DEPARTMENT
INFRASTRUCTURE
ENERGY &
DIGITALISATION

2023 Digital Report for ECOWAS Countries

Digital Economy and Post

1 PREFACE

The establishment of a single digital market is a key priority for the Economic Community of West African States (ECOWAS), aimed at deepening regional integration, fostering growth, promoting inclusion, and ensuring sustainable development.

Accurate, relevant, and valuable data indicators are essential for measuring the progress and impact of digital technologies in the ECOWAS region. These indicators encompass the internet, broadband infrastructure, mobile and fixed network coverage, backbone infrastructure and associated metrics such as value creation, employment, and digital inclusion.

In this context, the Commission has committed to measuring the progress of the digital economy in the region, with the support of the National Correspondents for Indicators (NCIs), who are responsible for collecting national indicators for the ECOWAS Digital Observatory (ECODOB).

Commissioner Infrastructure, Energy & Digitalisation

Utilising the key indicators from 2021 to 2023, the 2023 regional report on digital technologies provides a comprehensive overview of trends in telecommunications and information and communication technologies (ICT) in the region. These indicators serve as vital input data for formulating policies and strategies to enhance the digital economy across the region and attract private sector investment and development partners.

The period from 2020 to 2023 has been marked by significant challenges, including political crises in several countries, which have impacted data availability. Nevertheless, the 2023 ECOWAS digital report confirms the region's progress in digital infrastructure development.

Despite the challenges encountered in the data collection process, the ECOWAS Commission remains confident in our ability to close critical data gaps and address the challenge of data availability. By keeping the ECOWAS Digital Observatory (ECODOB) up to date, we aim to establish ECODOB as the reference digital observatory for ECOWAS and an essential tool for refining the sector's policies and strategies.

CONTENTS

1 OVERVIEW

Establishing secure, high-performance, and sustainable digital infrastructures is key for the conception of a single digital market, as they play a pivotal role in advancing the digital economy by addressing issues related to connectivity, access, and technological progress. This is an essential consideration for the ECOWAS region, particularly in terms of coverage and the cost of digital infrastructure access for the community. This includes internet connectivity, mobile network infrastructure, submarine and terrestrial fibre infrastructures, datacentres, internet exchange points (IXPs), e-government and cybersecurity facilities.

The ongoing development of digital infrastructure in West Africa is vital for stimulating economic growth, enhancing digital inclusion, and encouraging innovation across various industries. Based on the findings of this report, foundational infrastructures are still lacking in a few countries. Therefore, sustained investment in digital infrastructure is necessary to unlock the full potential of the region's digital economy and improve the overall quality of life for its citizens.

However, the review of key indicators and regional telecommunications trends show significant progress in telecommunication infrastructures in ECOWAS countries.

This progressive trend was also observed in the 2022 Telecommunication Infrastructure Index of the E-government Development Index (EGDI) survey. The EGDI, used by the United Nations Department of Economic and Social Affairs (UNDESA), measures the readiness and capacity of national institutions to use ICTs to deliver public services. The evolution of the total EGDI score for ECOWAS from 0.31 points in 2018 to 0.39 points in 2022 is almost entirely due to Telecommunication Infrastructure Index.

The following brief overview report on the advancement of these key indicators, provides the regional trend of telecommunications and an update on the backbone infrastructure.

Overview Content

- *Current key indicators*
- *Trend of telecommunications*
- *Telecommunication backbone infrastructures*
- *SIM registration policy*

1.1 Current key indicators

The statistical summary report consolidated in figure 1, based on the available national data provided by ECOWAS Member States, offers a snapshot of the telecommunication and ICT indicators at the end of year 2023, compared to 2022. Burkina Faso, Guinee, Mali, and Niger have not submitted key indicator data.

Population 347,061,597 11c	Mobile and Fixed telephone operators 34 operators 11c	
2023 Internet Subscription (mobile & fixed) +6.55%  (223,973,526 subscriptions) 7c	2023 Mobile-cellular Subscription +0.23%  107.13% penetration (371,769,543 subscriptions) 11c	2023 Fixed telephone Subscription +8.53%  0.37% penetration (1,206,354 subscriptions) 7c
2023 Internet Subscription for Mobile-Broadband +8.19%  (181,433,648 active mobile broadband subscribers) 10c	2023 International mobile traffic into ECOWAS region (in minutes) +0.48%  2.81 billion minutes Incoming international traffic to mobile network 11c	2023 International mobile traffic into ECOWAS region (in minutes) -24,69%  2.12 billion minutes Outgoing international traffic to mobile network 11c
2023 Mobile Revenue +5.09%  $13.65bn 10c	2023 Employment - telecom employees Full-time Telecommunication Employment +2.77%  >31,000 people 10c	
Xc: number of countries that submitted data within the 11 participating countries		

Figure1. Current Keys indicators 2023

The estimated population of the participating ECOWAS countries - Benin, Cabo Verde, Côte d'Ivoire, Ghana, The Gambia, Guinee Bissau, Liberia, Nigeria, Senegal, Sierra Leone and Togo is 347,061,597 citizens in 2023, according to the world population pyramid (https://www.populationpyramid.net), representing an increase of 2.51% compared to 2022.

In 2023, based on the estimated population of the participating countries, mobile cellular subscription penetration is estimated at 107.13%, indicating that mobile connectivity in the ECOWAS region is a significant driver of digital transformation. Over 180 million active mobile broadband internet subscriptions were registered in 2023, an increase of 8.19% compared to 2022. Internet subscriptions for both mobile broadband and fixed services are estimated at over 223 million, representing a 6.55% increase compared to 2022. The rise in mobile subscriptions, particularly in Côte d'Ivoire, Ghana, Nigeria, and Senegal is attributed to multiple mobile subscriptions by single individuals.

The advancement of mobile technology in the ECOWAS region is largely due to the efforts of mobile telecommunications operators, with thirty-four (34) operators serving the eleven participating countries, while fixed operators number only eighteen (18) across nine (9) ECOWAS countries. The low penetration of fixed telephone subscription at 0.37% and the high costs of investment in fixed telephony suggest the need to reconsider their role in the deployment of 4G and 5G networks to ensure they operate in conjunction with mobile networks.

A significant decrease of 24.69% in outgoing international mobile traffic calls was observed in 2023 compared to 2022, indicating fierce competition from alternative over-the-top (OTT) platforms. Overall, mobile incoming and outgoing calls in 2023 declined by 12.14% compared to 2022, representing a net loss of 682,174,460 minutes. According to the National Correspondent for Indicators, this decline is linked to the growth of mobile broadband services.

Telecommunications services have significantly contributed to the development of the digital economy by adding value and creating jobs. In 2023, telecommunications services revenue totalled $13,653,587,992.51, an increase of 5.09% compared to 2022. Employment in the sector also saw an upward trend, with a total of 31,911 operators' employees in 2023, representing an increase of 2.77% compared to 2022.

In conclusion, the consolidated key indicators reveal a progressive trend compared to 2022.

1.2 Trend of telecommunications 2021-2023

Apart from outgoing traffic call indicators, the analysis of the statistical key indicators submitted by Member States for the three (3) year period from 2021 to 2023 demonstrates a continued upward trend in the advancement of telecommunication and ICT infrastructures. This analysis summarizes the key indicators trends over these three years, as shown in the figure 2.

Figure2. 3 years telecom trend 2021 - 2023

From 2021 to 2023, mobile and fixed internet subscriptions increased significantly by 14.93% and mobile broadband internet subscription rose by 22.19%, confirming the global upward trend. Similarly, a continuous upward trend is observed for mobile cellular subscriptions and fixed telephone subscriptions, with increases of 10.61% and 8.79%, respectively. This upward trend in mobile cellular and fixed telephony subscriptions is slightly reflected in the total incoming traffic calls for the same period, with an increase of 2.57%. Regarding outgoing traffic calls, an increase of 18.37% was noted between 2021 and 2022, followed by a decrease of 24.69% between 2022 and 2023, attributed to the use of over-the-top (OTT) platforms, according to findings from Member States.

The advancements registered from 2021 to 2023 for the participating countries are mainly facilitated by mobile operators and the development of key telecom fibre infrastructures. In 2021, thirty-four (34) mobile operators were active, increasing to thirty-five (35) in 2022 and returning to thirty-four (34) in 2023 due to a delay in the renewal of Glo's license in Ghana. The period from 2021 to 2023 also saw the arrival of four (4) new submarine cable companies namely Ellalink, Equiano, SHARE, and Maroc Telecoms, adding eight (8) additional landing points.

The value added by telecommunication services was estimated in this report using the revenue of all telecommunication services and the employment created directly by operators. Reflecting the global upward trend, a continuous increase is observed in both revenue and the employment from 2021 to 2023. Revenue growth during this period was 17.56%, representing an increase of +$2,039,315,346.91 while employment growth was 5.61%, representing an addition of 1,696 employees. Only operators' employees are included in the employment figures.

1.3 Telecommunications backbone infrastructures

This section analyses the telecommunications backbone infrastructure, including broadband fibre cable infrastructures, Internet exchange points (IXPs), and Datacentres.

- ***Broadband fibre cable infrastructure***

Twelve (12) submarine cable companies with thirty-seven (37) landing points pass through the West African region, providing a total design landing capacity of 613.12 Terabyte. These companies are listed as follows: ACE - Africa Coast to Europe [10], SAT-3/WASC - South Atlantic 3/West Africa Submarine Cable [5], WACS [5], MainOne [4], Maroc Telecom West Africa Submarine Cable [3], SHARE - Senegal Horn of Africa Regional Express [2], Equiano [2], 2Africa [2], GLO -1 - Globacom 1 [1], ATLANTIS-2 [1], EllaLink [1], NCSCS - Nigeria-Cameroon Submarine Cable System [1].

The national backbone of landlock countries access the submarine cable infrastructures via the peering points of terrestrial fibre infrastructures.

- ***Internet Exchange Points (IXPs)***

Efficient IXPs are crucial for lowering the overall cost of broadband, especially in developing countries. In the region, a total of fifteen (15) IXPs, both government and private owned, have been identified. However, some countries, such as Cabo Verde, Guinea Bissau, and Sierra Leone do not have IXPs in 2023. This calls for action to enable Internet service providers and network operators to effectively route local traffic within their networks.

- ***Datacentres***

Datacentres and storage facilities are essential for the development of the digital economy. Therefore, the region needs to monitor the availability of reliable and high-tier data centres. There is a significant gap in accessing the required high-level standards in the region. Only forty-height (48) Datacentres were identified in the data collection process, both government and privately owned. Currently, there are no government-owned operational datacentres in Guinea Bissau, and Guinea, while the status in Burkina Faso, Mali, Niger is yet to confirmed.

