ZAMBIA INFORMATION AND COMMUNICATIONS TECHNOLOGY AUTHORITY

INFORMATION AND COMMUNICATION TECHNOLOGIES SECTOR
2021 ANNUAL MARKET REPORT

A Supply Side Assessment of Developments in the Information and Communications Technology Sector

Economic Regulation Department
February, 2022

About this Report

The 2021 Annual Market Report for the Information and Communication Technologies (ICT) Sector was developed by the Zambia Information and Communications Technology Authority (ZICTA) as part of its regulatory mandate to track developments in the sector. The report provides quantitative and qualitative insights gathered from various players in the ICT sector including providers of ICT services, Government Ministries, Agencies and Departments; as well as physical and online resources which were complemented with information generated by the Authority. Specifically, the report sought to track global and national developments in the ICT sector over the year 2021. An assessment of the macro-economic environment with a focus on deciphering implications for the ICT sector; key trends in ICT access and usage based on micro level data as well as some of the drivers that could explain any observed patterns at the global and national level; details on market size, competition landscape, revenue performance, investment and any impediments to the growth and development of the sector. The report concludes with some sentiments on the forecast for the subsequent review period and provides some suggestions on interventions to consider for the subsequent year.

List of Abbreviations

CA	Council of Administration
CIS	Commonwealth Independent States
CPI	Consumer Price Index
EMS	Expedited Mail Service
Gbps	Gigabytes per second
GCA	Global Cybersecurity Agenda
GCI	Global Cybersecurity Index
GDP	Gross Domestic Product
GSMA	GSM Association
HHI	Herfindahl-Hirschman Index
ICT	Information and Communication Technology
ITU	International Telecommunications Union
LTE	Long Term Evolution
MNO	Mobile Network Operator
NCS	National Cybersecurity Strategy
OTTs	Over –the-Top Technologies
PSTN	Public Switch Telephone Network
SMS	Short Message Services
VAT	Value Added Taxes
ZICTA	Zambia Information and Communications Technology Authority

TABLE OF CONTENTS

ABOUT THIS REPORT I

LIST OF ABBREVIATIONS II

LIST OF FIGURES V

LIST OF TABLES VI

EXECUTIVE SUMMARY VII

A SECTORIAL POLICY AND REGULATORY REVIEW UNDERTAKEN AT THE END OF DECEMBER, 2021 THROUGH EXTENSIVE CONSULTATIONS WITH OPERATORS REVEALED THE FOLLOWING CHALLENGES: IX

1.0. RECENT GLOBAL DEVELOPMENTS IN THE ICT SECTOR 1

1.1. GLOBAL TRENDS IN MOBILE CELLULAR SUBSCRIPTIONS 1
1.2. TRENDS IN GLOBAL INTERNET USAGE 1
1.3. GLOBAL NETWORK BROADBAND COVERAGE 2
1.4. PERFORMANCE IN THE GLOBAL CYBERSECURITY INDEX 2020 3
1.5. GLOBAL DISPARITIES IN THE AFFORDABILITY OF ICT SERVICES 3
1.6. MID-BAND SPECTRUM REQUIRED TO MEET UN TARGETS 4
1.7. 2020 GROWTH IN MOBILE MONEY TRANSACTIONS. 4
1.8. POSTAL DEVELOPMENT INDEX RANKING 4
1.9. 2021 UNIVERSAL POSTAL UNION THE CONGRESS 4
1.10. TENTH PAN AFRICAN POSTAL UNION PLENIPOTENTIARY SESSION 5

2.0. SELECTED LOCAL DEVELOPMENTS IN THE ICT SECTOR 5

2.1. ISSUANCE AND RENEWAL OF LICENSES TO OPERATORS IN THE ICT AND POSTAL SECTOR 5
2.2. ISSUANCE AND RENEWAL OF LICENCES TO OPERATORS IN THE POSTAL SECTOR 7
2.3. AWARD OF 800MHZ FREQUENCY BAND RADIO SPECTRUM TO MTN ZAMBIA 7
2.4. BEELINE TELECOM LICENSED AS ZAMBIA'S FOURTH MOBILE PHONE OPERATOR 7
2.5. TRENDS IN MOBILE MONEY ADOPTION AND USAGE 7
2.6. ENACTMENT OF VARIOUS ICT RELATED LEGISLATION 8
2.7. COMMUNICATION TOWERS CONSTRUCTED UNDER THE SMART ZAMBIA INITIATIVE 8
2.8. DIGITALISATION OF PRISONS BY ZAMBIA CORRECTIONAL SERVICES 8

