusophone, it is enclosed by two Francophone countries: Guinea and Senegal.

Guinea-Bissau is named after its capital, Bissau. Its territory is composed of 28 000 km² (10 810 Miles) of land and 21 031 km² (8 120 Miles) of sea, including 60 islands in the Atlantic Ocean and the Bijagos archipelago (also called the Bissagos archipelago).

The country's economy is essentially structured around agriculture, accounting for about 56 per cent of GDP, which occupies 75-80 per cent of the workforce. Most of these workers are engaged in food production for the local market, particularly cashew-nut production which represents 90 per cent of export earnings. Activities in the secondary and tertiary sectors (representing 12 and 30 per cent of GDP respectively) mainly relate to the transformation of cashews and related service activities (e.g. transport, banking and trade). Although Guinea-Bissau has a coastline, fishing remains underdeveloped, making only a small contribution to GDP. There is potential in the mining sector, given phosphate and bauxite resources, provided that investment is made in port infrastructure. The economy remains heavily hampered by the very poor state of the country's infrastructure, particularly in the energy sector; there is almost no electricity production (a production capacity of 5 MW, with effective production of 1.5 MW).

ICT sector overview

Legal and regulatory framework for regulation of tariffs

The national regulatory authority in Guinea Bissau is the Autoridade Reguladora Nacional das Tecnologias de Informação e Comunicação (ARN). The legal basis underlying regulations are those laws passed regarding telecommunications and the analysis of SMP.

Source: <http://arn-gb.com>

The reason for imposing price controls on the service is based on results and achievements, along with benchmarking to discourage excessive prices practice of the Operators.

Only operators with SMP are subject to cost accounting and regulatory auditing. A cost-accounting obligation is provided for under telecommunication law, but has not yet been enforced because of insufficient resources.

There are plans to develop a costing tool; any such tool would affect the incumbent operator and those operators with SMP.

Regulatory audit

Where a regulatory audit is to be performed, the basic underlying legal and regulatory framework is the law (as indicated above). All operators are affected.

In principle, it is the operator that pays for the audit, even in cases regarding irregular findings and/or where the operator does not accept the findings.

The lowest price observed for retail mobile national off-net voice services (in local currency per minute) is 84 XOF (0.165 USD).

Challenges

Key challenges are the need to secure financing for the establishment of a landing point for a fibre-optic cable, and the need to develop a strategy for the supply of 3G licences.

8. REPUBLIC OF GUINEA

Country in brief

<p>Area: 245 857 Km² Capital: Conakry Currency: Guinean Franc (GNF) Population: 11.5 million GDP : USD 6.8 billion GDP growth: 4% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants :0.2 Mobile-cellular subscriptions per 100 inhabitants :45.6 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0 Mobile-broadband subscriptions per 100 inhabitants :0 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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The Republic of Guinea is located in the south-west of West Africa. With 300 km of Atlantic coastline on its western border, it could be considered a coastal country. To the south it is bordered by Liberia and Sierra Leone; to the east by Côte d'Ivoire and Mali; and to the north by Guinea-Bissau, Mali and Senegal.

Guinea is characterized by a diversity of soil types and an abundance of river systems. The many water courses provide for all its neighbouring countries, making it the 'water tower' of the subregion. The country also has rich, largely untapped, mineral potential (including one-third of the world's bauxite reserves, gold, diamonds, iron, manganese, zinc, cobalt, nickel and uranium). At present the mining sector contributes only 15-20 per cent of GDP.

ICT sector overview

In accordance with Laws 017-2005 and 018-2005 of 8 September 2005, the Regulatory Authority, the Autorité de Régulation des Postes et Télécommunications (ARPT), is mandated to:

- Ensure compliance with legal and regulatory provisions relating to postal and telecommunications, including monitoring compliance by operators to the agreements and conditions of their licenses and permits;
- Take all necessary steps to ensure continuity of service and protect consumers;
- Ensure the planning, management and monitoring of frequency used and the national frequency plan;
- Assign the frequencies and numbering resources to operators and users and ensure their proper use;

- Initiate the process and oversee the tenders for the awards of licenses, i.e. in the preparation of the files and minutes for the office in the Ministry of Post and Telecommunications issuing/awarding the licenses;
- Provide a reasoned opinion for any modification, renewal or withdrawal of license;
- Define the terms and conditions for granting authorization and issuing rights;
- Issue approvals for terminal equipment and radio installations;
- Determine the terms and conditions of interconnection and monitor compliance;
- Ensure that interconnection charges are non-discriminatory, transparent and cost-oriented;
- Define the scope of the tariff policy of the operator of the public postal service;
- Ensure non-discriminatory access to postal activities;
- Collect the Universal Service Fund and the Digital Solidarity and propose to the "Management Committee of the Universal Service" how to use the funds to cover unprofitable rural areas;
- Conduct any expertise investigation or study, the collection of all data necessary for the exercise of its supervisory powers;
- Sanction breaches of operators vis-à-vis their obligations;
- Resolve any request for an opinion on a dispute between operators, including settling disputes in the areas of interconnection and access to private property. In the postal sector, to mediate to resolve disputes between operators or operator and third parties;
- In conjunction with the Minister for Post and Telecommunications, prepare the position of Guinea in international negotiations, negotiate and implement the conventions and treaties and to represent the Minister for Post and Telecommunications in international organizations, regional and subregional;
- Make publicly available all the relevant documents relating to industry regulation, including laws and regulations, notices of tenders, the specifications of the operators.

Source: <http://www.arpt.gov.gn>

The law on the general regulation of telecommunications is relatively clear on the division of tasks between the Ministry and ARPT, the one on the post being slightly less accurate. This division is relatively traditional, with the Ministry focusing on the sovereign functions:

- definition of sector policy and strategy including universal service, preparation (related to ARPT) of laws and regulations, and publication in the Official Gazette;
- assigning, suspending or revoking licences (proposed by ARPT), and permitting criticism of the postal monopoly (without intervention by ARPT);
- representation of Guinea in sectoral bodies, international, regional or subregional institutions; preparation and negotiation of international conventions and agreements regarding post and telecommunications, and then ensuring their implementation (with the support of ARPT);
- promotion of international cooperation (regional or subregional).

Although it is placed under the Ministry in charge of the telecommunication sector, ARPT is endowed by law with a very important role, as it is associated with all the missions of the Ministry. As a result, ARPT has to position itself as a technical expert and advisor to the Ministry. Six telecommunications operators are active in Guinea:

- Areeba;
- Cellcom;
- Intercel;

- Lagui;
- Orange;
- Sotelgui.

Legal and regulatory policies

The types of price control used are cost orientation, and price capping for voice services.

The strategic goal of imposing price controls on the service in question is to achieve a sustainable control mechanism, including the enforcement of cost-accounting obligations.

The legal and regulatory basis applied is the terms of the License, for all relevant operators. However, cost-accounting obligations have not yet been imposed; ARPT is deciding whether or not to impose them.

There is no difficulty in collecting data from operators. To determine the cost of providing services, ARPT uses a costing tool (based on an LRIC hybrid cost model).

Challenges

There have been no legal disputes concerning MTR regulation or cost modelling.

Evolutions and challenges foreseen

A review of the law and the regulatory framework for telecommunications, is pending, in light of the adoption of an ECOWAS Telecommunications framework.

Cost accounting and regulatory auditing

The accounting, auditing, regulatory and costing tools that have been implemented or are planned are described in the table below.

	Cost accounting	Regulatory auditing
Retail fixed voice	-	-
Retail mobile voice	Planned	-
Retail fixed data	Planned	Planned
Retail mobile data	Planned	Planned
Fixed interconnection	Planned	Planned
Bit stream access	Planned	Planned
Local loop unbundling	Planned	Planned
Leased lines	Planned	Planned
Access to IGW	Planned	Planned
Access to IXP	Planned	Planned

The allocation methodology used for regulatory accounting is the marginal cost, applied in relation to the size of the relevant increment.

9. REPUBLIC OF NIGER

Country in brief

<p>Area: 1 267 000 km² Capital: Niamey Currency : XOF Population: 17.2 million GDP : USD 6.6 billion GDP growth: 11% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants : 0.6 Mobile-cellular subscriptions per 100 inhabitants : 32.4 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0 Mobile-broadband subscriptions per 100 inhabitants: 0 Source for data indicators (2012): http://www.itu.int/net4/itu-d/ict/eve/CountryProfile.aspx</p>	
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The Republic of Niger is a country in sub-Saharan Africa. It is bordered to the north by Algeria and Libya; to the east by Chad; to the south by Nigeria and Benin; to the west by Burkina Faso; and to the north-west by Mali. Based on area, Niger is one of the largest countries in West Africa. It is also landlocked, with the nearest port about 1 000 km away.

In 2010, it ranked 167th out of 169 countries on the UNDP Human Development Index, with a GDP per capita in Purchasing Power Parity (PPP) terms of 680 USD, one of the lowest in Africa. However the outlook for Niger's private sector is quite good, given the provisions envisaged under the government's strategy of accelerated development and poverty reduction.

ICT sector overview

Since 1996, and in light of profound technological, economic and regulatory changes within the telecommunications sector in recent years, Niger has, like other countries, committed to a series of restructuring, liberalization and privatization reforms.

These reforms are part of the dynamics of economic globalization and convergence of information technology and communication, both of which are supported by institutions and organizations responsible for regional and international cooperation issues and for the development of the telecommunications sector in collaboration with the Republic of Niger.

Reforms have led to the restructuring, liberalization and privatization of the incumbent operator, SONITEL (Société Nigérienne des Télécommunications).

By 1996, the necessary regulatory reforms had been established through the adoption of Act 031-96 of 11 June 1996. This Law establishes the principle of separation of regulatory functions from entities operating telecommunications services or networks.

Source: <http://www.armniger.org>

This principle was reaffirmed by the Declaration of the Sectoral Policy adopted by the government in September 1999 and reiterated by Decrees 044-99 and 045-99 of 26 October 1999, which created the Multi-sectoral Regulatory Authority in Niger (Autorité de Régulation Multisectorielle, or ARM).

Source: <http://www.armniger.org>

The liberalization of the sector that began in 1996 was completed on 31 December 2004. Indeed, according to the appointments clause of the Declaration of the Sectoral Policy, and Article 67 of Decree 045-99 of 26th October 1999 regulating the telecommunications sector, all telecommunications networks and services were opened up to competition with effect from 31 December 2004.

Source: <http://www.armniger.org>

The government has adopted, under Decree 99-398/PCRN/MCC/JS of 23 September 1999, a Sectoral Policy Statement in which it defines the policies, objectives and strategy consistent with telecommunications development in Niger. Through this declaration, the government has undertaken, among other objectives, to:

- increase the supply of telephone services;
- increase productive investment and national private ownership;
- promote telecommunications as a key economic sector in a growing and competitive economy;
- promote the development of new technologies.