The following map (figure 3) depicts the regional connectivity of submarine cable companies to West African countries, including landing points and capacity, terrestrial fibre connections between countries, and the locations of IXPs and Datacentres of each country.

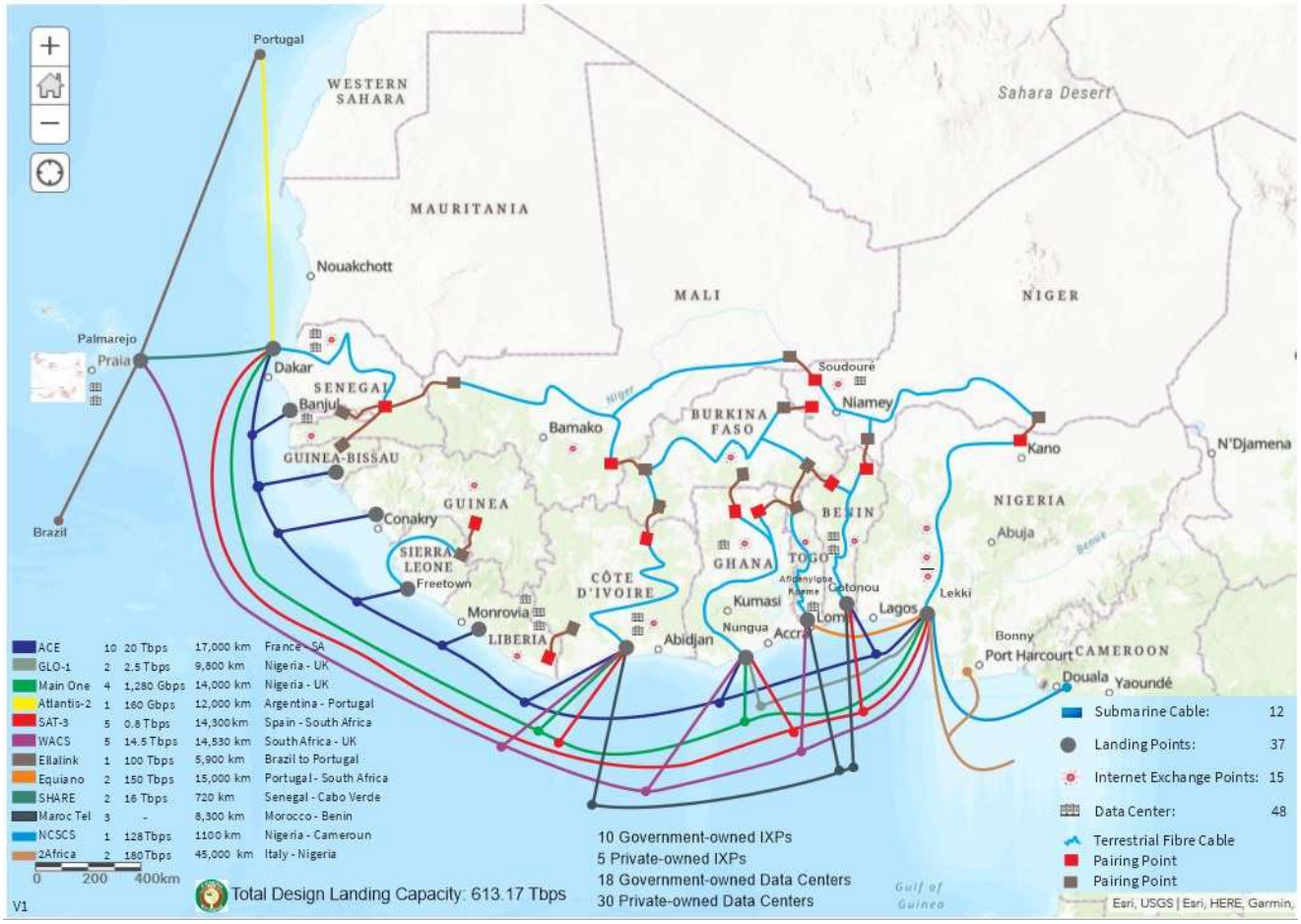


Figure3. Regional telecommunication backbone infrastructure map

1.4 SIM registration policy

Recognising the pivotal role played by SIM card registration in enhancing security and accountability in the use of telecommunication services and preventing crimes, most of the governments of ECOWAS implemented mandatory SIM card registration during the period 2021 to 2023.

In summary, ten (10) countries have a restriction policy, four (4) countries have no restrictions, and information is yet to be confirmed for one (1) country.

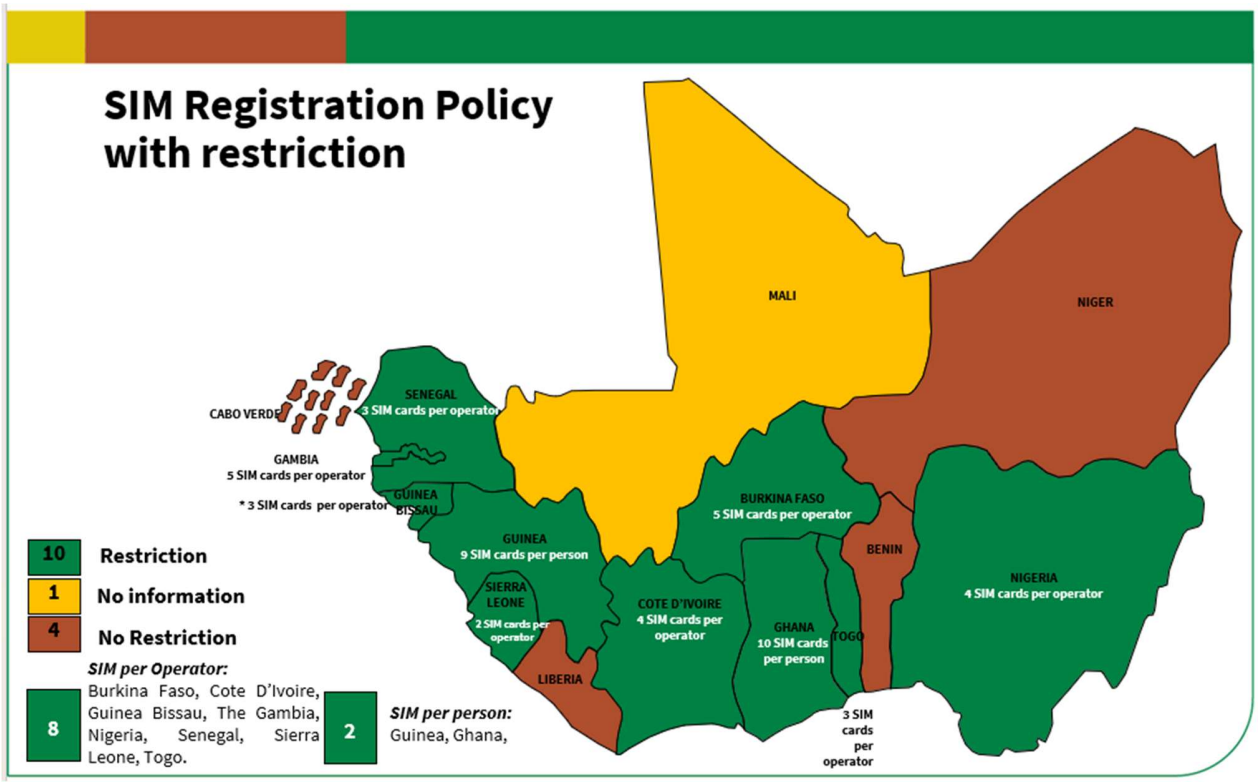


Figure4. SIM registration/restriction Policy

Out of the ten (10) Member States with a SIM registration restriction policy, eight (8) Member States have a policy of ***SIM registration per Operator*** while two (2) Member States (Guinea, Ghana) have a policy of ***SIM registration per person***.

Countries with a policy of SIM cards per operator restriction

- Burkina Faso and the Gambia: 5 SIM cards per operator
- Cote d'Ivoire and Nigeria: 4 SIM cards per operator
- Guinea Bissau, Senegal, and Togo: 3 SIM per operator
- Sierra Leone: 2 SIM cards per operator

Countries with a policy of SIM cards per person restriction

- Ghana: 10 SIM cards per person
- Guinee: 9 SIM card per person

Countries without policy restriction

Four (4) Member States - Benin, Cabo Verde, Liberia, and Niger have no restriction policy in terms of SIM registration. The current situation in Mali is yet to be confirmed.

The map shown above in figure 4 depicts the SIM registration policy of each Member State.

2 TELECOM BACKBONE INFRAS - TRUCTURES

To ensure the successful implementation of digital services, it is crucial to prioritise affordable access to the Internet as a pivotal structural goal for the ECOWAS region. This approach has significant implications for backbone infrastructure development, including the connection to submarine cables, the establishment of functional Internet Exchange Points (IXPs), and datacentres across all ECOWAS countries. It also involves setting up operational gateways, securing comprehensive coverage of national backbone networks with appropriate capacity, and ensuring both interoperability and simplified access to shared networks.

From the analysis carried out in this report, ECOWAS countries can be categorised into two clusters based on their levels of telecommunication backbone infrastructures development.

- Cluster A: Benin, Cabo Verde, Cote d'Ivoire, Ghana, Nigeria Senegal, and Togo.
- Cluster B: Burkina Faso, The Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, and Sierra Leone.

Cluster A is ahead of Cluster B, clearly differentiated by the development of submarine cables, Internet Exchange Points, and datacentre infrastructure.

It is essential to address this divide to further advance telecom backbone infrastructure supporting the regional integration. Concurrently, it is crucial to maintain the current achievements of Cluster A countries and enhance the existing backbone infrastructure.

This section provides details on the telecommunication backbone infrastructure as follows.

Telecom Backbone Infrastructures Contents

- *Submarine cable companies and landing points*
- *Internet exchange points*
- *Datacentres*

2.1 Submarine cable companies and landing points

2.1.1 Submarine cable companies and number of landing points per country

West Africa has seen significant development in submarine cable connectivity over the past decade, enhancing internet infrastructure and connectivity across the region. Twelve (12) submarine cables serve West Africa with thirty-seven (37) landing points, connecting the region to other continents and enabling high-speed internet access.

Submarine cables play a crucial role in enhancing international connectivity, improving internet speeds, and supporting economic development across West Africa.

Table 1 provides a breakdown of the submarine cable companies and their landing points within the region per country.