3.0. DEVELOPMENTS IN THE MACROECONOMIC ENVIRONMENT 10

3.1. ECONOMIC GROWTH 10
3.2. INFLATION RATE PERFORMANCE 10
3.3. PERFORMANCE OF THE FOREIGN EXCHANGE MARKET 11
3.4. AVERAGE LENDING RATES AND MONETARY POLICY RATES. 12
3.5. ACCESS TO COMMERCIAL BANK CREDIT IN THE ICT SECTOR. 13
3.6. FOREIGN CAPITAL INVESTMENTS AND INVESTOR PERCEPTIONS 14
3.7. TAXATION REGIMES AFFECTING THE ICT SECTOR 15

4. PERFORMANCE OF THE ICT SECTOR 16

4.1 MOBILE TELEPHONE SERVICES MARKET 16
4.1.1. Active Mobile Network Subscription *16*
4.1.3. Unique Mobile Subscribers *17*
4.1.4. Mobile Cellular Voice Traffic *18*
4.1.5. Mobile Voice Tariffs *20*

4.1.6. Telecommunication Infrastructure *21*
4.1.7. Mobile Revenue Performance *22*
4.1.8. MNO Average Revenue per User *23*
4.2 FIXED TELEPHONY MARKET 24
4.2.1. Active Public Switched Telephone Network Subscriptions *24*
4.2.2. PSTN Traffic *25*
4.2.3. Revenue from Public Switched Telephone Network Services *26*
4.3 INTERNET SERVICES 26
4.3.1. Fixed and Mobile Internet Subscription *26*
4.3.2. Mobile Internet Market Shares *27*
4.3.3. Fixed Internet Services Market *29*
4.3.4. Bandwidth Capacity and Utilisation *30*
4.4 PASSIVE INFRASTRUCTURE 32
4.4.1. Ownership of Tower Infrastructure *32*
4.4.2. Financial Performance of Passive Infrastructure Providers *33*
4.5 DATA STORAGE FACILITIES 34
4.5.1. Capacity and Utilisation of Data Storage Facilities *34*
4.6 TRANSMISSION NETWORK MARKET 35
4.6.1. Network Capacity and Utilization in the Transmission Network Market *35*
4.6.2. Wholesale Transmission Infrastructure *36*
4.6.2.1. Fibrecom Fibre Network *36*
4.6.2.2. Liquid Telecom Network *37*
4.6.2.3. Zamtel Fibre Network *37*
4.6.2.4. Airtel Networks Fibre Network *38*
4.6.2.5. MTN Zambia Fibre Network *39*
4.7 EMPLOYMENT IN THE ICT SECTOR 39

5. POSTAL AND COURIER SERVICES 41

5.1. THE PUBLIC POSTAL OPERATOR, ZAMPOST 41
5.1.1. Developments by Zampost to improve Postal Services in 2021 ..... *41*
5.1.2. Zampost Traffic *42*
5.1.3. Zampost Revenue and Employment Performance *43*
5.2. COURIER SERVICES 43
5.2.1. Traffic by Courier Service Providers *43*
5.2.2. Revenue Performance *44*
5.2.3. Coverage of Postal Services *44*

6. SECTORIAL POLICY AND REGULATORY REVIEW 46

6.1 POSITIVE DEVELOPMENTS ON THE MARKET 46
6.2 CHALLENGES OBSERVED ON THE MARKET 47
6.3 PROPOSED INITIATIVES TO ADDRESS ANY RISKS OR CHALLENGES 48