Source: <http://www.armniger.org>

Operators in the telecommunications market are:

- Airtel: mobile operator (previously Zain);
- Moov: mobile operator;
- Orange: mobile operator;
- Sahelcom: mobile operator, a subsidiary of the incumbent operator;
- Sonitel: incumbent operator.

Regarding the functions of the regulator, Decree 2000-371/PRN/MC of 12 October 2000 stipulates detailed rules for establishing and monitoring telecommunications services rates. The Regulatory Authority is responsible for:

- following the evolution of tariffs and accounting rates;
- ensuring compliance by all operators with competition rules;
- ensuring the orientation of fares to costs, especially in the case of framed tariffs;
- developing the modalities of price control and verifying compliance by the operators concerned in accordance with the provisions of the above decree;
- taking regulatory action against anti-competitive practices or abuse of a dominant position;
- verifying the application of published fares, and the principles of equal treatment of customers placed under equivalent conditions of service provision;
- taking regulatory action if the rates of a provider do not comply with price controls;
- taking regulatory action if tariffs for leased lines are not determined on the basis of the average cost of extension;
- hearing disputes between suppliers and initiating investigations on the basis of repeated customer complaints or on its own initiative;

- initiating studies and consultations regarding the pricing of telecommunications services
- proposing adaptations of rate regulation in light of the changing supply of telecommunications services;
- proposing the revision of the taxation of telecommunications services to make it equitable to all suppliers and to eliminate distortion due to taxation.

Regarding interconnection rates, the law states: ‘The interconnection and capacity lease charges are established in accordance with the principle of costs orientation.’

To this end, operators should set up (before the end of the transitional period of five years) cost-accounting processes that will allow them to identify different types of cost:

- general network costs, i.e. costs related to network elements used by the operator for providing services to its users, and interconnection services or lease of capacity;
- specific costs for interconnection services, i.e. costs directly and solely induced by interconnection services or lease of capacity;
- specific costs for operator services other than interconnection, i.e. the cost of implementing only these services;
- costs relating specifically to interconnection services are wholly allocated to interconnection services. Costs specific to operator services other than interconnection are excluded from the base cost of interconnection services;
- These excluded costs are:
 - access (local loop);
 - trade costs, advertising, marketing, sales, non-interconnection related sales administration, billing and collection.

Moreover, the costs allocated to interconnection services should be based on the following principles:

- Costs must be considered relevant, i.e. bound by a form of direct or indirect causality to the rendered interconnection service
- The costs taken into account must lead to an increase in economic efficiency in the long term, i.e. they must take into account any further network investment made on the basis of the best available technologies, and with the aim of achieving optimal dimensioning of the network, in the context of maintaining service quality.

An evaluation of interconnection costs is conducted annually by the operators using the financial accounts of the previous year. It is communicated to the regulatory authority, along with an interconnection reference offer. The regulator defines, as appropriate, the accounting and the detailed cost modelling rules applicable by the operators in order to ensure both consistency in their methods and the economic validity of the results. To this end, operators are involved in the development of these rules.

Legal and regulatory policies

Strategy for regulatory intervention

The type of price control used is cost orientation, which is applied to frame rates in accordance with the stipulations in the national policy for the development of the telecommunications sector.

Act 99-045 and Decree 2000-399/PRN/MC form the legal and regulatory basis for the imposition of price controls on the service in question.

Source: <http://www.armniger.org>

In order to ensure fair and effective competition, a cost-accounting obligation is imposed as stipulated in Article 12 of the abovementioned Act.

Operators will set up an analytical accounting system which will enable them to identify different types of costs' for the following aspects of the service:

- general network costs;
- specific costs relating to interconnection services;
- specific costs relating to services other than interconnection.

All operators are implicated. The data required by the regulator is verified

Article 6.6 of Act 99-045 provides that the regulatory authority may conduct inspections of facilities, give expert opinions, and conduct investigations and studies to collect all data necessary for it to exercise its supervisory powers. Providing information to ARM is not regarded as a breach of professional confidentiality, so ARM should therefore have no difficulty in collecting information from operators.

ARM uses a costing tool to determine the cost of providing the service, incorporating a bottom-up LRIC model and a top-down reconciliation model. ARM has employed this model since 2005. The tool is to be updated with the assistance of a consultant from Telecom Paris. All operators are implicated.

Mobile voice termination rate is (in local currency per minute of call termination) 35 XOF (0.07 USD), while retail off-net national mobile voice service is (in local currency per minute) 120 XOF (0.24 USD).

Challenges

No legal disputes have been raised concerning MTR regulation or cost modelling.

Evolutions and challenges foreseen

The National Regulatory Authority plans to harmonize the legislative and regulatory framework with WAEMU legislation. Doing so will update the texts relating to interconnection.

Cost accounting and regulatory auditing

Cost accounting

The process of collecting data from operators is carried out annually. The size of the relevant increment used is the marginal cost.

Audit regulation

The applicable legal basis and regulatory obligations are Act 99-045 and Decree 2000-399.

The regulatory audit is conducted irregularly. ARM pays for the audit and determines both the agency responsible for conducting it and the selection process for it.

Costing tools and cost modelling

Bottom-up

The model (skeleton, mechanics and associated input dataset) is publicly available. It is shared with the operators that are actively involved: they populate the model and the results are presented for their

comments. Exchanges take place between the consultant and the executives in charge of ARM's cost model.

The model does not generally interest the public but only the operators. However, the results are public and are published on the ARM website as supporting evidence for any decision approving the interconnection catalogue.

A consultant was appointed to conduct training on the LRIC model and methods of applying it to calculate call termination rate. In terms of human resources, this required the participation of eight people (five officials from the Regulatory Office and three engineers from the Telecommunications Sector Directorate) during three months, over the course of one year. A consultant, Mr Laurent Gille, was appointed to help develop the LRIC model and to conduct training on it and methods of applying it; his fees were covered by ARM.

These eight people were involved in collecting data from operators and calculating the rates. Operators were referred to the ARM for guidance in the course of filling out the templates. Discussions took place with operators to establish their method of reviewing contracts and calculating equipment costs.

In the model, it is the incumbent operator that is modelled. The timescale used for cost recovery is the duration of the License. The level of demand used is the current level, and the operator's market share is assumed to be the same as its current market share. The main cost drivers are traffic (total, by service, at the busiest times), network topology and relevant expenditure. The coverage modelled is the current average coverage provided by existing networks. The methodology adopted for the design of effective optimal network topology is scorched node; this ensures the model is in line with reality by taking into account the actual topology of the network (nodes). OPEX is calculated using mark-ups as a percentage of the network assets.

Benchmarking

Benchmarking is used as a complementary tool to calculate call termination rates, and the main tool used to calculate capacity rental rates.

Benchmarking is based on WAEMU countries and extended to include ECOWAS countries. Countries were selected on account of their similarity to Niger, all being landlocked and all forming part of the same region.

The price is very often fixed on the basis of an average of prices in the selected countries. Where necessary, prices are converted into the national currency using the most recent exchange rate. For member countries of WAEMU, which use a common currency, the problem does not arise.

10. NIGERIA

Country in brief

<p>Area: 923 768 km² Capital: Abuja Currency: Naira (NGN) Population: 168.8 million GDP: USD 262.6 billion GDP growth: 6.5% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants : 0.3 Mobile-cellular subscriptions per 100 inhabitants : 67.7 Fixed (wired)-broadband subscriptions per 100 Inhabitants: 0 Mobile-broadband subscriptions per 100 inhabitants : 10.2 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Nigeria, the most populous country in Africa, is situated on the Gulf of Guinea in West Africa. It is neighboured by Benin, Cameroon, Chad and Niger. The lower course of the Niger River flows south through the western part of the country into the Gulf of Guinea. Swamps and mangrove forests border the southern coast, while hardwood forests feature inland.

The Nigerian economy is still dominated by the hydrocarbons sector, which represents 39 per cent of GDP and over 90 per cent of Foreign Direct Investment (FDI).

Although rich in oil, the country is facing a state of emergency in the energy sector. Some 70 per cent of the population continues to depend on firewood for energy, as the country's power generation capacity is less than 4 000 MW (compared to South Africa, with a population of 48 million inhabitants and a production capacity exceeding 36 000 MW), and gas derived from oil is mispriced. Refining capacity being insufficient, Nigeria is, paradoxically, forced to import refined petroleum products.

ICT sector overview

The first phase in the Nigerian telecommunications evolution was the period covering 100 years from the colonial era, through political independence in 1960, to the year 2000.

From 1886, when the first telegraphic submarine cable was laid by the British firm Cable & Wireless Limited, until independence, Nigeria had just 18 724 fixed telephone lines. Between 1960 and the year 2000, the active subscriber base grew to 400 000 fixed lines across the population, then estimated at 120 million. This lengthy period was characterized by several restrictions in the sector, and particularly by the monopolistic approach to telecommunications businesses that was then common across the globe.

The second phase in the historical evolution of the Nigerian telecommunications sector, between 2000 and 2011, was the most eventful. It could be described as Nigeria's telecommunications revolution, given

that it saw quantum growth among diverse fields of telecommunications services delivery, and regulatory advancements that contributed significantly to the country's GDP.

Although a policy of liberalization began to manifest itself in the early 1980s. Two factors drove this historic phase in Nigerian telecommunications:

- A strong desire on the part of the democratic government to liberalize the sector
- The subsequent installation of a strong, independent regulatory body, sustained by professionals with clear vision and purpose regarding global trends in telecommunications evolution along with their business potential, and an understanding of how to translate them into service delivery within Nigeria.

The first mobile services in Nigeria were introduced in 2001, but growth in the mobile communication sector has been so rapid that mobile penetration swiftly surpassed fixed-line penetration, with wire-line penetration struggling at barely 1 per cent (2005).

In Nigeria's fixed-line market, the government operator, NITEL, dominates the other 24 private operators providing fixed-line services. The whole fixed-line sector has been faced with serious issues such as liquidity problems and capital adequacy. Nevertheless, liberalization of the telecommunications sector and a subsequent increase in competition have been the key drivers of growth in this sector, and have also brought benefits to customers in terms of lower prices and enhanced services and diversity of choice.

Total telecommunications investment in Nigeria reached 10 billion USD by the end of 2004.

Mobile market

The total number of mobile subscribers in Nigeria as of 2011 was 95.2 million, with 58.58 mobile subscriptions per 100 people.⁹

The Nigerian mobile market is a comparatively young market by African standards. However, it has emerged as the fastest growing mobile market in Africa, registering triple-digit growth rates in subscriber numbers.

The rapid growth of the mobile market is primarily due to the government's liberalization policy and the subsequent increase in competition in the market. Greater competition has resulted in an increase in the country's subscriber base, reduced tariffs, wide network coverage and high quality of service, along with the creation of employment opportunities. The operators are witnessing lower Average Revenue Per User (ARPU) and a slow rise in profits, driven largely by lower mobile tariffs and the growth of low-income and low-usage subscribers.