Member States	Submarine Cable Companies	Number of Landing Points
Benin	ACE, SAT-3/ WASC, Maroc Telecom West Africa	3
Burkina Faso	-	**1***
Cabo Verde	WACS, EllaLink, SHARE	3
Cote d'Ivoire	ACE, Main One, SAT-3/WASC, WACS, Maroc Telecom West Africa	5
Gambia	ACE	1
Ghana	ACE, SAT-3/WASC, WACS, Main One	4
Guinea	ACE	1
Guinea Bissau	ACE	1
Liberia	ACE	1
Mali	-	-
Niger	-	-
Nigeria	ACE, Glo-1, MainOne, SAT3, WACS, Equiano, NCSCS, 2Africa	8
Senegal	ACE, Main One, ATLANTIS-2, SAT-3/WASC, SHARE	5
Sierra Leone	ACE	1
Togo	WACS, Equiano, Maroc Telecom West Africa	3
Total	**12 Submarine Cable Companies**	**37 landing points**

* Virtual landing point

Table1. Submarine Cable Companies per country

Apart from the landlock countries Burkina Faso, Mali, and Niger, all ECOWAS countries are served by at least one submarine cable. Benin, Cabo Verde, and Togo are served by three (3) submarine cables each; Ghana by four (4) submarine cables; Côte d'Ivoire, and Senegal by five (5) submarine cables each; Nigeria by eight (8) submarine cables; and all the other non-landlock countries by one (1) submarine cable each. Within the thirty-seven landing points, one (1) is a virtual landing point (dry port for a submarine optical fibre cable) deployed by the government of Burkina Faso.

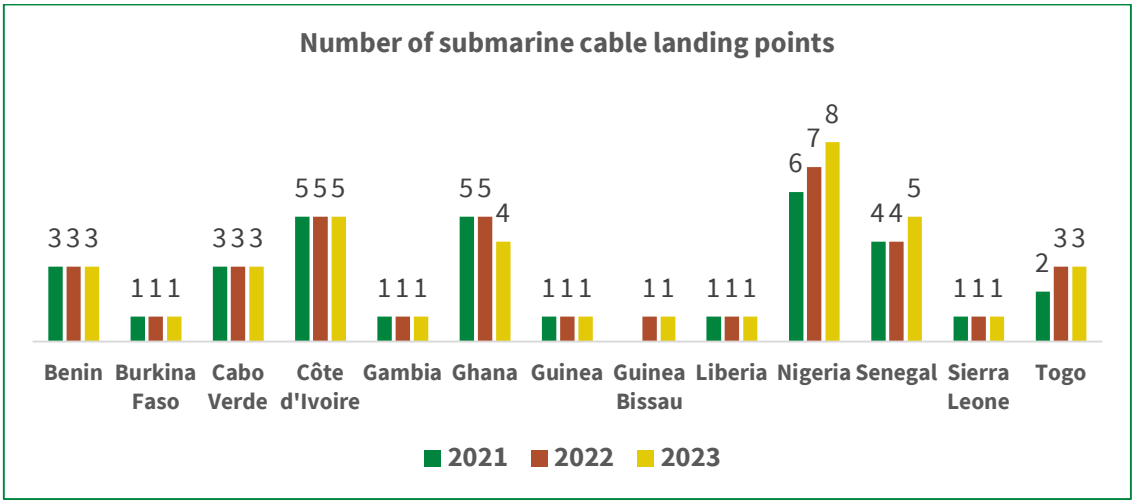


Figure5. Submarine cable companies 2021 to 2023

As showed in figure 5, from 2021 to 2023, the following developments occurred:

- Ellalink landed in Cabo Verde
- Equiano landed in Nigeria and Togo
- SHARE landed in Cabo Verde and Senegal
- Maroc Telecoms West Africa landed in Benin, Côte d'Ivoire and Togo

These represent the four (4) additional new submarine cables referred to in the overview. Additionally, in 2023, the deactivation of GLO-1 submarine cable was noted in Ghana. Lastly, the 2Africa submarine cable landed in Qua Iboe, Nigeria in February 2024.

2.1.2 Submarine Cable companies' countries served, length and landing capacity

Submarine Cable Companies	Country Landing Points	landing points	Length of Cable	Landing Capacity
1. Africa Coast to Europe (ACE)	– Dakar, Senegal, – Banjul, the Gambia – Conakry, Guinea – Freetown, Sierra Leone – Monrovia, Liberia – Abidjan, Côte d'Ivoire – Accra, Ghana – Cotonou, Benin – Lagos State, Nigeria – Surru, Guinea Bissau	10	17,000 km (France – South Africa)	20 Tbit/s
2. SAT-3/WASC – South Atlantic 3/West Africa Submarine Cable	– Dakar, Senegal – Abidjan, Côte d'Ivoire – Accra, Ghana – Cotonou, Benin – Lagos, Nigeria	5	14,300 km	0.78 Tbit/s
3. West Africa Cable System (WACS)	– Nigeria, Lekki, near Lagos – Togo, Afidenyigba near Lomé – Ghana, Nungua near Accra – Cote d'Ivoire, Abidjan – Praia (Cabo Verde)	5	14,530 km West Cape, South Africa – London, UK	14.5 Tbit/s
4. Main One	– Dakar, Senegal, – Abidjan, Côte d'Ivoire – Bonny, Nigeria – Accra, Ghana	4	14,000 km Nigeria – UK	1.28 Tbit/s
5. Maroc Telecom West Africa	– Kpeme, Togo – Cotonou, Benin – Abidjan, Côte d'Ivoire	3	8,300 km Morocco to Benin Republic	
6. Equiano (Google)	– Lagos, Nigeria – Lome, Togo	2	15,000 km Portugal to South Africa	150 Tbit/s
7. Senegal horn Africa Regional Express (SHARE)	– Dakar, Senegal – Praia, Cabo Verde	2	Spanning 720 km Dakar in Senegal to Praia in Cabo Verde	16 Tbit/s
8. 2Africa	– Lagos, Nigeria – Akwa Ibom, Nigeria	2	45,000 km Genoa, Italy to Nigeria	180 Tbit/s
9. GLO -1	– Lagos State, Nigeria	1	9,800 km Lagos – UK	2.5 Tbit/s
10. ATLANTIS-2	– Dakar, Senegal	1	12,000 km Argentina – Portugal	0.06 Tbit/s

Submarine Cable Companies	Country Landing Points	landing points	Length of Cable	Landing Capacity
11. EllaLink	– Praia (Cabo Verde)	1	5,900 km Approx. Fortaleza (Brazil) - Sines (Portugal)	100 Tbit/s
12. Nigeria - Cameroon Submarine Cable System (NCSCS)	– Lagos, Nigeria	1	Spanning 1100 km Nigeria (Lagos) to Cameroon (Limbe)	128 Tbit/s
West Africa Total Capacity	**37**	**613.12 Tbit/s**		

Table2. Submarine Cable Companies countries landing points, length and capacity

2.1.3 Fibre Optics connectivity between landlocked and coastal countries

This section highlights the connectivity of terrestrial fibre optics cables among Member states, specifically between coastal and landlocked countries, enabling them to leverage broadband infrastructures for full access to increased bandwidth capacity and advantages.

The **three (3) landlocked countries** of ECOWAS, Burkina Faso, Mali, and Niger rely on coastal countries for submarine cable fibre interconnectivities. The coastal countries have the advantage of being situated along coastlines, facilitating the easy laying of submarine cables. They can also extend fibre connections to neighbouring countries, which enhances regional integration.

The pairing deployment connectivity and laying among Member States are as follows:

- **BENIN -** pairing with Burkina Faso, Ghana, and Niger Republic
- **BURKINA FASO** - pairing with Benin, Cote d'Ivoire, Ghana, Mali, and Niger.
- **CABO VERDE** - pairing with Senegal owned by SHARE submarine cable company.
- **CÔTE D'IVOIRE -** pairing with Burkina Faso and Liberia
- **GAMBIA** - pairing Senegal-Dakar.
- **GHANA** - pairing Burkina Faso and Togo.
- **GUINEA** - pairing between Sierra Leone
- **GUINEA BISSAU** - pairing Senegal-Dakar.
- **LIBERIA** - pairing Sierra Leone and Côte d'Ivoire.
- **MALI** - pairing Senegal-Dakar, Burkina Faso, and Niger.
- **NIGER** - pairing Benin, Mali, and Nigeria.
- **NIGERIA** - pairing Niger Republic.
- **SENEGAL** - pairing Cabo Verde, Gambia, Guinea Bissau, and Mali.
- **SIERRA LEONE** - pairing Guinea and Liberia.
- **TOGO** - pairing Ghana and Burkina Faso.

2.2 Internet exchange points

Internet Exchange Points (IXPs) play a crucial role in reducing Internet connectivity costs for each country. They are instrumental in enhancing the efficiency, speed, and reliability of Internet connectivity by enabling direct interconnection between networks. Beyond affordability, IXPs improve efficiency, reliability, foster direct interconnection between networks, and promote the exchange of Internet traffic at local, regional, and global levels.

Based on the data collected, no IXPs have been implemented in Cabo Verde, Guinea Bissau, and Sierra Leone in 2023. Of the 15 IXPs identified, ten (10) are government-owned, and five (5) are privately owned. From 2021 to 2023, no additional IXPs were established in the region. However, Sierra Leone plan to launch a new Internet exchange point in Freetown in 2024.

Table 3 lists the current number of Internet Exchange Points (IXPs) and their locations in the ECOWAS Member States countries.

Member States	2023 number of IXPs			
	Govt	Private	Total	Location
Benin	1	-	**1**	SBIN, Cotonou
Burkina Faso	1	-	**1**	Burkina Faso Internet Exchange Point, Ouagadougou
Cabo Verde	-	-	**-**	-
Cote d'Ivoire	1	-	**1**	CIVIX Internet Exchange Point, Abidjan
Gambia	1	-	**1**	Sere-Kunda Internet Exchange Point
Ghana	-	2	**2**	1. Ghana Internet Exchange Association, Accra 2. Accra Internet Exchange Point
Guinea	1	-	**1**	Point d'Echange Internet de la Guinée (IXP-GUINEE), Conakry
Guinea Bissau	-	-	**-**	-
Liberia	1	-	**1**	Cable Consortium of Liberia, Monrovia
Mali	1	-	**1**	Mali IX (MLIX), Bamako
Niger	1	-	**1**	Soudoure near Niamey, maintained by ANSI
Nigeria	-	3	**3**	*3 IXPs and 6 locations* 1. IXPN (Internet Xchange Point of Nigeria) has 4 locations (Abuja, Lagos, Kano & Port Harcourt) 2. WAF-IX (West African Internet Xchange Point) managed by Mainone Cable in Lagos 3. AF-CIX (West Africa Interconnection Exchange) managed by rack centre in Lagos
Senegal	1	-	**1**	Senegal Numeric, Dakar
Sierra Leone	-	-	**-**	-
Togo	1	-	**1**	Togo Internet Exchange Point (TGIX), Lome
Total	**10**	**5**	**15**	

Table3. Internet Exchange Point per Country

2.3 Datacentres

The datacentre industry is set for rapid development in line with the advancements observed in the digital economy across the region. In fact, Datacentres are increasing rapidly due to the irreversible trend of digital transformation. This report highlights the key role of private investment in datacentre infrastructures, with twenty-nine (29) privately owned datacentres identified. Côte d'Ivoire reported twelve (12) privately owned datacentres and Nigeria reported eleven (11).