7. OUTLOOK FOR THE ICT SECTOR IN 2022 50

LIST OF FIGURES

FIGURE 1: MOBILE CELLULAR PENETRATION, 2020 - 2021 1
FIGURE 2: PROPORTION OF INDIVIDUALS USING THE INTERNET 2005 - 2021* 2
FIGURE 3: TRENDS IN NETWORK POPULATION COVERAGE BY TECHNOLOGY; 2015 - 2021 3
FIGURE 4: ECONOMIC GROWTH PERFORMANCE; 2019Q1 TO 2021Q3 10
FIGURE 5: INFLATION PERFORMANCE; DEC 2020 – DEC 2021 11
FIGURE 6: EXCHANGE RATE PERFORMANCE; DEC 2020 TO DEC 2021 12
FIGURE 7: COMMERCIAL BANK LENDING RATES AND POLICY RATES; DEC 2020 TO DEC 2021 13
FIGURE 8: COMMERCIAL BANK CREDIT ALLOCATED TO TRANSPORT, STORAGE AND COMMUNICATION SECTOR; 2020 TO 2021 14
FIGURE 9: PRIVATE INVESTMENT PERFORMANCE: 2018 - 2020 15
FIGURE 10: TRENDS IN MOBILE SUBSCRIPTION: 2019 TO 2021 16
FIGURE 11: TRENDS OF SUBSCRIPTION-BASED MNO MARKET SHARES AND HHI: 2019 TO 2021 17
FIGURE 12: TRENDS IN DOMESTIC OUTGOING TRAFFIC MINUTES: 2019 TO 2021 18
FIGURE 13: TRENDS IN DOMESTIC INCOMING TRAFFIC MINUTES: 2019 TO 2021 19
FIGURE 14: TRENDS IN INTERNATIONAL OUTGOING TRAFFIC MINUTES: 2019 TO 2021 19
FIGURE 15: TRENDS IN INTERNATIONAL INCOMING TRAFFIC MINUTES: 2019 TO 2021 20
FIGURE 16: MOBILE VOICE TARIFFS 'PER MINUTE IN ZMW': 2010 TO 2021 20
FIGURE 17: TELECOMMUNICATION SITES BY TYPE OF TECHNOLOGY: 2019 TO 2021 22
FIGURE 18: TREND IN MNO TOTAL REVENUE PERFORMANCE: 2020 TO 2021 23
FIGURE 19: CONTRIBUTION TO TOTAL REVENUE BY SERVICE FOR MNOS: 2019 TO 2021 23
FIGURE 20: MNO AVERAGE REVENUE PER USER: 2013 TO 2021 24
FIGURE 21: PSTN SUBSCRIPTION AND PENETRATION RATES: 2020 TO 2021 25
FIGURE 22: TRAFFIC FOR PSTN SERVICES: 2019 TO 2021 26
FIGURE 23: REVENUE PERFORMANCE FOR PSTN SERVICES: 2019 TO 2021 26
FIGURE 24: TRENDS IN INTERNET SUBSCRIPTION; 2019 TO 2021 27
FIGURE 25: TRENDS IN MARKET SHARES OF MOBILE INTERNET SUBSCRIPTION: 2019 TO 2021 28
FIGURE 26: MARKET SHARE OF SUBSCRIBERS BY INTERNET SERVICE PROVIDER: 2019 TO 2021 30
FIGURE 27: BANDWIDTH CAPACITY AND UTILIZATION BY MNO: 2019 TO 2021 31
FIGURE 30: DATA THROUGHPUT VOLUMES: 2019 TO 2021 32
FIGURE 31: TRENDS OF TOWER INFRASTRUCTURE: 2019 TO 2021 33
FIGURE 32: FIBRECOM NETWORK MAP: 2021 36
FIGURE 33: LIQUID TECHNOLOGIES METRO AND BACKBONE NETWORK DIAGRAM, 2021 37
FIGURE 34: ZAMTEL FIBRE BACKBONE INFRASTRUCTURE 38
FIGURE 35: AIRTEL NETWORK PLANNED AND EXISTING FIBRE NETWORK INFRASTRUCTURE 38
FIGURE 36: MTN ZAMBIA AERIAL AND UNDERGROUND BACKBONE FIBRE NETWORK 39
FIGURE 37: EMPLOYMENT IN THE ICT SECTOR: 2019 TO 2021 40
FIGURE 38: DOMESTIC MAIL DELIVERY 2020 AND 2021 – NO. OF ITEMS DELIVERED 42
FIGURE 39: COURIER TRAFFIC 2021 *(NUMBER OF ITEMS DELIVERED)* 43
FIGURE 40: COURIER REVENUE 2021 (ZMW) 44
FIGURE 41: POST OFFICE/ COURIER PRESENCE 2021 – NUMBER OF POST/COURIER OFFICES PER PROVINCE 45