The current list of GSM operators consists of:

- Airtel (formerly Zain);
- Etisalat;
- Glomobile;
- MTN.

NITEL's M-Tel also provides a service. All operators provide services based on 2G (GSM) and 2.5G (GPRS) networks. Although 3G services are not yet available in the country, MTN is expected to launch these services using UMTS¹⁰ technology.

⁹

<http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/datavisualization.pdf>

CDMA technology has had a more checkered history, hampered by its lack of national and comprehensive geographical coverage. Current operators of this technology are Multilinks, Starcomms, Visafone and ZoomMobile. Multilinks was acquired by South Africa's Telkom, but is now up for sale.

The Nigerian mobile market also has a large number of value-added services (VAS) companies, such as A3&O, Cellulant, 3G Reality Centre, Entegration Solutions, MTech, SaveMyContacts, TaviaTxt, and Textnigeria, which generate mobile content to deliver VAS via the GSM network operators. The mobile operators share the revenue equally with these private VAS companies, barring M-Tel, which has yet to develop a relationship with a VAS company.

Interconnection law and policy

The law regarding interconnection (Nigerian Communications Act 2003) states that:

If a network services or facilities provider receives a request for interconnection from another service provider, then the service or facilities provider is obligated to interconnect its communications system with the other network provider at technically feasible locations, in accordance with the principles specified and pursuant to the terms and conditions negotiated between the parties in good faith:

- All interconnection agreements between license holders shall be in writing and shall comply with:
 - a) The regulations and guidelines published from time to time by the Commission in pursuant of this Act, and
 - b) The principles of neutrality, transparency, non-discrimination, fair competition, universal coverage, access to information, equality of access and equal terms and conditions.
- The terms and conditions of interconnection agreements shall primarily be agreed upon between the parties thereto and the Commission may intervene and make binding rulings in its own initiative or at the initiative of either or both parties to the agreement:
 - a) If the Commission determines that the agreement or any provision thereof is inconsistent with the provisions of this Act or its subsidiary legislation; or
 - b) In the event of a failure of consensus between the parties on specific issues or a delay in reaching such consensus; or
 - c) If the Commission considers it in the public interest to so intervene at its own initiative and without any invitation from either or both parties to the agreement.

All interconnection agreements shall be registered with the Commission, by either or both parties thereto, within 30 (thirty) days from the date of execution thereof.

- The parties shall furnish the Commission with any additional information that the Commission may require in respect of such interconnection agreement.
- The Commission may, upon evaluating the terms and conditions and the charges set out in the interconnection agreement, require the parties thereto to revise the agreement, if, in the Commission's opinion, the agreement is inconsistent with this Act or the regulation or the interconnection guidelines or the integrity of the public network.

¹⁰ The Universal Mobile Telecommunications System (UMTS) is a third generation mobile cellular system for networks based on the GSM standard.

- (1) The Commission shall make interconnection regulations which may specify, but shall not be limited to model terms and conditions for interconnection agreements between service providers.
- (2) Matters which the interconnection regulations shall address include but are not limited to:
 - a) The time frame and procedures for negotiations and the concluding of interconnection agreements
 - b) Quality and levels of service
 - c) Rate methodologies
 - d) Protection of intellectual property
 - e) Protection of commercial information
 - f) Provisioning of facilities, and
 - g) Sharing of technical information.

Notwithstanding the terms and conditions of any interconnection, a party thereto shall not at any time and in any circumstance disconnect or discontinue interconnection to any interconnecting party without the prior written approval of the Commission.

TARIFF RATE REGULATION

1. Holders of individual licenses shall not impose any tariff or charges for the provision of any service until the Commission has approved such tariff rates and charges except as otherwise provided.
2. The individual holders as specified above, shall provide services at the tariff rates and charges so approved by the Commission and shall not depart there from without prior written approval by the Commission of such proposed changes in tariff rates and charges.
3. All holders of individual licenses shall publish the tariff rates charged to customers for their respective services and the modifications thereto as may be approved from time to time by the Commission.
4. The tariff rates established by a holder of license, shall be on the basis of such principles as the Commission may from time to time stipulate in its guidelines or regulation regarding the tariff rates including the following —
 - a) Shall be fair, and for similarly situated persons not discriminatory;
 - b) Shall be cost-oriented and, in general, cross-subsidies shall be eliminated;
 - c) Shall not contain discounts that unreasonably prejudice the competitive opportunities of other providers;
 - d) Shall be structured and levels set to attract investments into the communications industry; and
 - e) Shall take account of the regulations and recommendations of the international organizations of which Nigeria is a member.

Notwithstanding the provisions of the **TARIFF RATE REGULATION**, the Commission may intervene in such manner as it deems appropriate in determining and setting the tariff rates for any non-competitive services provided by a provider for good cause or as the public interest may require.

- (1) The Commission may from time to time make rules or regulations on determination and publication of tariff rates for respective services by the individual license holders.
- (2) The regulations and rules which may be made by the Commission may include but are not limited to:
 - a. Rules about the tariff rates and charges and variation of rates for specified or several classes of services

- b. Rules about the publication or disclosure of tariff rates for specified or several classes of services; or
- c. Tariff rate models that may be applicable to specified individual license holders or different classes of individual license holders or specified or classes of services.

Notwithstanding any other provision of this Act, the Commission shall prescribe and enforce appropriate financial penalties upon any holder of an individual license who exceeds the tariff rates duly approved by the Commission for the provision of any of its services.

Source: <http://www.ncc.gov.ng>

Legal and regulatory framework for tariff regulation

Strategy for regulatory intervention

The underlying reason for imposing price controls on the service in question is to deepen competition and market growth. The type of price control used is retail minus. The relevant market analysis is the underlying legal and regulatory basis.

The underlying legal and regulatory basis is the License conditions and the Nigerian Communications Act 2003.

Cost-accounting obligations are not currently in force, however the Nigerian Communications Commission (NCC) plans to impose them. NCC has yet to determine SMP, reference Interconnection offer obligations and other SMP obligations. Only operators with SMP would be implicated.

NCC has no difficulty in collecting data from operators. Although data obtained from operators is not currently being audited, because of insufficient scope – detail of submitted data -, such data can be audited in the future.

NCC is using a costing tool (bottom-up cost model) to establish the cost of providing the service. However, it needs manpower as well as capacity building in cost Modelling skills. All operators, including data operators, are taken into account during the costing exercise.

Mobile voice termination rate is (in local currency per minute) 10.8 NGN (0.0687 USD), while retail off-net national mobile voice service is (in local currency per minute) 38 NGN (0.2417 USD).

Challenges

The NCC has faced legal disputes regarding MTR regulation and cost modelling, coming from new entrants and operators with low economies of scale. The subject of the dispute has been around the costing elements and financial data, along with the methods of cost allocation. This has resulted in the need for additional consultancy on Cost of Capital and Busy Hour (Erlang) determination.

The disputes have had an impact on tariff regulation and the cost modelling strategy.

Evolutions and challenges foreseen

No review of the telecommunications law and regulatory framework is foreseen that could impact the regulation of MTR.

The table below indicates those services that have implemented, or plan to implement, cost accounting, regulatory auditing or costing tools.

	Cost accounting	Costing tool if used or planned
Retail fixed voice	Yes	Bottom-up LRIC+
Retail mobile voice	Yes	-
Retail fixed data	No	-
Retail mobile data	Yes	-
Fixed interconnection	Yes	-
Bit stream access	Planned	-
Local loop unbundling	No	-
Leased lines	Planned	-
Access to IGW	No	-
Access to IXP	Planned	-

The following specific regulatory models or strategies apply:

- no regulation on roaming;
- encouraging private participation and foreign investment in broadband infrastructure;
- no plans to introduce NGNs;
- mobile payments are made in collaboration with the Central Bank of Nigeria.

Current challenges include weak backbone infrastructure; however, there are also opportunities, given low broadband and Internet penetration.

Cost accounting and regulatory auditing

Cost accounting

Data is collected from operators as follows:

- annualized financial and industry statistical data;
- actual figures taken from three years in the cost model;
- forecast figures taken for two additional years (using percentage growth rate);
- data collection has taken place three times: 2003, 2006 and most recently in December 2009.

NCC has already established a relevant cost and revenue categorization in consultation with the operators in question. It has imposed specifications as to how these operators should restate their internal data so as to comply with regulatory accounting requirements. Specifications are as follows:

- no principles of cost causality;
- no cost preparation methodologies;
- no basis on which assets are valued;
- no attribution methodologies used for revenues, costs, assets, capital employed;
- no basis used to set internal transfer charges;
- no handling of costs that are not attributed to the services valued.

The main principles used to allocate cost categories between voice and data are as follows:

- network costs – current cost accounting;
- License costs – amortization over the lifetime of the License;
- other costs – attributable cost.

NCC uses LRIC/LRAIC as its accounting system/allocation methodology. The size of the relevant increment used is marginal i.e. the increase in costs following the introduction of a small service unit.

NCC uses CCA for regulatory cost accounting, and OCM as its capital maintenance concept. For asset valuation (i.e. investment), it applies the following methodologies:

- indexation (i.e. original prices to which indices are applied);
- historical cost applied with inflation factor.

The depreciation method used by NCC is the tilted annuity method, with lifetimes (in years) applied to the different types of asset as follows:

- civil works/buildings: 10;
- power equipment: 2;
- access telecommunications equipment: 15;
- core network telecommunications equipment: 15;
- backhaul/backbone transmission equipment: 10;
- License: cost divided by the lifespan of the License, i.e. amortized annually.

NCC allows operators a rate of return (Average Industry Borrowing Cost) on capital employed to deliver the service. The methodology it uses to calculate the appropriate rate of return is WACC.

NCC estimates the cost of equity with beta factor and CAPM, using the current debt and equity profile in the industry.

Regulatory auditing

Only operators with SMP are concerned by the regulatory audit.

Costing tools and cost modelling

Bottom-up

The cost model (skeleton, mechanics and associated input dataset) is shared with the operators.

The strategy adopted for implementation is in line with the cost models developed by the consultants (PriceWaterHouse Coopers and Detecon), and the cost (i.e. consultancy fees) of developing the model is estimated at between USD 158 599.37 and 190 319.25.

In terms of internal (NCC) human resources, four people were involved with the modelling work, although no information was provided regarding the amount of time they had spent on it.

NCC used data from operators, collecting these by specific statistical data request.

In the model, the operator is a hypothetical efficient operator. The timescale for recovering costs is based on License duration and the lifespan of network cost elements. NCC uses future level based on extrapolation. The market share assumed for the modelled operator is the actual market share of the operator. The key cost drivers are:

Nigeria

- network demands;
- transmission;
- traffic pattern;
- call volumes;
- Busy Hour Erlang;
- WACC;
- subscriber base.