In the ECOWAS region, the late adoption of datacentres has resulted in a significant gap, particularly for government owned facilities. Only nineteen (19) government owned datacentres have been identified from the findings of Member States. It is observed that there is no government-owned datacentre in Guinea Bissau.

Table 4 below lists the number of datacentres and their locations in the ECOWAS Member States.

Member States	2023 number of Data Centre			
	Govt	Private	Total	Location
Benin	1		**1**	- Cotonou: Ministry of Finance
Cabo Verde	2		**2**	- Praia - Mindelo
Cote d'Ivoire	5	12	**17**	- Abidjan
Gambia	1		**1**	- Seru Kunda: Central Govt. office
Ghana	2	3	**5**	- Accra o Ministry of Communication & Digitalization o National Datacentre (NITA) o MDXi Appolonia Datacentre o Pan African Internet Exchange data centres (PAIX Accra) o IS GH Data Centre (IS Internet Solutions GH LTD)
Guinea Bissau	-	-	**-**	
Liberia	3		**3**	- Monrovia o Ministry of Finance o Central Bank o Libtelco
Nigeria	1	10	**10**	- Lagos (10) /Abuja (1)
Senegal	2		**2**	- Diamniadio: Centre of Diamniadio - Dakar: Centre of the Technopole
Sierra Leone	1	3	**4**	- 3 in Freetown - 1 Bank of Sierra Leone
Togo	1	1	**2**	- Lome o Lome Datacentre: belonging to the Société d'Infrastructures Numériques (SIN) o Cloud & Racks Datacentre
Total	**19**	**29**	**48**	

Table4. Datacentres per Country

3 KEY INDICATORS

This section reports the current status and three-year trends (2021, 2022 and 2023) of the telecommunications and information & communication technologies (ICT) sector indicators for participating Member States.

On of the main insights from the analysis of the national key indicators is the pivotal role played by mobile technology in ECOWAS countries as a driver of digital transformation. Mobile subscription penetration exceeds 100% in most countries, facilitated by thirty-four operators, including major players in the telecommunication industry as MTN, Orange and Moov. In contrast, the low fixed telephone subscription indicates the underutilisation of this technology. Additionally, mobile technology is the primary means through which individuals' access to Internet.

Regarding the national breakdown of internet subscriptions, Benin, Nigeria, and Senegal exhibit more diversified means of internet access. However, the low fixed telephony penetration in Benin and Nigeria suggests that satellite broadband technology is being significantly considered in these countries.

The analysis also reveals a slight decrease in total traffic for the region from 2021 to 2023, primarily due to a significant decrease in outgoing calls during the same period. Member States attribute this decline to the enhanced quality of the Over-The-Top platforms.

The total value-added and job created by the telecommunications and ICT are mainly attributed to four countries: Côte d'Ivoire, Ghana, Nigeria, and Senegal.

The breakdown per country of the following indicators is provided accordingly in the content below.

Key indicators Contents

- *Telecommunication operators in West Africa*
- *Mobile telephony indicators*
- *Fixed telephone*
- *Internet Indicators*
- *Call traffic (minutes)*
- *Revenue*
- *Employment*

3.1 Telecommunication operators

3.1.1 Mobile Operators

As of 2023, thirty-four (34) mobile operators, most of which provide both mobile and fixed telephone services, are operational in the ECOWAS participating countries.

The decline observed in 2023 is due to the deactivation of GLO mobile in Ghana.

In 2022, Benin's state-owned infrastructure firm SBIN (Société Béninoise d'Infrastructures Numériques) began operating as the third mobile operator.

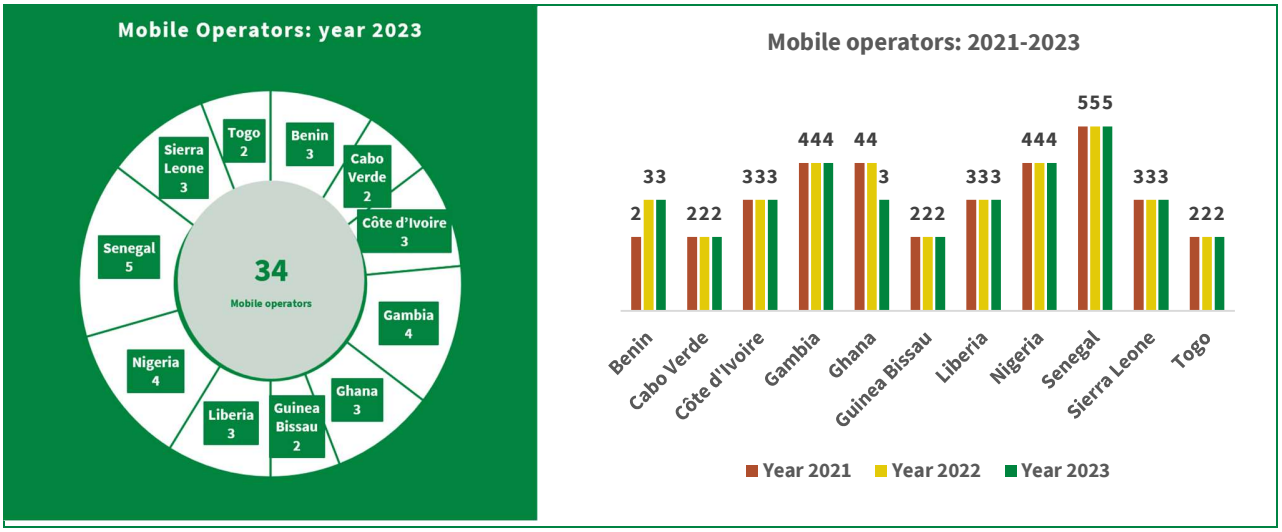


Figure6. Mobile Operators: current and period 2021- 2023

Table 5 below shows the presence of mobile operators in ECOWAS participating countries. MTN, Orange, MOOV, AIRTEL, AFRICELL, and QCELL have led with in terms of presence. The other sixteen operators are exclusively present in one country each.

S/N	Operators	Number of Member States	Member States	
1.	MTN	6	Benin Côte d'Ivoire Ghana	Guinea Bissau Liberia Nigeria
2.	ORANGE	5	Côte d'Ivoire Guinea Bissau	Liberia Senegal Sierra Leone
3.	MOOV	3	Benin Côte d'Ivoire	Togo
4.	AIRTEL	2	Ghana	Nigeria
5.	AFRICELL	2	The Gambia	Sierra Leone
6.	QCELL	2	The Gambia	Sierra Leone
7.	GLO	1	Nigeria	
8.	SBIN SA	1	Benin	
9.	CV MOVEL	1	Cabo Verde	
10.	UNITEL T+	1	Cabo Verde	
11.	GAMCEL	1	Gambia	
12.	COMIUM	1	Gambia	
13.	VODAFONE (GHANA TELECOM)	1	Ghana	
14.	LONESTAR CELL MTN	1	Liberia	
15.	LTC MOBILE	1	Liberia	
16.	9MOBILE	1	Nigeria	
17.	EXPRESSO	1	Senegal	
18.	HAYO TELECOM	1	Senegal	
19.	FREE	1	Senegal	
20.	PROMOBILE	1	Senegal	
21.	SIERRATEL	1	Sierra Leone	
22.	TOGO CELLULAIRE	1	Togo	

Table5. Operators repartition

3.1.2 Fixed telephone Operators

As presented in figure 7, only eighteen (18) telecom companies have invested in fixed telephony in the participating Member States, indicating that mobile telephony attracts more investment than fixed telephony.