LIST OF TABLES

TABLE 1: NUMBER OF VALID LICENSES ISSUED IN THE ICT SECTOR, 2020- 2021 6
TABLE 2: NUMBER OF VALID LICENSES ISSUED IN THE POSTAL SECTOR: 2020 - 2021 7
TABLE 3: TRENDS IN VOLUMES AND VALUES OF ELECTRONIC MONEY TRANSACTIONS 8
TABLE 4: EXTENT OF MULTIPLICITY OF SIM CARDS IN MNO SUBSCRIPTION: 2020 TO 2021 17
TABLE 5: BENCHMARKING OF MOBILE VOICE TARIFFS IN US DOLLARS 21
TABLE 6: REGIONAL BENCHMARKING OF DATA AND VOICE BUNDLES 28
TABLE 7: REVENUE (ZMW '000') PERFORMANCE OF PASSIVE INFRASTRUCTURE PROVIDERS: 2019 TO 2021 33
TABLE 8: DATA CENTRE SERVICE PROVIDERS' PERFORMANCE STATISTICS: DEC 2020 TO DEC 2021 34
TABLE 9: TREND IN NETWORK TRANSMISSION CAPACITY AND UTILIZATION: JUNE 2020 TO JUNE 2021 35
TABLE 10: INTERNATIONAL MAIL DELIVERIES: 2020 TO 2021 (*NUMBER OF ITEMS DELIVERED* 42

EXECUTIVE SUMMARY

Major Global Developments in the ICT Sector: Preliminary estimates by the ITU show that the number of global mobile cellular subscriptions increased from 107 subscriptions per 100 inhabitants in 2020 to 110 subscriptions per 100 inhabitants in 2021. Similarly, the number of individuals using the internet during the year increased by 800 million to an average of 4.9 billion people in 2021, or 63 per cent of the population. The global population covered by a mobile cellular network increased marginally from 96.7 percent of the population in 2020 to 96.9 percent in 2021. In the ITUs 2021 Global Cybersecurity Index, it was revealed that countries had improved their cyber safety as 64 per cent of the reviewed countries had adopted a national cybersecurity strategy compared to 58 per in the preceding year. The 2021 GSMA report on the State of the Industry Report on Mobile Money showed that mobile money accounts grew by 13 percent to 1.2 billion in 2020 from 1 billion in 2019. In the postal sector, the 2021 postal development report showed that Guinea, Cameroon and Zambia have made the largest relative gains in the African region with regards to the postal development index, moving up by 36, 34 and 25 places, respectively.

Major Local Developments in the ICT Sector: By the end of December 2021, there were a total of seventy three (73) valid licences in the ICT sector relative to seventy one (71) valid licences reported at the end of December, 2020. In addition, by the end of December, 2021, the Authority had issued a total of forty nine (49) valid licenses to operators in the postal and courier services sector compared to thirty five (35) licences reported at the end of December, 2020. During the year, the number of active mobile money subscribers increased from 8.6 million subscriptions in 2020 to 9.9 million in 2021 while the volume of mobile money transactions increased from 746.5 million to 843.1 million transactions in 2021 representing an annual improvement of 11.7 percent. On a year on year basis, the value of mobile money transactions in 2021, grew from ZMW 105.6 billion in 2020 to ZMW 169.4 billion in 2021 representing a growth rate of 60 percent. The Government of the Republic of Zambia enacted four pieces of legislation in 2021 that will enhance the regulation of the ICT sector. These legislations included; The Cyber Security and Cybercrimes Act number 2 of 2021, the Data Protection Act number 3 of 2021, the Electronic Communications and Transactions Act number 4 of 2021 following the repeal of the Electronic Communications and Transactions Act number 21 of 2009 and the Electronic Government Act number 41 of 2021. Phase II of the SMART Zambia communication tower project progressed significantly during the review period with a total of 823 communication towers constructed and on-air out of the proposed 1,009 towers.