Coverage represents an average of the current coverage provided by existing networks, as follows:

- percentage of population covered: 69.4 per cent
- percentage of territory covered: 60 per cent

The methodology adopted to design the topology of the optimal efficient network was scorched node, owing to the level of coverage and signalling links associated with this methodology.

OPEX was modelled using a mark-up on network assets; the same mark-up was applied to all network assets. The marked-up figures used to model OPEX were derived from operators' data.

11. SENEGAL

Country in brief

<p>Area: 196 722 km² Capital: Dakar Currency : XOF Population: 13.7 million GDP : USD 14.2 billion GDP growth : 4% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants: 2.6 Mobile-cellular subscriptions per 100 inhabitants : 87.5 Fixed (wired)-broadband subscriptions per 100 inhabitants: 0.7 Mobile-broadband subscriptions per 100 inhabitants: 3.8 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Senegal is a Sahelian country located in western Africa. It is bordered by Mauritania to the north, Mali to the east, Guinea and Guinea-Bissau to the south, and The Gambia and the Atlantic Ocean to the west.

Senegal is a member of WAEMU. Its economy is dominated by a few strategic sectors, including agriculture (groundnuts), fisheries and services. However, the role of the agricultural sector, especially groundnut production, is in decline, due to Senegal's proximity to the arid Sahel region, which has resulted in frequent droughts. High levels of rural poverty and limited access to rural infrastructure and basic services have fuelled migration to urban areas, and the country's informal sector accounts for about 60 per cent of GDP, which was estimated at 6 813 billion XOF in 2011.

ICT sector overview

After gaining independence in 1960, Senegal, like other French West African countries, set up an Office of Post and Telecommunications (OPT).

In 1968, the company Télésénégal was created to take charge of international communications previously administered by France Cable and Radio (FCR). A few years later, the Government of Senegal adopted Law 39-72¹¹ on telecommunications.

The year 1985, following a decision by the State of Senegal to separate telecommunications from post (both established through Act 35-85 and Act 36-85 of 23 July 1985).

Source: <http://www.artpsenegal.net>

¹¹ http://www.gouv.sn/IMG/pdf/document_Telechargez_le_code_des_Telecoms_6.pdf

In 1996, the state completed the first phase of liberalization of the sector with the enactment of Law 03-96 on Telecommunications Code. This encouraged the rise of Sonatel and the liberalization of the mobile telephony segment. In 1997, the state proceeded with the privatization of Sonatel.

In 1998, the state awarded a second GSM license to SENTEL (now TIGO), which commenced operations in 1999.

In 2001, the National Assembly passed Bill 15-2001 with the Telecommunications Code.

In November 2007, the State of Senegal assigned a new License to Expresso Senegal. This was the second global License to be granted in Senegal (after that of Sonatel).

On 28 January 2011, the National Assembly adopted a new telecommunications code. This, together with Law 01-2011 of 24 February 2011¹², comprised the new legal framework for the telecommunications sector.

Today, the telecommunications sector is considered to be a strategic sector for national wealth creation and has contributed significantly to the improvement of Senegal's economic and social development. Owing to its importance in the national economy, telecommunications has become a key factor in supporting modernization and competitive growth among firms in Senegal.

Regulatory framework

Senegal's regulatory authority for telecommunications and postal services (Autorité de Régulation des Télécommunications et des Postes, or ARTP) is a legal and public institution with financial autonomy under the authority of the President of the Republic. Its overall mission for telecommunications regulation is summarized below.

General mission:

- Provide the telecommunications and postal sector with an effective regulatory framework based on transparency and the promotion of fair competition for the benefit of users of telecommunications networks and services
- Encourage the creation of jobs directly or indirectly related to this sector
- Conduct any public duties as assigned by the government in relation to telecommunications and postal services.
- **Legal mission and regulatory power:**
 - At the request of the President of the Republic or on its own initiative, draft laws and regulations regarding telecommunications, postal and ICT services
 - Make regulatory decisions.
- **Administrative mission:**
 - Monitor competition and punish anti-competitive practices, including abuse of dominance
 - Audit network operators and telecommunications services providers on an annual basis
 - Organize competitive bidding for the selection of operators of telecommunications networks available to the public
 - Allow independent networks and cryptology.

¹² <http://www.gouv.sn/Code-des-telecommunications.html>

Technical mission:

- Ensure the planning, management and control of the frequency spectrum
- Ensure the management of the national numbering plan
- Develop standards for cryptography
- Set the conditions for prior approval of equipment, laboratories and installation of radio equipment.

Economic mission:

- Approve the standards for network interconnection
- Set permit fees for independent networks
- Approve the rates for telecommunications services under monopoly and universal service tariffs.
- **Mission of investigation, control and sanction:**
- Ensure that the provisions contained in the licences, authorizations and approvals are issued under the Law 01-2011 of 24 February 2011
- Ensure provisions for interconnection services
- Request and analyse all information required from the operators
- Issue formal notices to operators that do not meet their obligations and decide on any financial sanctions
- Receive and treat disputes between management and operators, and between operators themselves
- Receive and investigate complaints from consumer organizations and monitor their treatment by the operators.

Service provision

Mobile communication has formed the backbone of the telecommunications sector in Senegal in recent years, with the presence of three operators: Orange, Tigo and Expresso (listed in order of their arrival on the market). The only two players in the fixed-line segment are Orange and Expresso.

Interconnection rates

Operators provide interconnection on a non-discriminatory basis.

The interconnection charges and capacity-lease fees are established in accordance with the principles of cost orientation. To this end, operators maintain separate accounts for their interconnection business. This accounting separation enables them to identify the different types of costs, as follows:

- general network costs, i.e. costs related to network elements used by the operator, both for the services to its users and for interconnection services or lease capacity;
- specific costs relating to interconnection services, i.e. costs directly incurred solely by interconnection services or lease capacity;
- specific costs relating to operator services other than interconnection services, i.e. the cost of implementing these services alone;
- common costs, i.e. any costs not covered by the preceding categories.

Costs specific to interconnection services are allocated entirely to interconnection services.

Costs specific to operator services other than interconnection services are excluded from the base cost of interconnection services. The costs of access (local loop) and marketing (including advertising, sales, sales administration of interconnection, billing and collection outside interconnection) are specifically excluded.

Moreover, the costs allocated to interconnection should be based on the following principles.

- The costs must be relevant, i.e. bound by a form of direct or indirect causality to the interconnection service provided
- The costs in question must lead to an increase in economic efficiency in the long term, i.e. they must take into account any further network investment made on the basis of the best available technologies and with the aim of achieving optimal dimensioning of the network, in the context of maintaining service quality.

The methods of cost accounting applied must respect the principles of non-discrimination and relevance.

Rates include a fair contribution of costs, in accordance with the proportionality principle of costs that are common to both interconnection services and other services, in line with the principles of cost relevance.

- Rates include a normal return on capital employed
- Rates are flexible according to time slots, to reflect the congestion of transmission capacity and network switching of the operator
- The unit rates applicable for interconnection services are independent of volume or capacity of the network elements typically used by this service
- The unit pricing should reflect the needs of interconnected operators.

Operators conduct an annual evaluation of interconnection costs, based on the accounts of the previous year. It is communicated to ARTP, along with the interconnection catalogue.

Expenses related to the audit of public telecommunications network operators are part of the cost base taken into account when calculating interconnection costs, as stipulated in the Telecommunications Code.

ARTP defines, as necessary, detailed accounting and modelling rules for application by operators in order to ensure consistency of methods and economic validity of results. To this end, operators are consulted in the development of these rules.

Interconnection Pricing

Pricing has two components:

1. a fixed part, depending on the implemented capacity;
2. a variable, depending on the traffic conveyed.

Operators contribute to the development of the method proposed by ARTP by communicating, at its request, any technical, economic, and accounting information that is required in respect of commercial confidentiality.

Legal and regulatory framework of tariff regulation

Strategy for regulatory intervention

The type of price control used is MTR, which is cost oriented.

For the service in question, namely, mobile voice transmission, the legal basis is Article 23 of the Telecommunications Code. It is regulated by Article 47 of the same code (Law 01-2011 of 24 February 2011).

The data requested by ARTP from the operators are checked and audited.

The statutory audit is conducted under section 42, paragraph 2 of the Telecommunications Code. Operators' accounts and summary statements 'are subject to audit annually by an organization designated by the regulatory authority'.

All operators are implicated, according to article 42, paragraph 1 of the Code, which applies to all licensed operators (of telecommunications networks and services).

The data are not currently checked because there is no verification framework. ARTP has difficulty in collecting data from operators owing to a lack of guidelines for cost accounting, including its regulatory aspects.

ARTP uses a bottom-up costing tool to price up service delivery. This was used until 2009 and is expected to be updated. The operators implicated are those with SMP.

Mobile voice termination rate is (in local currency per minute) 23.4 XOF (0.047 USD).

Challenges

ARTP has encountered legal disputes concerning MTR regulation and cost modelling, as in the case where a new entrant (Expresso) disagreed with the incumbent Sonatel over the network termination rate. This occurred in the second quarter of 2009. As result of the dispute, ARTP has defined the termination rate, based on previous interconnection agreements. This dispute has not had any impact on the regulation and strategy of cost modelling.

Evolutions and challenges foreseen

A review of the law and the regulatory framework for telecommunications is expected. This could affect the regulation of MTR.

The table below indicates those services that are implementing, or plan to implement, cost accounting, regulatory auditing or regulatory tools.

	Costing tool if used or planned
Retail fixed voice	Not determined
Retail mobile voice	Not determined
Retail fixed data	Not determined
Retail mobile data	Not determined
Fixed interconnection	Bottom-up
Bit stream access	Bottom-up
Local loop unbundling	Not determined
Leased lines	Bottom-up
Access to IGW	-
Access to IXP	-

The status of application projects, specific models or regulatory strategies is as follows:

- Roaming: the strategy is in consultation with stakeholders
- Broadband infrastructure: the aim is to pool infrastructure
- NGN: a model developed in 2006 is being updated
- Mobile payment: none is envisaged.

Cost accounting and regulatory auditing

Cost accounting

The most recent data collection process was carried out in 2009, to update the model and the operators were consulted.

No specifications have been imposed as to how the operators should deal with their internal data in order to comply with regulatory accounting requirements.

The allocation methodology used for regulatory accounting is LRIC/LRAIC. The size of the relevant increment used is service increment. The methodology used to calculate the appropriate rate of return is WACC, and ARTP estimates the cost of equity by the same WACC regulatory audit.

The Telecommunications Code provides the legal basis and regulatory obligations. The regulatory audit takes place every year, and the agency responsible for conducting the audit is appointed by the regulator, following a tender. The operator pays for the audit as well as for the costing tools and cost modelling.