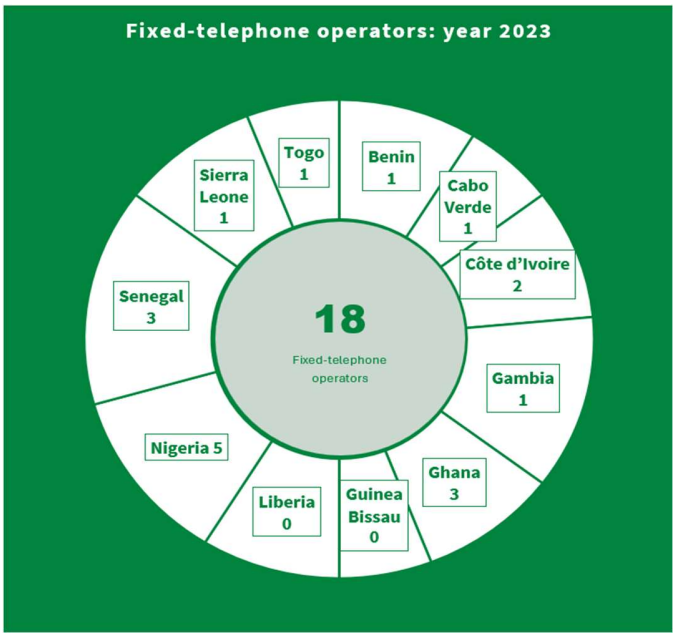


Figure7. Current fixed operators

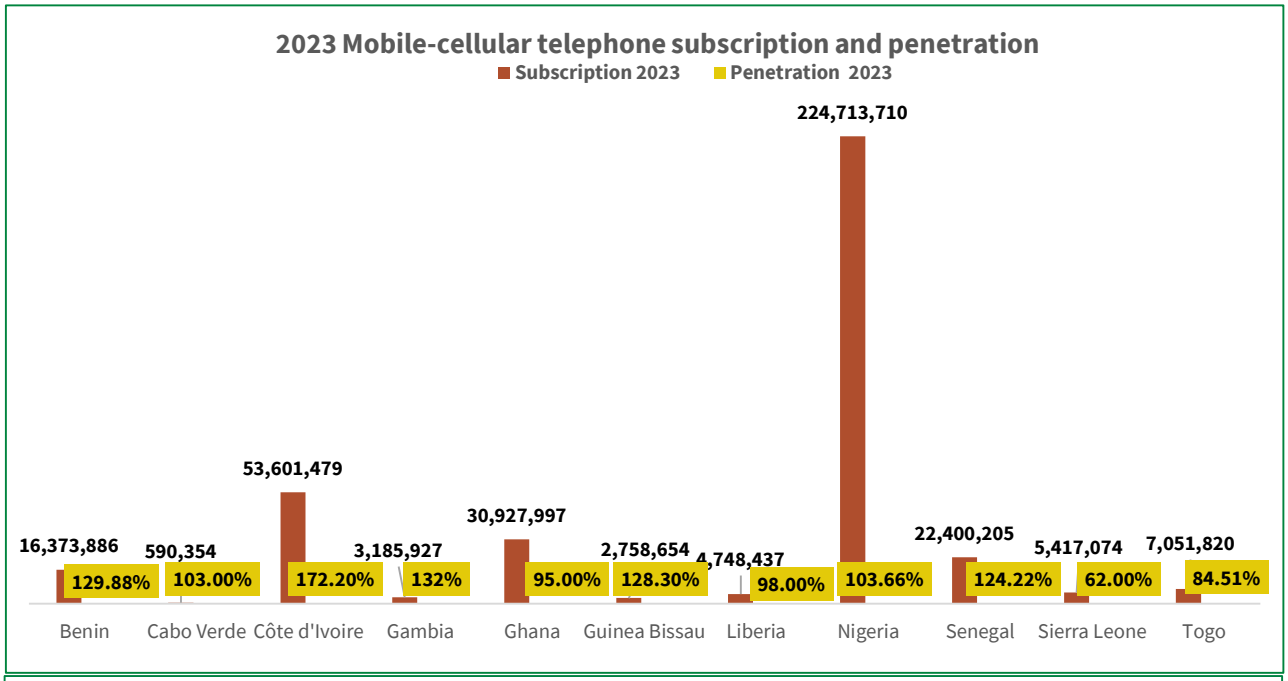
As shown in Table 6, there are only four (4) standalone fixed-telephone operators in the region: GAMTEL in The Gambia, IPNX and 21st Century in Nigeria, and Togotelecom in Togo. The remaining fixed telephone operators provide both fixed and mobile telephony. Additionally, fixed telephone networks are no longer operational in Guinea Bissau and Liberia.

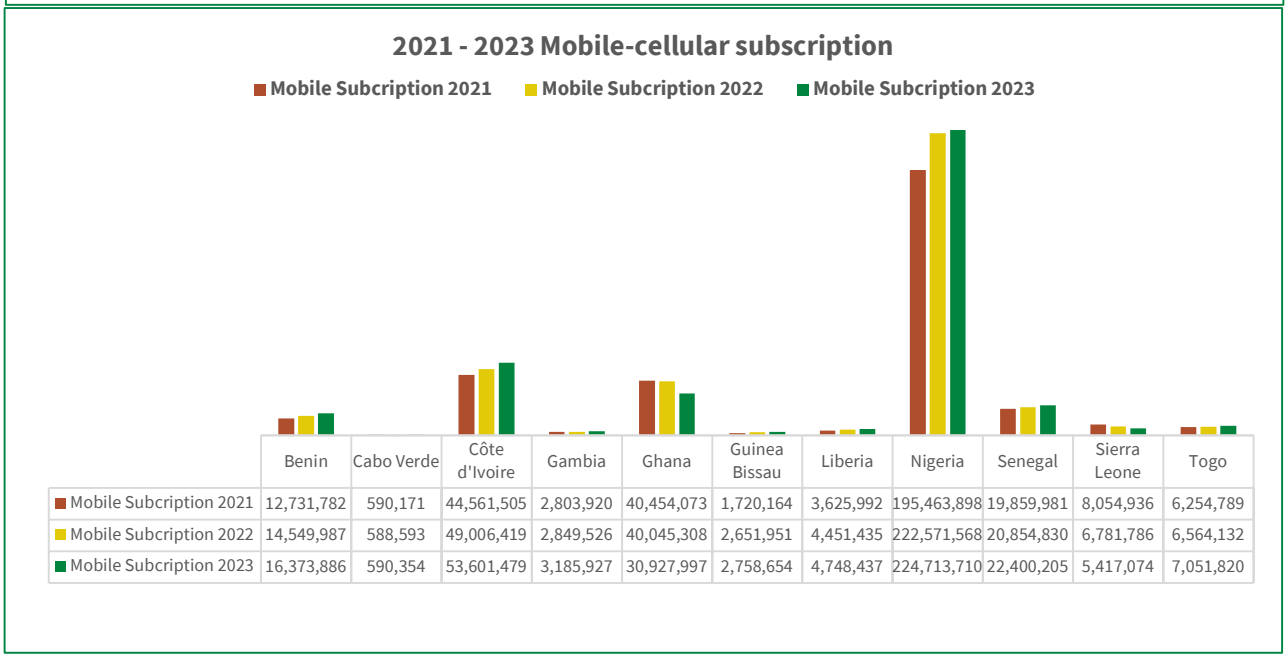
Country	Operators	Exclusively Fixed	Fixed and Mobile
Benin	SBIN		x
Cabo Verde	CVTELECOM		x
Côte d'Ivoire	ORANGE/ MTN		x
Gambia	GAMTEL	x	
Ghana	MTN/ TELECEL/ AIRTEL		x
Guinee Bissau	-		
Liberia	-		
Nigeria	MTN/ GLO / BIG PICTURE		x
	IPNX	x	
	21ST CENTURY	x	
Senegal	SONATEL/ FREE/ EXPRESSO		x
Sierra Leone	SIERATEL		x
Togo	TOGOTELECOMS	x	

Table6. Operator's type of license

3.2 Mobile cellular telephony subscription per country

Figure 7 provides the current status and the three-year trend (2021 to 2023) of mobile cellular telephony subscription and penetration for each country.





	Benin	Cabo Verde	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
Mobile Subcription 2021	12,731,782	590,171	44,561,505	2,803,920	40,454,073	1,720,164	3,625,992	195,463,898	19,859,981	8,054,936	6,254,789
Mobile Subcription 2022	14,549,987	588,593	49,006,419	2,849,526	40,045,308	2,651,951	4,451,435	222,571,568	20,854,830	6,781,786	6,564,132
Mobile Subcription 2023	16,373,886	590,354	53,601,479	3,185,927	30,927,997	2,758,654	4,748,437	224,713,710	22,400,205	5,417,074	7,051,820

Figure7. Mobile cellular subscription per country: current and period 2021- 2023

The analysis of national mobile subscription and penetration, as shown in Figure 7, suggests the key role played by mobile connectivity in ECOWAS countries as a driver of digital transformation. The current regional mobile subscription penetration is estimated at 107.13% in 2023, representing 371,769,543 subscribers. A continuous upward trend is observed from 2021 to 2023, with over thirty-five (35) million additional subscribers during this period, increasing the penetration indicator by 4.62% in 2023.

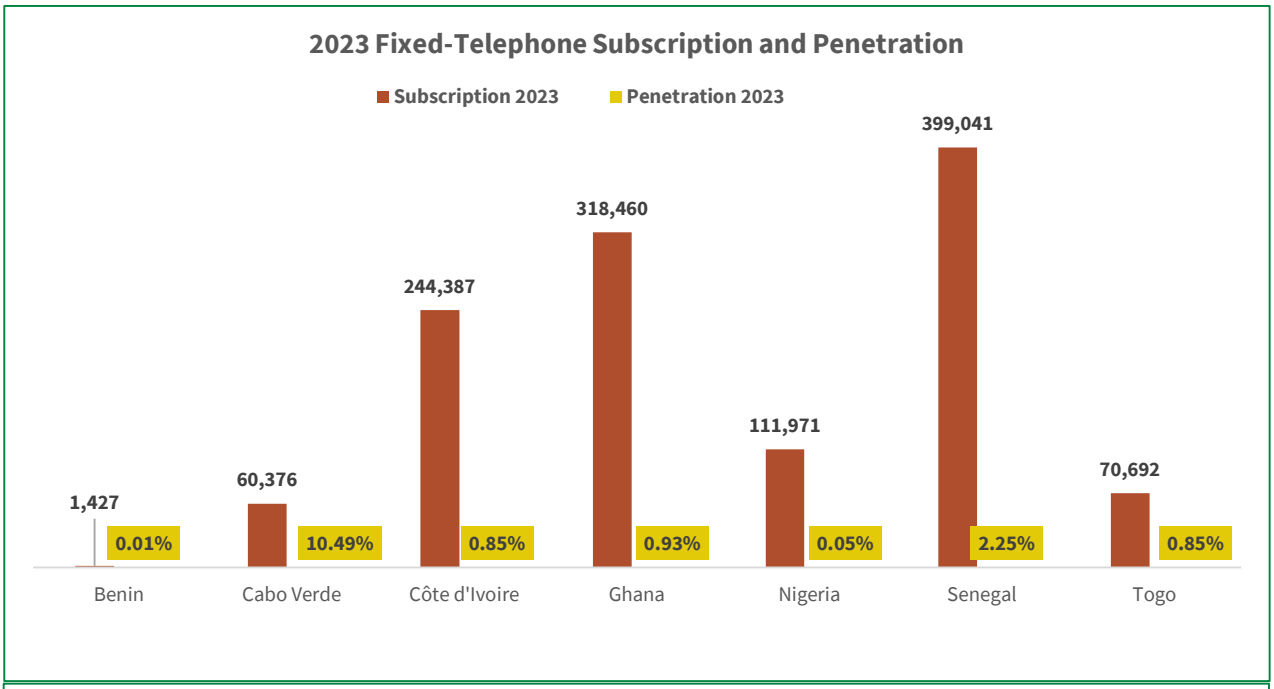
The breakdown of this regional indicator demonstrates that Benin, Cabo Verde, Cote d'Ivoire, Gambia, Guinea Bissau, Nigeria, and Senegal have mobile penetration rates exceeding 100% relative to their populations. In contrast, the remaining participating Member States: Liberia, Sierra Leone and Togo have yet to achieve a penetration rate of 100% or higher. This implies a higher number of mobile phones in use in the former group of countries.

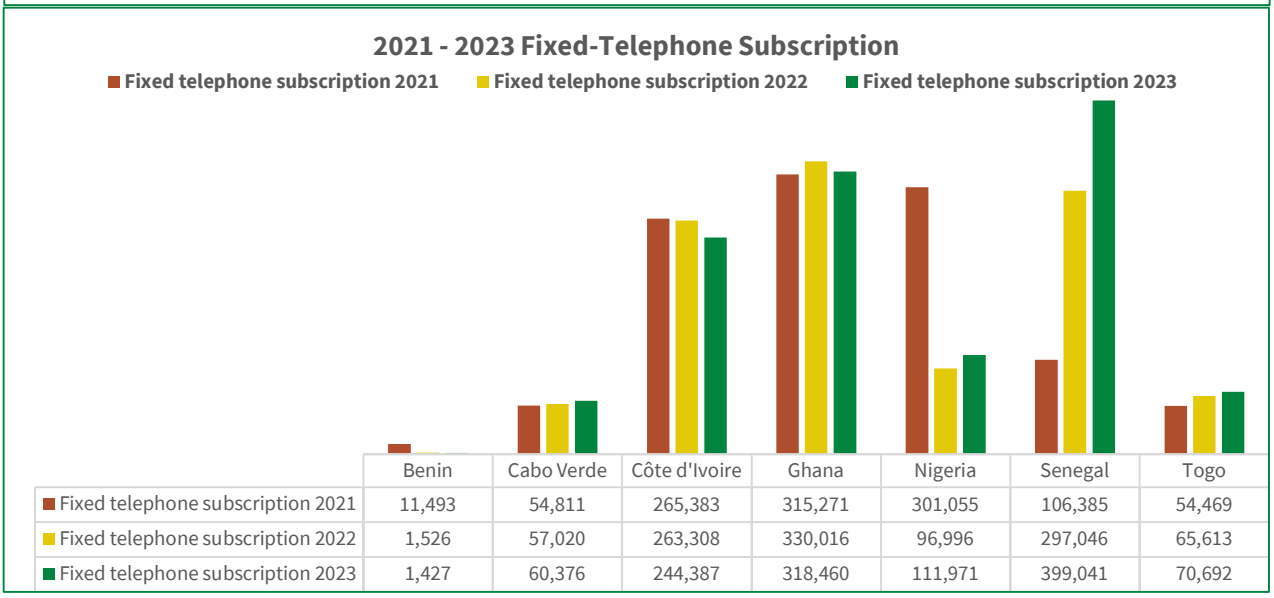
In 2023, Côte d'Ivoire had the highest mobile penetration at 172.20% (over *fifty-three (53) million mobile-telephone subscribers*), while Sierra Leone had the lowest mobile penetration rate at 62% (5.4 million mobile-telephone subscribers).

Apart from Ghana and Sierra Leone, the three-year trend shows an upward trajectory. The mobile subscription penetration in Ghana decreased from 131.30% in 2021 to 95% in 2023, while in Sierra Leone, the decrease was from 96% in 2021 to 62% in 2023.

3.3 Fixed telephone subscription and per country

Figure 8 provides the current and the three-year trend (2021 to 2023) of fixed telephony subscription and penetration for each country.





	Benin	Cabo Verde	Côte d'Ivoire	Ghana	Nigeria	Senegal	Togo
Fixed telephone subscription 2021	11,493	54,811	265,383	315,271	301,055	106,385	54,469
Fixed telephone subscription 2022	1,526	57,020	263,308	330,016	96,996	297,046	65,613
Fixed telephone subscription 2023	1,427	60,376	244,387	318,460	111,971	399,041	70,692

Figure8. Mobile cellular subscription per country: current and period 2021- 2023

The key findings of the 2023 regional statistics on fixed telephony shows that over 1.2 million subscribe to fixed telephone with penetration rate of 0.37%. The fixed telephony penetration trend stagnated in 2022 compared to 2021 and slightly increased in 2023 representing an addition of over ninety-seven (97) thousand subscriptions in the period signifying a penetration increase of 0.02%.

Breaking down this regional indicator, in 2023 only Cabo Verde and Senegal exceeded a fixed-telephone penetration of 1% with 10% (60,376 fixed-telephone subscriptions) and 2.25% (399,041 fixed telephone subscriptions), respectively. The fixed telephone penetration for all other participating countries is below 1%. Benin has the lowest fixed-telephone subscription rate, with 1,427 subscriptions. This is attributed to the fact that only the new operator, SBIN, provided fixed telephone service in 2023.

Fixed telephony is underused in ECOWAS region due to low investment in this technology, which is overshadowed by the attractiveness of mobile technology. Comparing mobile-cellular to fixed telephone subscription in 2023, it is noted that the penetration rate of mobile-cellular subscribers at 107.13% far exceeds the 0.29% fixed-telephone subscription penetration.

Globally the regional fixed telephone penetration trend for the period 2021 to 2023 is almost stagnant, with a penetration rate of 0.35% in 2021 and 2022, slightly increasing to 0.37% in 2023. At the national level, the fixed telephone subscription trend shows a downward trend for Benin and Côte d'Ivoire, an upward trend for Cabo Verde, Senegal and Togo suggesting strong traditional fixed telephone networks, while for Ghana and Nigeria the fixed telephone penetration fluctuated slightly during the referenced period.

3.4 Mobile and fixed Internet subscriptions per country

Individuals in the ECOWAS region access the internet through fixed, mobile and satellite broadband technologies, with speeds of at least 256 Kbit/s. The primary categories of mobile broadband connections include 4G, which offers fast connectivity, and 5G, which provides the fastest connection but has limited coverage. The main fixed broadband Internet technologies are cable modem Internet connections, DSL Internet connections of at least 256 Kbit/s or higher, and fibre. While fixed and mobile infrastructures are the primary means of internet access across the region, satellites are also increasingly used to enable connectivity. In West Africa, Starlink is the main satellite internet provider, despite regulatory barriers in some countries.

	Benin	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone
2021	8,441,111	23,578,963	1,094,256	1,861,420	141,971,560	16,088,932	1,842,095
2022	9,748,242	22,987,273	1,320,525	2,185,388	154,847,901	17,227,783	1,895,656
2023	10,955,772	22,987,273	1,589,767	2,565,741	163,838,439	19,854,661	2,181,873

	Benin	Cabo Verde	Côte d'Ivoire	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
2021	4,336,339	448,720	21,784,106	23,414,527	1,090,953	1,859,288	78,041,883	12,703,876	1,841,123	2,961,688
2022	5,629,242	442,420	25,732,691	22,846,248	1,315,910	2,184,574	90,398,960	13,988,613	1,792,817	3,362,423
2023	7,069,113	506,200	29,171,602	22,846,248	1,583,082	2,566,769	94,893,212	16,613,281	2,182,335	4,001,806

Figure9. Internet subscription mobile and fixed 2021-2023

Figure 9 above illustrates the internet subscriptions for both mobile and fixed connections for each participating country for the period from 2021 to 2023. Cabo Verde Côte d'Ivoire and Togo were unable to provide consolidated data for mobile and fixed internet subscriptions; only mobile broadband internet subscription data is available for these three countries.

Upon reconciling the consolidation of mobile and fixed internet subscriptions with the mobile broadband internet subscriptions for each country, it is observed that mobile technology is the predominant means through which individuals access the Internet. Specifically, for the countries that submitted both mobile and fixed internet subscriptions (Benin, Ghana, Guinea Bissau, Liberia, Nigeria, Senegal, Sierra Leone), fixed internet subscriptions represented 36.74% of the overall internet subscriptions in 2021. This percentage decreased to 34.28% in 2022 and 34.03% in 2023 indicating a downward trend.

In 2023, apart from Benin, Nigeria and Senegal, the percentage of fixed internet subscription in the total internet subscriptions for other countries was less than 1%. This percentages were 35.48% for Benin, 42.08% for Nigeria, and 16.33% for Senegal, suggesting that internet access in Benin, Nigeria and Senegal is more diversified to other countries.

The low fixed-Telephone penetration rates in 2023 for Benin (0.01%) and Nigeria (0.05%) imply that other means of internet access, such as satellite broadband technology are being utilised.

3.5 Call traffic (minutes)

3.5.1 Total call traffic (minutes)

A decrease of 3.66% in total call traffic was observed in the region from 2021 to 2023, despite an increase of 9.65% between 2021 and 2022.

This overall decline in total call traffic is primarily due to a significant reduction in outgoing call traffic in 2023. Outgoing call traffic increased by 18.37% from 2021 to 2022, but then decreased by 26.69% from 2022 to 2023, resulting in a net decrease of 10.85% over the period. This decline is attributed to the rise in the use of Over-The-Top (OTT) platforms by mobile phone users, facilitated by the widespread adoption of smartphones and the expansion of 4G mobile network coverage. Additionally, the operationalisation of 5G mobile networks in a few countries has enhanced the quality of OTTs calls and videos, further contributing to the decline in outgoing calls.

This analysis is illustrated in figure 10.