Bottom-up

For reasons of confidentiality, and because no audit has been carried out to date, ARTP's model is not publicly available and is for internal use only. The results and philosophy of the model are presented to operators, but ARTP has no plans to make it publicly available. The goal is to have TERA consultants¹³ develop a customized model.

ARTP used data from operators, having collected these by specific request.

In the model, the operator is the existing operator and the timescale for cost recovery is ten years. The level of demand (i.e. customers, volume of traffic) used is the current one, and traffic is the main cost driver. Coverage is based on the actual coverage provided by the modelled operator, and is as follows:

- percentage of population covered: 55 per cent;
- percentage of territory covered: 85 per cent.

The methodology adopted for the design of effective optimal network topology is scorched node. OPEX is modelled using a mark-up on network assets. A variety of increases, depending on the asset type, are used to model OPEX figures (marked up or otherwise).

Benchmarking

Benchmarking is used as a complementary tool to check the result of calculations made using an alternative costing tool.

¹³ <http://www.teraconsultants.fr>

ARTP used ten countries (European countries, Maghreb countries and countries of the subregion) to calculate its benchmark. These were chosen on the basis of ARTP experience, and comparison with neighbouring countries and countries proposed by operators. Prices were converted into the national currency using the most recent exchange rate.

12. TOGO

Country in brief

<p>Area: 56 785 km² Capital: Lomé Currency: XOF Population: 6.6 million GDP: USD 3.8 billion GDP growth: 6% Source for data indicators (2012): http://www.worldbank.org</p> <p>Fixed-telephone subscriptions per 100 inhabitants: 3.6 Mobile-cellular subscriptions per 100 inhabitants : 56 Fixed (wired)-broadband subscriptions per 100 Inhabitants : 0.1 Mobile-broadband subscriptions per 100 inhabitants : 0.7 Source for data indicators (2012): http://www.itu.int/net4/itu-d/icteye/CountryProfile.aspx</p>	
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Togo is one of the smaller African states, stretching 600 km from north to south and nowhere more than 100 km wide. Despite its size, Togo is recognized for the great diversity of its landscape.

Togo's economy is based on the transit trade, agriculture and the exploitation of phosphates. The informal sector is very important. Economic growth is low while population growth is high.

ICT sector overview

In 1996, Togo adopted a sectoral policy declaration on post and telecommunications. One objective of the government was to separate these two areas, which have historically been grouped, to allow each to develop according to its own specificities. Regarding telecommunications, the challenges were:

- to make telecommunications services accessible to as many people as possible, with quality and competitive costs being key;
- to make this sector a key driver of socio-economic development;
- to increase the sector's contribution to regional planning;
- to enable the emergence of a viable competitive industry that would pay for itself by ending monopolies and allowing others to participate in its development.

Source: www.minpostel.gouv.tg

The Law 05-98 of 11 February 1998 on Telecommunications (amended by Acts 010-2004 and 011-2004 of 3 May 2004) helped create the Regulatory Authority for the areas of Post and Telecommunications (ART&P); defined the roles of the different actors (Ministry, regulator, network operators and service providers); and authorized the opening of certain markets to competition, including mobile telephony, Internet services and data transmission.

Source: <http://www.artp.tg>

This law has been clarified through several regulations, including decrees on:

- the organization and functioning of ART&P;
- setting up conditions for authorization of the establishment and operation of public networks governing interconnection;
- defining the universal service;
- setting up fees;
- allocating frequencies.

In addition to the fixed-network incumbent (Togo Telecom), two mobile network operators (Togo Cellular and Atlantic Telecom Togo, both created in 1998) and an operator of international telecommunications services based on voice-over IP have joined the market. Following the initial creation of two ISPs, Togo Telecom and Café Informatique), dozens of other service providers now share the Internet market.

Togo Telecom voice-over is the national public company responsible for the implementation and operation of infrastructure and fixed telecommunications services. The mobile telephony market is shared between the state-owned Togo Cellular (Togocel), a subsidiary of Togo Telecom, and Atlantic Telecom (Moov).

Law 005-98 of 11^h February 1998, on Telecommunications Network Interconnection, states:

1. Operators of public networks have the right, on objective, transparent and non-discriminatory conditions, to request for interconnection from holders of an authorization license issued, as well as from telecommunications service providers.
2. The interconnection request may not be refused if it is reasonable given the requirements of the applicant on the one hand, and the capabilities of the operator to satisfy on the other.
3. A decree determines the terms and conditions of interconnection, including those related to essential requirements, and pricing principles on which interconnection agreements must be based.
4. Operators of public networks are required to publish under the conditions determined by their specifications, a reference interconnection offer with prior approval by the Regulatory Authority.

Interconnection tariffs reward the effective use of the transport network and service, and reflect the costs incurred.

Type of interconnection agreements

Interconnection shall be subject to private law agreement between the two parties. This agreement determines, in accordance with the provisions of this Act and its implementing measures, the technical and financial conditions of interconnection. It is communicated, upon signature, to the Regulatory Authority for consideration and filing in the registry of telecommunications.

Amendment of interconnection agreements

To ensure equal conditions of competition or interoperability of networks and telecommunications services, the Regulator may, after inviting the parties to submit comments, ask them to amend their interconnection agreement within a specified period. At the end of this period, the interconnection agreement is deemed to include the changes requested by the Regulator. It may conduct verification checks. The Regulatory Authority has a period of six (6) months from receipt of the interconnection agreements and its request for changes. At the end of this period, no changes may be required.

Disputes relating to interconnection

1. In case of refusal of interconnection, failure of commercial negotiations or agreement, the Regulator can be informed of the dispute by either party.
2. The Authority shall decide within a period of one (1) month, after having asked the parties to submit comments. Such decision should stress the technical and financial motivation for which the interconnection must be provided. Disputes are brought before courts.
3. In case of serious and flagrant break of rules governing the telecommunications sector, the Regulatory Authority may (after having asked the parties to submit their comments), order some interim measures appropriate to ensure continuity of operation and networks services.

Fare Conditions

The pricing terms of interconnection agreements follow the principles of objectivity, transparency and non-discrimination. They should not lead to or impose unduly excessive costs to operators using interconnection. They must be justified at the request of the Regulatory Authority and be equivalent to those granted to their own services, subsidiaries or partners.

Prices to interconnect

Interconnection services rates reward the effective use of the transport network and service and reflect the costs involved.

For services contained in interconnection agreements, the Regulatory Authority may require from operators any information enabling it to assess whether the rates contained in agreements for these services reflect the real costs.

Principles of pricing

Interconnection charges are based on the following principles:

- a. Costs considered shall be relevant i.e. bound by a form of causality, direct or indirect to the interconnection service provided;
- b. The costs taken into account must lead to the increase of economic efficiency in the long term, i.e. the costs considered must take into account the renewal of network investment on the basis of the best available technologies and aiming at an optimal dimensioning of the network, in the context of keeping the quality of service;
- c. The rates shall include a fair contribution, in accordance with the proportionality principle, of the common costs to both interconnection services and other services;
- d. The rates shall include a return on capital employed used for investment, this remuneration is set by the Regulatory Authority taking into account the weighted average cost of capital of the operator and one that would be supported by an investor in the Telecommunications network activities in Togo;
- e. The rates may be set according to time slots in order to take into account the congestion of transmission and switching capacity of the operator network;
- f. The unit rates applied to an interconnection service are not linked to the volume or to the capacity of the network elements used by this service.

Legal and regulatory framework of tariff regulation

Strategy for regulatory intervention

The types of price control used are price caps and cost orientation. The legal and regulatory basis is the Law on Telecommunications specifications (Law 005-98, source: www.artp.tg).

The strategy behind imposing price controls on the service in question is to obtain lower prices, as competition alone is not enough to achieve this goal. Cost-accounting obligations are imposed and all operators are implicated.

The data obtained from operators are audited. All operators are subject to a regulatory audit. Sometimes, it is difficult to collect data from operators owing to the fact that the operators find it difficult to supply certain data or are reluctant to do so.

ART&P uses a cost tool to price up service delivery. The current cost tool used is the LRIC model (simulator ictNetSim).

Mobile voice termination rate is (in local currency per minute) 99 XOF (0.2 USD), while retail off-net rate for national mobile voice service is (local currency per minute) 150 XOF (0.3 USD).

Challenges

ART&P has previously faced legal disputes concerning MTR regulation and cost modelling. These occurred in 2000, 2002 and 2007 and all related to a lack of agreement on the repayment of rates between mobile operators and the fixed incumbent.

As a result of these disputes, ART&P has arbitrated to fix the tariffs payout.

However, these disputes have had no impact on the ART&P regulation rate or the cost modelling strategy.

Evolutions and challenges foreseen.

A review of the law and the regulatory framework for telecommunications was expected in 2012. This could affect the regulation of MTR.

The main objectives for the implementation of the review are:

- To ensure a more open market in the interests of users
- To promote access to the largest possible number of electronic communications services and digital development.

The following regulatory strategies are envisaged for the services below:

- Roaming: to introduce national roaming to accelerate the deployment of 3G through the implementation of universal service. Regarding international roaming, provisions are in development (under WAEMU) to harmonize tariffs and impose ceilings.
- Broadband infrastructure: to encourage sharing and pooling, to ensure competition as regards access to these resources.

The table below indicates which services use cost accounting, regulatory auditing and costing tools.

	Cost accounting	Regulatory auditing	Costing tool if used or planned
Retail fixed voice	Yes	Yes	IctNetSim
Retail mobile voice	Yes	Yes	IctNetSim
Retail fixed data	Yes	Yes	IctNetSim
Retail mobile data	Yes	Yes	IctNetSim
Fixed interconnection	Yes	Yes	IctNetSim
Bit stream access	Yes	Yes	IctNetSim
Local loop unbundling	Yes	Yes	IctNetSim
Leased lines	Yes	Yes	IctNetSim
Access to IGW	Yes	Yes	IctNetSim
Access to IXP	Yes	Yes	IctNetSim

Cost accounting and regulatory auditing

Cost accounting

The process of collecting data from operators is as follows:

- Frequency: annual and ad hoc, as needed
- Timescale: from April of each year
- Date of most recent collection: January 2011.

To date, ART&P has not established a relevant cost and revenue categorization in consultation with the operators in question, nor has it imposed specifications as to how operators should deal with their internal data in order to comply with regulatory accounting requirements. The process has yet to be completed.

The following principles of cost causation should apply, according to the IctNetSim model.

- The method of cost preparation is total allocation of costs according to various factors (manpower, payroll, intermediate consumption and depreciation)
- The basis on which assets are assessed is the use of current costs and discounting of the cost of assets
- The allocation method used to allocate revenues, costs, assets and capital employed is the total allocation of costs according to various factors (manpower, payroll, intermediate consumption and depreciation). This method is based on the determination and recovery of incremental resources whose activation is entirely justified by the consumption of a given service
- In handling costs attributed to valued services, all costs must be allocated to specific services, otherwise they are not taken into account
- The following main principles are used to allocate categories of costs between voice and data:
 - for network costs: routing factors;
 - for licensing costs: allocated as common costs according to the factors mentioned above, if not specific to a particular service;

- for other costs: allocated as common costs according to the factors mentioned above, if not specific to a particular service.

The allocation methodology used for regulatory accounting is LRIC/LRAIC. The size of the relevant increment used is the increase in marginal costs following the introduction of a service unit. The cost base used for cost accounting regulations is CCA.

Regarding the valuation methodologies (investments) for different types of asset, ART&P uses the absolute value for all assets (i.e. the current purchase price). The method used for depreciation is the straight-line and declining balance.

The following lifetimes (in years) are applied for different asset types:

- civil works/building: 20;
- supply equipment: 10;
- access telecommunications equipment: 10;
- network of telecommunications equipment: 10;
- transmitting equipment backhaul/backbone: 10;
- License: 10.

There is currently no threshold prescribed for the rate of return on capital employed to provide service to operators, however a decision on such a threshold is forthcoming.

WACC methodology is used to calculate the appropriate rate of return. The cost of equity is estimated using the beta factor method.

Regulatory audit

Matters covered by the regulatory audit are:

- reconciliation between the cost model and statutory accounts;
- range of costs included and extent of costs allocated to the relevant service;
- the methodologies used for assessing costs and allocation;
- the methods used for capitalization, asset valuation and depreciation.

Operators that are subject to the statutory audit are required to:

- Provide the auditor with access to all internal data and support information required
- Respond within a preset timeframe to any issues raised during the audit process.

The regulatory audit is implemented annually and on request.

An independent auditor is responsible to conduct the audit. The NRA conducts the selection process through consultation. The cost of the audit may be covered by the audited operator and/or the regulator, depending on the given situation.

To date, no audits have been conducted other than those performed by auditors appointed and chosen by the Ministers of Telecommunications and Finance.

Costing tools and bottom-up cost modelling

The cost model (skeleton and associated mechanical input data) is publicly available (www.tactikom.ch). The strategic model for implementation was developed by the firm TACTIKOM. Different operators' data were used, having been collected by specific request. All operators were modelled.

In the model, the timescale for cost recovery is the term of the License. The level of demand (i.e. customers, volume of traffic) is based on the current level, but according to optimal design of a network. The main cost driver is traffic; routing factor protocols are based on network management. Coverage is based on the current average coverage provided by existing networks, and is as follows:

- percentage of population: 95 per cent;
- percentage of territory: 75 per cent.

OPEX is modelled using a mark-up on network assets.

Benchmarking

Benchmarking is used as a complementary tool to check the result of an alternative costing tool calculation. In this case, the benchmarking exercise took into account eight WAEMU countries and the 15 ECOWAS countries. They were chosen on the basis of their similarity to Togo in terms of population size, population density, topography and mobile market. The price was set on the basis of the benchmark. This method is usually used to compare the prices charged by various operators and impose cuts, without necessarily specifying the proportions of the cuts.

Prices were converted into national currency using the current exchange rate.

The cost of equity was estimated using the beta factor method.

ANNEX: Analysis of telecommunications legislative frameworks per country

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
BENIN	<p>Decree N° 2008-507 of September 08 2008</p> <p>AGREEMENT ON TECHNICAL AND COMMERCIAL CONDITIONS OF THE ORGANIZATION OF DIRECT ACCESS TO INTERNATIONAL AND INTERCONNECTION - June 05 2008</p>	<p>Bearing a condition of acceptance and allocation of licences and prior declarations for the operation of networks or telecommunications services in the Republic of Benin</p> <p>This Agreement defines the technical and commercial arrangements for the implementation of direct access to international and interconnection between mobile operators in Benin.</p> <p>Article 7: exchange of communications between authorized operators in Benin (direct interconnection)</p> <p>Article 8: Technical conditions rather vague (para 1 and 2)</p> <p>Section 9: Trade conditions; paragraph 3 does not specify deadlines for reporting nor of processing of interconnection requests by the Authority in charge of regulating</p> <p>Harmonization of the concepts: Posts and Telecommunications, electronic communications</p> <p>Based on additional acts of ECOWAS and WAEMU directives, the ATRPT has instructed its technical departments to study the issue of interconnection to allow greater competition in the telecommunications sector in Benin</p> <p>A draft decree on tariff regulation in the Republic of Benin is being adopted. It will be associated with an operational framework of the advisory board of interconnection and of an act on the principles of pricing services of telecommunications.</p>	<p>This text provides, in general, a definition of interconnection</p> <p>Does not capture the entire size of interconnection</p> <p>After reviewing the regulatory framework governing telecommunications/ICT in Benin, the laws are almost silent on the issue of interconnection</p>
BURKINA FASO		<p>CHAPTER IV: INTERCONNECTION RATES</p> <p>Article 16:</p> <p>The interconnection charges and capacity leasing are established in accordance with the principle of cost orientation.</p> <p>For this purpose, operators will set up before the end of the transitional period.</p> <p>Article 18, below, provides analytical accounts that will allow them - the operators- to identify the different types of costs:</p> <p>a) general network costs, that is to say costs related to network elements used by both the operator for the services to its users and interconnection services or lease of capacity;</p> <p>b) the costs related to interconnection services, that is to say the costs directly brought about by the interconnection services or lease of capacity;</p>	<p>The decree calls on operators to implement a cost-accounting system to identify the various costs of their network</p> <p>The allocation of costs</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
<p>BURKINA FASO</p>	<p>Decree 2000-087/PRES/PM/MC/CEC which defines the general conditions of interconnection of networks and telecommunications services</p>	<p>c) the costs related to the services of the operator other than that of interconnection, that is to say the costs induced by these other services alone.</p> <p>Specific costs related to interconnection services are fully allocated related to interconnection services. Costs specific to the operators' services other than interconnection are excluded from the base cost of interconnection service. Specifically excluded are the costs of access (local loop) and commercial costs, advertisements, marketing, sales, sales administration off interconnection, billing and collection off interconnection.</p> <p>Furthermore the costs allocated to the interconnection should be based on the following principles:</p> <p>a) the costs considered should be relevant, that is to say, bound by a form of direct or indirect causality to the interconnection service provided;</p> <p>b) the costs taken into account must strive to increase economic efficiency in the long run, that is to say that the costs considered must take into account the investments for renewal based on using the best technologies available and seeking an optimal scaling of a network in the context of maintaining the quality of service. The evaluation of interconnection costs is conducted annually by the operators based on the accounts of the previous year. The findings are communicated to the Regulatory Authority together with a RIO.</p> <p>The regulator defines modelling and accounting rules for operators in order to ensure consistency of methods and the validity of economic results. To this end; operators are associated with the development of these rules.</p> <p>Article 17: Pricing has two components:</p> <p>a) a fixed-part function relating to the implementation capacity,</p> <p>b) a variable function relating to the traffic carried.</p> <p>The fixed part is related to the expenses and/or connection fees and the cost of operating and maintaining traffic independently. It is paid in periodic instalments.</p> <p>the credit of the incumbent operator, interconnection fees relating to interconnection traffic in the direction-interconnected network of the incumbent;</p> <p>the rate of the incumbent, the cost of the call termination network of the incumbent in the direction of the interconnected system.</p>	<p>The principle of orientation towards relevant costs is also highlighted in this text</p> <p>Article 17 provides for pricing components</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Cape-Verde	Decree Nº 7/2005 NOVEMBER, 28, B.O Nº 48, I SÉRIE, II SUPLEMENT	<p>It is understood that the Legislative Decree of Cape Verde is in accordance with international best practices.</p> <p>Main aspects of interconnection based on the law.</p> <ul style="list-style-type: none"> • Art 59. Companies can negotiate and agree on technical and commercial arrangements for interconnection and access, without prejudice to the authority of ANAC to intervene when necessary in the context of paragraph 2 of Article 60. • According to Article 60, ANAC can intervene on its own initiative, including on agreements already concluded, or, if there is no agreement between the companies, at the request of either party, to resolve through a compulsory decision any dispute related to obligations under this decree, and in the manner provided in Articles 9 and 10. • Article 60 sets out the objectives of efficiency, sustainable competition and the pursuit of greater benefit to end users. These three aspects are repeated more than once in this law with respect to interconnection and access. • Articles 63 to 73 relate to the obligations that apply to companies that have been defined as operators with SMP. • In the case of mobile operators, these SMP obligations are imposed only on CV Móvel, which is the operator identified as SPM for call termination on mobile network, No. Deliberação 01/CA/2011. • Article 63 establishes the authority of ANAC as regards the obligations set in relation to interconnection and access, such as not to discriminate; to establish an accounting separation system for the specific activities of interconnection and access; and to ensure compliance with price control and cost accounting. These aspects are detailed in Articles 68 and 71 to 73. • Article 68 provides some more details on accounting separation, which may include, among others, wholesale prices and internal transfer prices, according to the format and accounting methodology established by ANAC. • Article 69 provides that ANAC must take into account the opportunity cost of capital rate for determining the initial investment costs and risks involved in such 	<p>Article 59 provides for negotiation and agreement on technical and commercial arrangements for interconnection and access</p> <p>Provides for objectives of efficiency, sustainable competition</p> <p>Article 63 provides that interconnection must be non-discriminatory, and that an accounting separation system for the specific activities of interconnection and access must be established</p> <p>Article 69 provides for cost of capital rate</p> <p>For price controls, cost</p>
Cape-Verde			