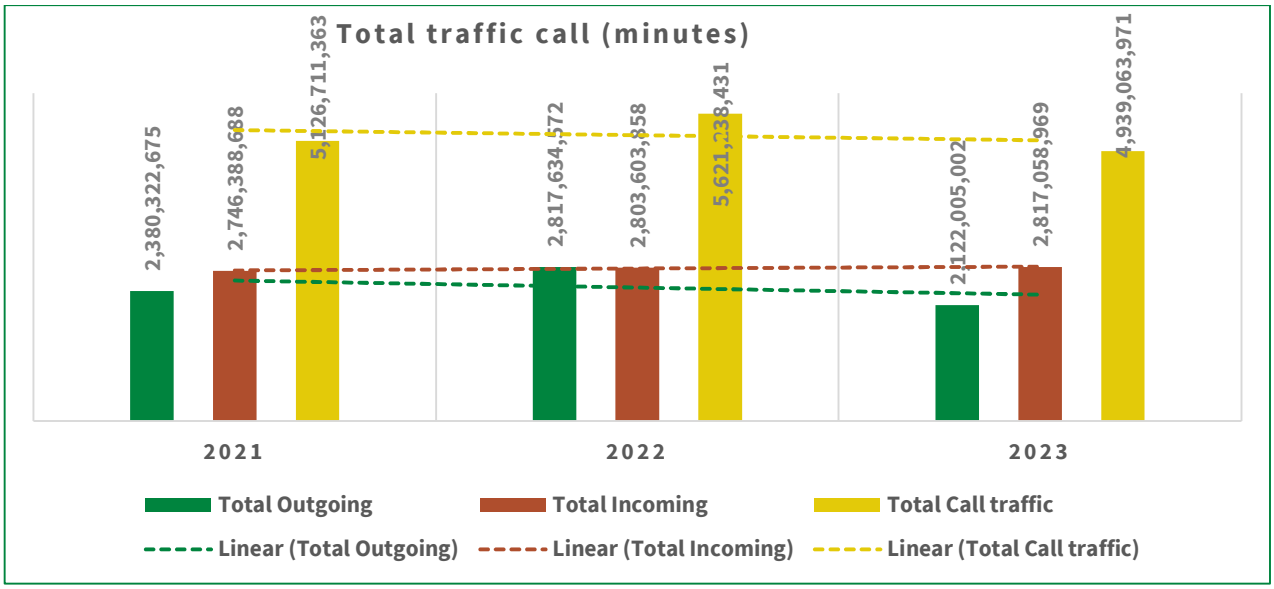
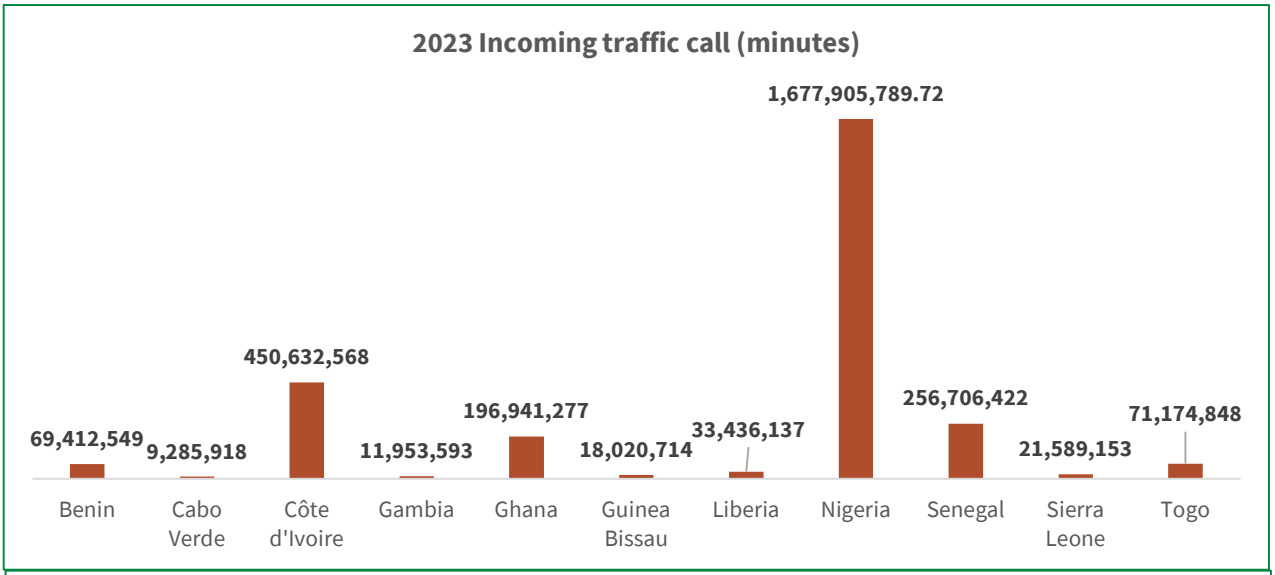
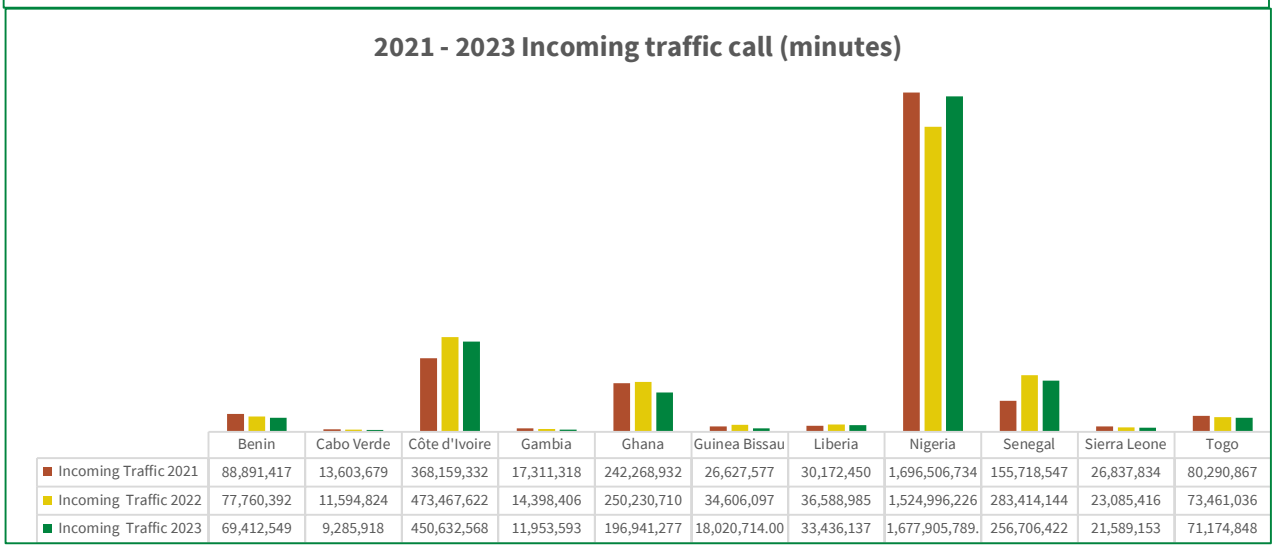


Figure10. Total traffic call 2021-2023

3.5.2 Incoming traffic call (minutes)

The breakdown of total incoming call traffic per country for the period from 2021 to 2023 is shown in figure 11.





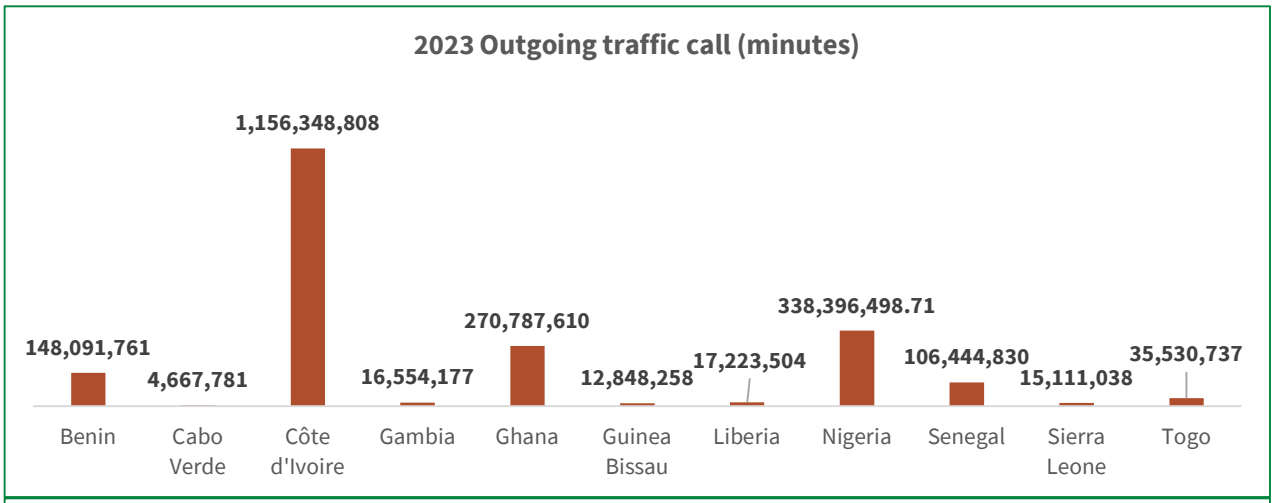
	Benin	Cabo Verde	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
Incoming Traffic 2021	88,891,417	13,603,679	368,159,332	17,311,318	242,268,932	26,627,577	30,172,450	1,696,506,734	155,718,547	26,837,834	80,290,867
Incoming Traffic 2022	77,760,392	11,594,824	473,467,622	14,398,406	250,230,710	34,606,097	36,588,985	1,524,996,226	283,414,144	23,085,416	73,461,036
Incoming Traffic 2023	69,412,549	9,285,918	450,632,568	11,953,593	196,941,277	18,020,714.00	33,436,137	1,677,905,789.	256,706,422	21,589,153	71,174,848

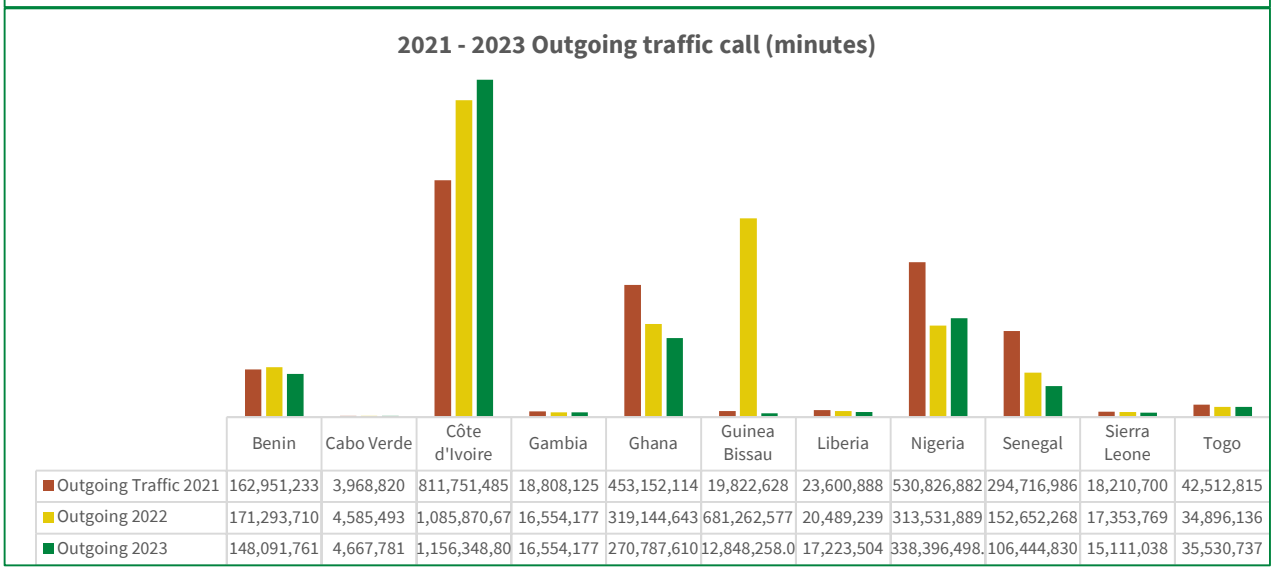
Figure11. Total incoming traffic call: current and period 2021-2023

For Benin, Cabo Verde, The Gambia, Sierra Leone and Togo, a downward trend was observed over this period. In contrast, Côte d'Ivoire, Ghana, Guinea Bissau, Liberia, and Senegal experienced an increased in incoming call traffic from 2021 to 2022, followed by a decrease from 2022 and 2023. For Nigeria, incoming call traffic decreased in 2022 but increased in 2023. These fluctuations suggest that incoming call traffic may follow a similar downward trend as observed for outgoing call traffic.

3.5.3 Outgoing traffic call (minutes)

The breakdown of total outgoing call traffic per country for the period from 2021-2023 period is presented in figure 12.