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Cape-Verde		<p>investment.</p> <ul style="list-style-type: none"> • Article 71 provides that where it is concluded that a lack of effective competition exists, which implies that operators can maintain or apply high prices, ANAC may impose obligations for cost recovery and price controls, including the obligation of cost orientation and the obligation to impose a cost-accounting system. Again, this article states that the methodology to be used for pricing should promote efficiency, sustainable competition and benefits for the end user. • As a result of this article ANAC may impose price controls on CV Móvel (identified as operator with SMP in call termination on mobile networks), including obligations to apply cost-oriented prices and to adopt a cost-accounting system. • The methodology of LRIC is the appropriate methodology to determine cost-based prices, in the form of collecting all costs causally related to the interconnection, including shared and common costs, capital recovery and the opportunity cost of capital rate. • Article 72 requires operators to demonstrate that their prices are based on costs. At the same time, it allows ANAC to use its own independent methods to calculate the cost of efficient provision of services. • Finally, Article 73 establishes that ANAC can conduct an annual audit on the accounting system to allow control of prices. This refers especially to audits of interconnection and access procedures, as this is stated in Article 71. 	<p>orientation and the obligation to impose a cost-accounting system</p> <p>Provides methodology to determine cost-based prices</p> <p>Provides for price controls</p>
Ghana	<p>National Telecommunications Policy</p>	<p>Regulation of the telecommunications market is an essential component of public policy to ensure effective competition and broad, equitable development, consistent with the goals and objectives set out in this Policy. Regulation is the primary responsibility of the NCA, with guidance from the Ministry of communications, and advice from any interested parties, including representatives of industry, the private sector, consumers, civil society, and the government in its capacity as a user.</p> <p>Companies licensed to operate public telecommunications networks and to provide public telecommunications services are obligated to provide interconnection, subject to negotiated commercial agreements. Such interconnection must be of adequate quality for the purposes of transmitting traffic between subscribers of different networks. The NCA shall establish and administer an interconnection regime, which will be non-discriminatory and transparent, and</p>	<p>Provides for interconnection</p> <p>Interconnection must be non-discriminatory and is subject to commercial negotiations</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Ghana		<p>will promote fair and effective competition for all operators, including cost-oriented charges for interconnection services. Operators may be free to negotiate interconnection agreements among themselves on such terms and conditions as they may choose, so long as such terms are non-discriminatory to other market participants, and consistent with the principles of this Policy. The NCA shall facilitate such negotiations, and encourage operators to achieve agreement in a timely manner.</p> <p>In cases where parties are unable to reach satisfactory interconnection agreements through negotiations, the NCA shall intervene to determine interconnection terms, either through mediation or specific interconnection rulings. The NCA will establish general terms, conditions and methodologies that it will apply in reviewing interconnection proposals, including the basis for determining interconnection charges. Such charges must be cost-oriented, and based upon the unbundled costs of network elements required for interconnection.</p> <p>Operators with SMP in given telecommunications market segments are required to publish a RIO, indicating all conditions (price, technical, administrative, etc.) of interconnection to their networks, which will be available to all potential interconnection operators. Similarly situated operators must be provided interconnection on the same terms and conditions. This RIO must be approved by NCA, following review of its provisions. Other conditions and procedures for ensuring fair interconnection will be provided by NCA through formal interconnection regulations.</p> <p>All interconnection arrangements shall include formal service level agreements between the parties, which identify minimum quality of service standards that each party is obligated to meet in the provision of interconnection services, and the remedies and compensation terms for failure to meet such standards.</p>	

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
		<ul style="list-style-type: none"> • a fixed capacity function of the implementation • a variable function of the traffic carried. <p>The fixed part is related to the expenses and/or connection and the cost of operating and maintaining independent traffic. It is paid in periodic instalments.</p> <p>The variable differs depending on whether the traffic is local, national or international, or forwarded to a third operator in relation to the supplier and buyer of interconnection.</p> <p>Article 19: Supervision of interconnection rates</p> <p>Up to 31 December 2004, and the publication of this decree, the interconnection rates of SONITEL was subject to supervision under the control of the regulatory authority. During this period, these rates may not exceed the levels set by its specifications. This period will be used to develop methods for assessing the costs of interconnection in accordance with the preceding articles.</p> <p>After this period, the regulator will decide, either:</p> <ul style="list-style-type: none"> • to set new maximum rates based on the analysis of interconnection costs, or: • if it considers that the management of SONITEL is not efficient, to fix maximum rates based on the experience of comparable foreign countries, especially those neighbouring Niger. <p>Interconnection rates for operators with more than a quarter of the national transmission links and/or over a quarter of international capacity will be subject to supervision by capping by the regulatory authority, if it observes that these operators offer rates well above their cost price.</p>	<p>Article 19 provides for supervision of interconnection rates</p>
Nigeria	TELECOMMUNICATIONS NETWORKS INTERCONNECTION REGULATIONS 2003	<p>PART III—INTERCONNECTION OBLIGATIONS OF DOMINANT TELECOMMUNICATIONS OPERATORS</p> <p>10.—(1) Any telecommunications operator who is determined by the Commission as a dominant operator shall—(a) meet all reasonable requests for access to its public telecommunications network, and in particular, access at any point that is technically feasible on its telecommunications network</p> <p>(b) comply with the principle of non-discrimination with regard to interconnection offered to other telecommunications operators, in particular, it shall apply similar conditions in similar circumstances to interconnected telecommunications operators providing similar</p>	<p>Interconnection agreement with dominant operators</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Nigeria		<p>services and provide interconnection facilities and information to other telecommunications operators under the same conditions and of the same quality as it provides for its own services or those of the group of companies or partners</p> <p>(c) make available on request to other telecommunications operators considering interconnection with its public telecommunications network, all information and specifications reasonably necessary, in order to facilitate conclusion of an agreement for interconnection, including information on changes planned for implementation within the next six months, unless agreed otherwise by the Commission</p> <p>(d) submit to the Commission for approval and publish a RIO, sufficiently unbundled, giving description of the interconnection offerings broken down into components according to market needs and the associated terms and conditions including tariffs;</p> <p>(e) provide access to the technical standards and specifications of its telecommunications network with which another operator shall be interconnected.</p> <p>(2) The Commission may impose or prohibit conduct by a dominant telecommunications operator, if the operator is violating the obligations imposed on it and declare interconnection agreements wholly or partially invalid to the extent that such dominant telecommunications Operator abuses its dominant position in the market.</p> <p>(3) The Commission shall, before taking the action in paragraph (2) of this regulation, first of all request the dominant telecommunications operator to refrain from the abuse to which the objection has been made.</p> <p>11.—(1) A dominant telecommunications operator shall set charges for interconnection on objective criteria and observe the principles of transparency and cost orientation and the burden of proof that charges are derived from actual costs lies with the telecommunications operator providing the interconnection service to its facilities.</p> <p>(2) The Commission has the right to request that the dominant telecommunications operator justify fully its interconnection charges and where appropriate may request for the adjustment of the charges.</p> <p>(3) The burden of proof that charges are derived from relevant costs, including a reasonable rate of return on investment, shall lie on the dominant operator providing interconnection to its facilities.</p> <p>(4) The Commission has the right to request dominant operators to provide full justification for their interconnection charges and the dominant operators shall comply</p>	<p>Principles of interconnection Charges and costing to be applied by dominant telecommunications operators.</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Nigeria		<p>with any adjustment required by the Commission.</p> <p>(5) The dominant operators may set different tariffs, terms and conditions for interconnection of different categories of telecommunications services where such differences can be objectively justified on the basis of the type of interconnection provided.</p> <p>(6) The Commission shall ensure that the differences mentioned in paragraph (5) of this regulation, do not result in the distortion of competition and in particular that the dominant operators apply the appropriate interconnection tariffs, terms and conditions when providing telecommunications for its own services or those of its subsidiaries or affiliates in accordance with the principle of non-discrimination.</p> <p>(7) A dominant telecommunications operator shall—</p> <p>(a) give written notice of any proposal to change any charges for interconnection services in accordance with the procedure set out in the Guidelines on Interconnection of Telecommunications Networks and the provisions of the operating License</p> <p>(b) sufficiently unbundle charges for interconnection, so that the telecommunications operator requesting the interconnection is not required to pay for any item not strictly related to the service requested</p> <p>(c) maintain a cost accounting system which— (i) in the opinion of the Commission is suitable to demonstrate that its charges for interconnection have been fairly and properly calculated, and (ii) provides any information requested by the Commission</p> <p>(d) make available to any person with a legitimate interest, on request, a description of its cost accounting system showing the main categories under which costs are grouped and the rules for the allocation of costs to interconnection and the Commission or any other competent body independent of the dominant telecommunications operator and approved by the Commission, shall verify compliance of the dominant telecommunications operator with the cost accounting system and the statement concerning compliance shall be published by the Commission annually.</p> <p>12.—</p> <p>(1) Where interconnection services are not provided through a structurally separated subsidiary, a dominant operator shall keep separate accounts as if the telecommunications activities in question were in fact carried out by legally independent companies, so as to identify all elements of cost and revenue with the basis of their calculation and the</p>	<p>Separate accounts and financial information</p> <p>provides for interconnection principles applicable to all</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Nigeria		<p>detailed attribution methods used.</p> <p>(2) Every dominant operator shall maintain separate accounts in respect of interconnection services and its core telecommunications services and the accounts shall be submitted for independent audit and thereafter published.</p> <p>(3) Every dominant operator shall supply financial information to the Commission promptly on request and to the level of detail required by the Commission.</p> <p>(4) The Commission may publish any information which in its opinion will contribute to an open and competitive telecommunications market, while having considerations for commercial confidentiality.</p> <p>PART IV—INTERCONNECTION PRINCIPLES APPLICABLE TO ALL TELECOMMUNICATIONS OPERATORS</p> <p>13.—</p> <p>(1) Every telecommunications operator shall maintain the highest level of service and meet any priorities set by the Commission.</p> <p>(2) The Commission shall take all necessary steps—</p> <p>(a) to impose, including, where appropriate, conditions on interconnection, to ensure that the availability of the public telecommunications network is maintained in the event of catastrophic network breakdown or in exceptional cases of force majeure, such as extreme weather conditions, earthquakes, floods, lightning or fire</p> <p>(b) to ensure that the integrity of the public telecommunications network is maintained and the need to maintain network integrity does not, however, constitute a valid reason for refusal to negotiate terms of interconnection.</p> <p>(3) The Commission shall ensure that all the conditions for interconnection relating to the protection of telecommunications network integrity are proportionate and non-discriminatory in nature and are based on objective criteria identified in advance.</p> <p>(4) The Commission may impose conditions in interconnection agreements in order to ensure—</p> <p>(a) inter-operability of services, including conditions designed to ensure satisfactory end-to-end quality and such conditions may include implementation of specific technical standards, specifications or codes of conduct</p> <p>(b) the protection of data, to the extent necessary to ensure compliance with relevant</p>	operators

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
		<p>legal and regulatory provisions on the protection of data, including protection of personal data, the confidentiality of information processed, transmitted or stored and the protection of privacy.</p> <p>(5) Where the Commission imposes conditions in an interconnection agreement based on the essential requirements set out in this regulation, these conditions shall be published in accordance with paragraph (1) of regulation</p>	
Senegal	<p>Law 2011-01 of February 2011 concerning Telecommunications code</p>	<p>Article 14: SMP in a relevant market in the telecommunications sector are subject, in terms of interconnection and access, to the following obligations:</p> <ol style="list-style-type: none"> 1) to make public information on interconnection or access, including by publishing a detailed technical and pricing list of interconnection or access, called the interconnection catalogue. The interconnection offer may be amended during the validity period of a catalogue provided that all operators may qualify for the modification. However, changes must be approved in advance by the Regulatory Authority. The Regulatory Authority may request, at any time, changing the standard interconnection if it considers that the conditions of competition and interoperability of networks and telecommunications services are not guaranteed. It may also decide to add or delete services included in the catalogue to implement the guiding principles of interconnection tariffs towards costs or to better meet the needs of the community of operators and providers of telecommunications services. 2) to provide interconnection services and access to non-discriminatory terms 3) to allow access to reasonable requests for accessing the network elements or means associated with it 4) to charge prices that reflect the relevant costs 5) independently of any accounting activities related to interconnection or access, to keep records of services and activities aimed at ascertaining compliance with the obligations imposed under this section, in order to allow an independent body appointed by the Regulatory Authority to verify the expenses incurred by the operator. <p>Article 45: To ensure fair competition between operators and to avoid any abuse of a prevailing position, the Regulatory Authority oversees the proportionality of rates to the relevant</p>	SMP Obligations

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Senegal		<p>costs, as part of its oversight policy.</p> <p>To ensure effective and fair competition between operators for the benefit of the user, the Regulatory Authority shall monitor the implementation of interconnection rules in accordance with Article 47-52 of this Act.</p> <p>TITLE V: ACCESS AND INTERCONNECTION</p> <p>CHAPTER ONE: INTERCONNECTION</p> <p>Article 47:</p> <p>Operators, including operators of infrastructure, have the right, to request interconnection with other operators, in an objective, transparent and non-discriminatory manner. The interconnection request may not be refused provided it is reasonable in light of the applicant's needs, and within the capacity of the operator in question to satisfy the request.</p> <p>Any refusal of interconnection must be justified and notified to the applicant and the regulatory authority. Operators, including operators of infrastructure, are entitled, on a contractual basis, to request access to providers of telecommunications services.</p> <p>Article 48:</p> <p>Interconnection shall be subject to a private legal agreement, called the interconnection agreement between the two parties. This agreement shall determine, in compliance with applicable laws and regulations, the technical and financial conditions of interconnection. It is communicated to the Regulatory Authority upon signature. The Regulatory Authority may, either automatically or at the request of a party, set a term for the agreement's signature. When it is necessary to ensure compliance with fair competition, non-discrimination between operators or interoperability of services and networks, the Regulatory Authority may request the parties to amend the interconnection agreement. It then sends its requests to the parties to amend their grounds. They have a period of one month after the request for modification to accommodate the agreement itself.</p> <p>At the end of this period, the interconnection agreement is deemed to include the changes requested by the Regulatory Authority. It can carry out checks. Operators may, upon request, consult the Regulatory Authority in the manner approved by the Regulatory Authority, regarding interconnection agreements entered into by operators.</p> <p>Where the Regulatory Authority considers it urgent to take action to preserve competition</p>	<p>Orientation of prices towards relevant costs</p> <p>Non-discrimination,</p>

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Senegal		<p>and protect the interests of users, it is entitled to demand that the operators in question carry out the interconnection immediately pending the conclusion of the interconnection agreement.</p> <p>Article 49: SMP operators are obliged to publish a technical and pricing interconnection list annually, called the interconnection catalogue, which includes a list of prices and technical services offered. The offer must contain the following services as a minimum:</p> <ul style="list-style-type: none"> - routing of switched traffic (initiation and termination of calls) - leased lines - interconnection links - additional services and procedures for implementing these services - a description of all points of interconnection and access conditions to these points for physical co-location¹⁴ - a full description of the proposed interconnection interfaces, including the signalling protocol and, potentially, the encryption methods used for these interfaces - where appropriate, the technical and pricing terms relating to carrier selection and number portability. <p>Article 50: SMP operators respect the principle of orientation of interconnection charges towards the underlying cost of providing the service, that is to say the costs of network components or the facilities management operator actually involved in providing interconnection.</p> <p>Article 51: The interconnection catalogues are approved by the Regulatory Authority and published on the websites of SMP operators, infrastructure operators and the Regulatory Authority.</p>	transparency and objective conditions

¹⁴ Physical co-location involves the installation of competing operators in the vicinity of the host operator's equipment.

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Togo	Decree n° 98-089/PR of 16/09/98	<p>ARTICLE 6: Interconnection agreements Interconnection agreements specify a minimum, unless otherwise agreed by the Regulatory Authority:</p> <ul style="list-style-type: none"> a. Under the general principles: <ul style="list-style-type: none"> i. the commercial and financial relations, including the procedures for billing and collection, and the conditions of payment services ii. information transfer required between the two operators and the corresponding frequency iii. procedures to be applied to proposed changes in the interconnection offer by one party iv. definitions and limits on liability and compensation between operators v. any intellectual property rights vi. the duration and terms of negotiation of the interconnection agreements. b. under the description of interconnection services provided and corresponding remuneration: <ul style="list-style-type: none"> i. conditions of access to basic services: switched traffic and for operators of networks open to public, leased lines ii. conditions of access to additional services iii. benefits billing for third parties iv. the conditions for sharing of facilities associated with physical network connection. c. under the technical characteristics of interconnection services: <ul style="list-style-type: none"> i. measures implemented to achieve equal access of users to different networks and services, the equivalence of sizes and number portability ii. measures to ensure the respect of essential requirements iii. a full description of the interconnection interface iv. the billing information provided to the interconnected interface v. the quality of services provided: availability, security, efficiency, timing vi. how traffic is routed. d. under the terms of implementation of interconnection: <ul style="list-style-type: none"> i. the conditions for provision of benefits: how to forecast traffic and implementation of 	

Country	Regulatory Instrument & Reference	Selected Relevant Provisions	Effect of the Provisions
Togo		<p>interconnection interfaces, identification procedure link ends, periods of availability</p> <p>ii. the designation of interconnection points and the physical description of how to interconnect them</p> <p>iii. terms of reciprocal sizing equipment interface of joint bodies in each network to maintain the quality of service provided by the interconnection agreement and compliance with essential requirements</p> <p>iv. terms of operational testing of interfaces and interoperability of services</p> <p>v. response procedures and fault reports.</p> <p>ARTICLE 7: Fare Conditions</p> <p>The pricing terms of interconnection agreements follow the principles of objectivity, transparency and non-discrimination. They should not lead the Regulatory Authority to impose interconnection unduly on operators applying excessive costs. They must be justified at the request of the Regulatory Authority and be equivalent to those granted to their own services.</p> <p>ARTICLE 8: Interconnection Prices</p> <p>Rates for interconnection services reward the effective use of the transport network and service and reflect the costs involved.</p> <p>For services contained in interconnection agreements, the Regulatory Authority may require operators to provide it with any information enabling it to assess whether the rates contained in agreements for these services reflect the real costs.</p> <p>ARTICLE 9: Principles of Pricing</p> <p>Interconnection charges are based on the following principles:</p> <p>a) the costs considered to be relevant, that is to say, bound by a form of causality, direct or indirect interconnection to the service rendered</p> <p>b) the costs taken into account must strive to increase economic efficiency in the long term, i.e. that the costs considered must take into account investment in system renewal, based on the basis of best available technologies and tending to an optimal dimensioning of the network, with the aim of maintaining the quality of services</p> <p>c) the rates include a fair contribution, in accordance with the proportionality principle, costs that are common to both interconnection services and other services</p>	

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Togo		<p>d) the rates include a return on capital employed used for investment; this remuneration is set by the Regulatory Authority taking into account the weighted average cost of capital of the operator and the need to support investment in Togolese telecommunications networking activities</p> <p>e) the rates may be modulated to take account of congestion and transmission capacity switching the general network of the operator</p> <p>f) the applicable unit rates for interconnection services are independent of volume or capacity of the network elements used by the general service</p> <p>g) charging units should match the needs of interconnected operators.</p> <p>ARTICLE 10: Technical Offers and Pricing Interconnection</p> <p>Any operator or service provider defined in accordance with Article 35 of Law No. 98-005 on Telecommunications as dominant in the market is required to seek prior approval from the Regulatory Authority for their technical and pricing interconnection proposal. An order of the supervising Minister, after consultation with the Regulatory Authority, defines the terms of technical and pricing interconnection of these operators and service providers.</p>	

GLOSSARY

ANAC	Agência Nacional de Comunicações (Cape Verde)
ARCEP	Autorité de Régulation des Communications Electroniques et des Postes (Burkina Faso)
ARM	Autorité de Régulation Multisectorielle (Niger)
ARN	Autoridade Reguladora Nacional das Tecnologias de Informação e Comunicação (Guinea-Bissau)
ARTP	Agence de Régulation des Télécommunications et des Postes (Sénégal)
ART&P	Autorité de Règlementation des secteurs des Postes et de Télécommunications (Togo)
ATCI	Agence des Télécommunications de Côte d'Ivoire
ATRPT	Autorité Transitoire de Régulation des Postes et Télécommunications (Benin)
CAPEX	Capital expenditure
CAPM	Capital asset pricing model
CCA	Current cost accounting
CRT	Comité de Régulation des Télécommunications
CVR	Cost/volume relationships
ECOWAS	Economic Community of West African States
FCM	Financial capital maintenance
FAC	Fully allocated cost
FDC	Fully distributed costs
HCA	Historical cost accounting
ICGB	Institut des Communications de la Guinée-Bissau
ICT	Information and communications technology
IGW	International gateway
ISP	Internet service provider
IXP	Internet exchange point
GSM	Global System for Mobile Communications
LRIC	Long Run Incremental Cost
LR(A)IC	Long-run (average) incremental costs
MEA	Modern equivalent asset
MNO	Mobile network operator
MTR	Mobile termination rate

Glossary

N/A	Not applicable
NCA	National Communications Authority (Ghana)
NCC	Nigerian Communications Commission (Nigeria)
NGN	Next generation network
NRA	National regulatory authority
OCM	Operational capital maintenance
OPEX	Operating expenditure
PPP	Purchasing Power Parity
PURA	Public Utilities Regulatory Authority (Gambia)
SMP	Significant market power
WACC	Weighted average cost of capital
WAEMU	West African Economic and Monetary Union

References and sources

Administrations	Countries	Sources
International institutions		
International Telecommunications Union	Switzerland	www.itu.int
World Bank	United States of America	www.worldbank.org
National regulatory authorities		
Autorité Transitoire de Régulation des Postes et Télécommunications	Benin	www.atrpt.bj
Autorité de Régulation des Communications Electroniques et des Postes	Burkina Faso	www.arce.bf
Agência Nacional das Comunicações	Cape Verde	www.anac.cv
Agence des Télécommunications de Côte d'Ivoire	Côte d'Ivoire	www.atci.ci
Public Utilities Regulatory Authority	Gambia	www.pura.gm
National Communications Authority	Ghana	www.nca.org.gh
Autoridade Reguladora Nacional das TIC	Guinea-Bissau	www.arn-gb.com
Autorité de Régulation Multisectorielle	Niger	www.armniger.org
Nigerian Communications Commission	Nigeria	www.ncc.gov.ng
Autorité de Régulation des Télécommunications et des Postes	Senegal	www.artpsenegal.net
Autorité de Réglementation des secteurs des Postes et de Télécommunications	Togo	www.artp.tg

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