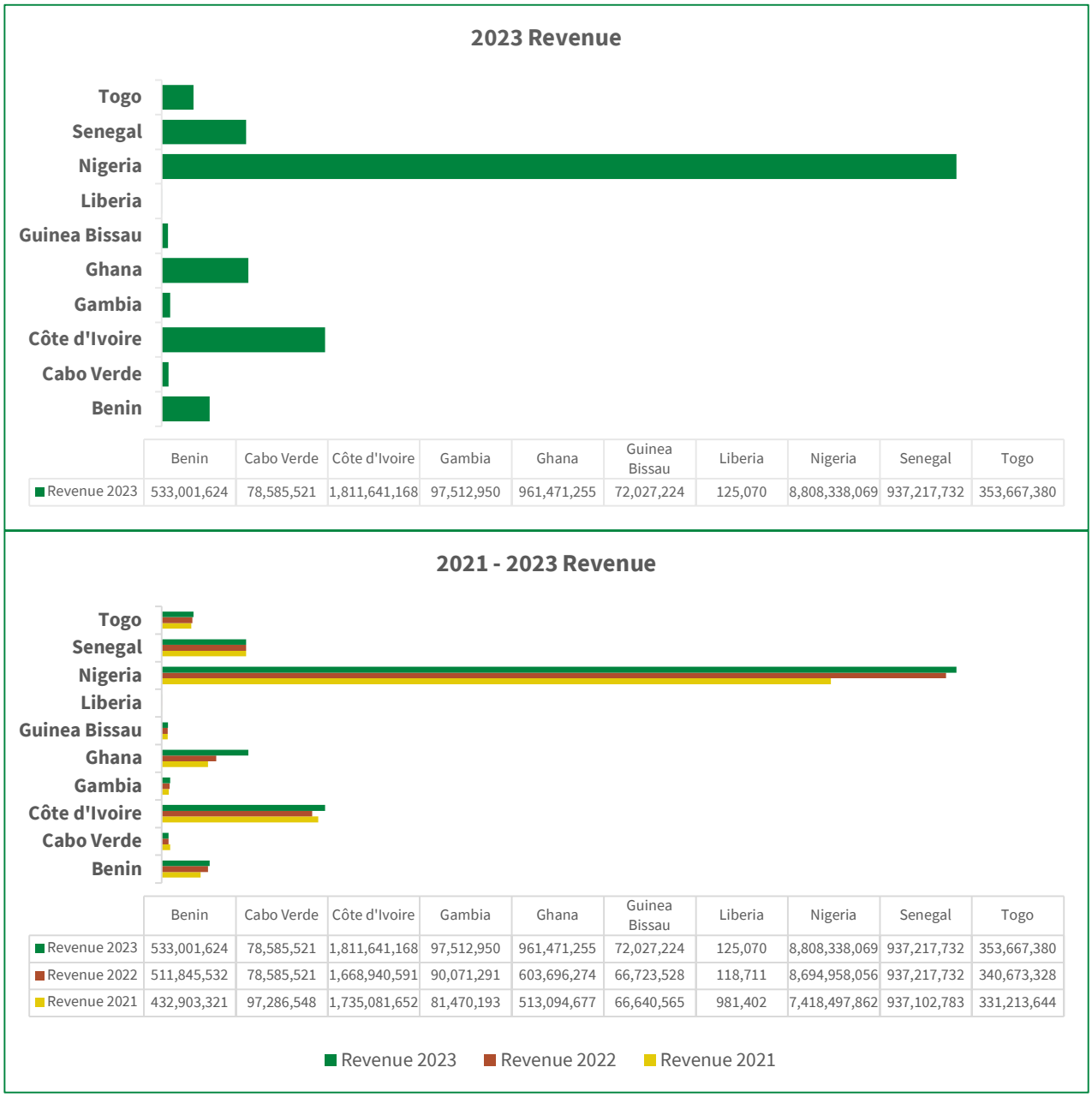
	Benin	Cabo Verde	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
Outgoing Traffic 2021	162,951,233	3,968,820	811,751,485	18,808,125	453,152,114	19,822,628	23,600,888	530,826,882	294,716,986	18,210,700	42,512,815
Outgoing 2022	171,293,710	4,585,493	1,085,870,67	16,554,177	319,144,643	681,262,577	20,489,239	313,531,889	152,652,268	17,353,769	34,896,136
Outgoing 2023	148,091,761	4,667,781	1,156,348,80	16,554,177	270,787,610	12,848,258.0	17,223,504	338,396,498.	106,444,830	15,111,038	35,530,737

Figure12. Total outgoing traffic call: current and period 2021-2023

Apart from Cabo Verde and Côte d'Ivoire, where an upward trend was observed, all other countries experienced a downward trend in outgoing call traffic. An exceptional increase was noted for Guinea Bissau between 2022 and 2023.

3.6 Revenue of Telecommunications and ICT services

The regional trend indicates a revenue growth of 5.09% in 2023 and 17.56% between 2021 and 2023. Figure 13 provides a breakdown of telecommunications and ICT revenue for 2023 and the period from 2021 to 2023.



	Benin	Cabo Verde	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Togo
Revenue 2023	533,001,624	78,585,521	1,811,641,168	97,512,950	961,471,255	72,027,224	125,070	8,808,338,069	937,217,732	353,667,380
Revenue 2022	511,845,532	78,585,521	1,668,940,591	90,071,291	603,696,274	66,723,528	118,711	8,694,958,056	937,217,732	340,673,328
Revenue 2021	432,903,321	97,286,548	1,735,081,652	81,470,193	513,094,677	66,640,565	981,402	7,418,497,862	937,102,783	331,213,644

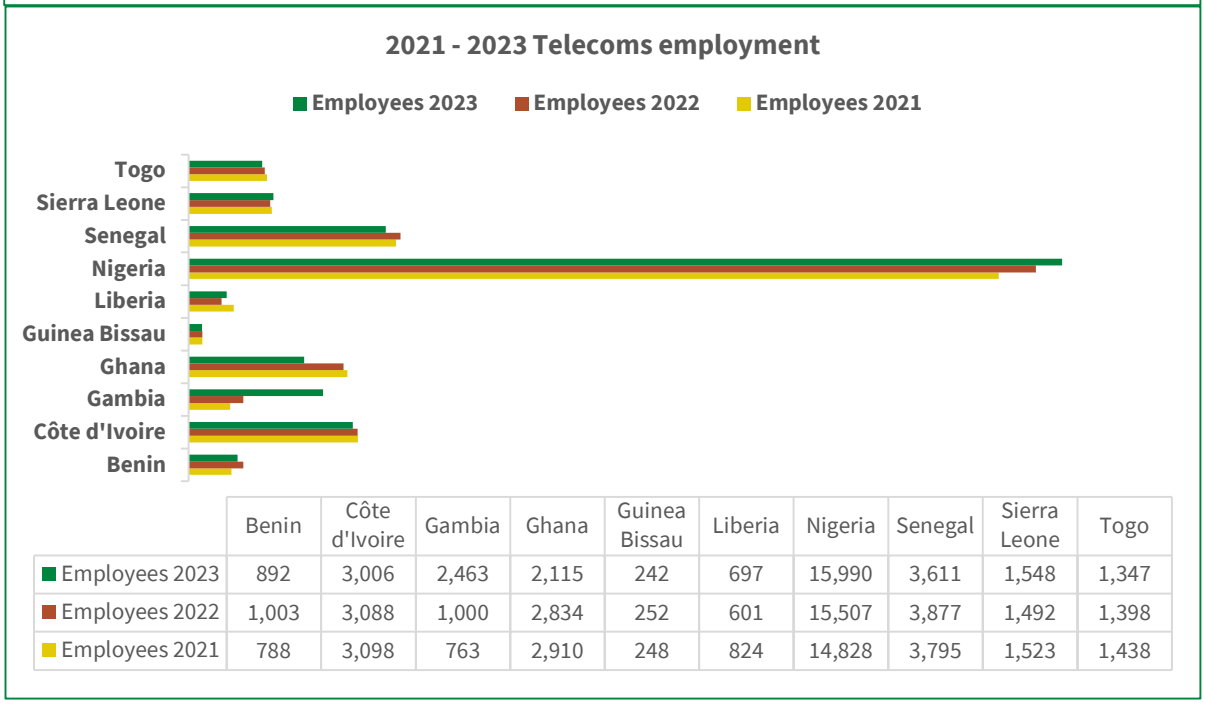
Figure13. Total revenue: current and period 2021-2023

In 2023, the economic value added by telecom and ICT sectors was predominantly contributed by Côte d'Ivoire, Ghana, Nigeria, and Senegal, which together accounted for 91.69% of the total value added, amounting to $12,518,668,224 out of $13,653,587,993. This pattern is consistent for the period from 2021 to 2023.

3.7 Employment

The regional trend of full-time employment in the telecommunications sector shows a growth of 2.77% in 2023 and 5.61% between 2021 and 2023. Figure 14 provides a breakdown of this indicator for 2023 and the period from 2021 to 2023.

	Benin	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
2023 Employees	892	3,006	2,463	2,115	242	697	15,990	3,611	1,548	1,347



	Benin	Côte d'Ivoire	Gambia	Ghana	Guinea Bissau	Liberia	Nigeria	Senegal	Sierra Leone	Togo
Employees 2023	892	3,006	2,463	2,115	242	697	15,990	3,611	1,548	1,347
Employees 2022	1,003	3,088	1,000	2,834	252	601	15,507	3,877	1,492	1,398
Employees 2021	788	3,098	763	2,910	248	824	14,828	3,795	1,523	1,438

Figure14. Total employees: current and period 2021-2023

In 2023, the majority of jobs created by telecom operators were in Côte d'Ivoire, Ghana, Nigeria, and Senegal, which together accounted for 77.47% of the total 31,911employees, representing 24,722 employees. This trend is also observed for the period from 2021 to 2023.

4 CONCLUSION

Effective governance is essential to position Telecommunications/ICT as a driver of economic growth and inclusion. Data plays a central role in developing governance instruments. Therefore, the ECOWAS Digital Observatory, is a strategic tool for evaluating the region's progress in order to provide relevant inputs for the refining of policies and strategies.

The period from 2021 – 2023 falls within a critical four-year span marked by political crises in several countries within the region, which has posed challenges for data collection.

Despite these challenges, significant advancements in infrastructure development have been observed. However, foundational infrastructures are still lacking in some countries, leading to a clustering effect, and highlighting the need for greater coordination to ensure harmonisation and regional integration in the journey towards digital transformation.

The analysis indicates that the region is divided into two clusters based on their levels of telecommunication backbone infrastructures development. These clusters are distinctly differentiated by the development of submarine cables, Internet Exchange Points, and data centre infrastructure. This disparity is reflected in the value-added and job creation metrics, which are predominantly driven by four (Côte d'Ivoire, Ghana, Nigeria, and Senegal) leading countries within the more advanced cluster.

The advancements underscore the vital role of mobile technology in ECOWAS countries. However, there remain significant underserved areas where further investment is needed, and alternative means of internet access should be considered. To accelerate the digital transformation trend, regulatory barriers must be addressed to allow new entrants into the sector.