Macroeconomic Performance: The local economy is estimated to have recorded a positive growth rate of 3 percent in 2021 after a decline of 3 percent in economic activity was recorded in 2020. The annual inflation rate, measured using the consumer price index, decreased from 19.2 percent in December 2020 to 16.4 percent in December, 2021 representing a decrease of 2.8 percentage points. The general slowdown in the

change of prices of goods and services is expected to have a positive effect on the affordability of the ICT services due to the anticipated decrease in the cost of operations. The local currency appreciated against all major trading currencies over the review period. On a year to date basis, the currency appreciated by an average of 20 percent between December 2020 and December 2021 from ZMW/USD21.17 to ZMW/USD16.67; ZMW/GBP28.4 to ZMW/GBP22.38; ZMW/ZAR1.45 to ZMW/ZAR1.10. This appreciation is expected to affect the sector positively as the cost of internationally sourced inputs falls. According to the Private Sector Foreign Investment Survey, the Information and Communications sector recorded a net inflow amounting to $11.4 million in 2020 relative to the net outflow of $19.2 million recorded in 2019 suggesting an increase in investments within the sector.

2021 Performance of Selected Indicators in the ICT Sector

INDICATOR	2020	2021	COMMENT
1. Total number of active mobile network subscriptions	19.1 million	20.2 million	**Improvement (5.76 percent)**
2. Market Concentration (HHI)	0.368	0.369	**Marginal decrease in competitive forces**
3. Number of unique mobile cellular subscriptions	7.4 million	7.5 million	**Improvement (1.4 percent)**
4. Total domestic outgoing traffic on mobile cellular networks	21.4 billion	24.4 billion	**Improvement (14.1 percent)**
5. Volume of international outgoing traffic	21.2 million	17.4 million	**Decrease (18 percent)**
6. Volume of international incoming traffic	21.6 million	18.6 million	**Decrease (14 percent)**
7. Benchmarking of mobile voice across 18 countries drawn from the region (Zambia performance on On-net calls during Peak hours)	7th position	7th position	**Status quo retained**
8. Total number of operational telecommunication sites in the country	10,574	11,478	**Improvement (8.5 percent)**
9. Revenue performance in the mobile telephone subsector	5.3 billion	6.6 billion	**Improvement (24.3 percent)**
10. Total number of active internet (mobile & fixed) subscriptions	10.3 million	10.4 million	**Improvement (1.3 percent)**
11. Average equipped capacity for the mobile network operators.	103,095.5 Gbps	181,728.25 Gbps	**Improvement (76.3 percent)**
12. Number of telecommunication towers in Zambia	3,309	3,413	**Improvement (3 percent)**
13. Total available capacity among wholesale carriers	633.5 Gbps	640.2 Gbps	**Improvement (1 percent)**
14. Outgoing International Mail Traffic – Zampost	147,024	153,905	**Improvement (4.7 percent)**

INDICATOR	2020	2021	COMMENT
15. Outgoing Domestic Mail Traffic – Courier operators	n/a	283,872	**New indicator**
16. Outgoing International Parcel Traffic – Courier operators	n/a	5,548	**New indicator**
17. Total number of employees in the ICT sector	1662	1709	**Improvement (2.8 percent)**

A sectorial policy and regulatory review undertaken at the end of December, 2021 through extensive consultations with operators revealed the following challenges:

a) **Deterioration in the Macro economic Environment:** Operators continued to highlight the challenges associated with the prevailing macro-economic environment. Notably, the depreciation of the local currency, rising inflation and high interest rates were noted to have increased the cost of acquiring key inputs for their operations as well as limited their prospects on profitability.

b) **Delays in Issuance of Statutory Instruments:** There was a noted concern on the delayed issuance of statutory instruments that would operationalise the new legislation on cyber security, data protection and electronic transactions.

c) **Increased requirements for Spectrum**: There was an indication that operators would need more spectrum resources allocated to support the maintenance of quality of service following the increased subscriber base as well as their deployment plans. The specific bands sought were noted to be the 2,100 MHz, 2,600 MHz and 900 MHz.

d) **High cost of Fibre termination fees at towers and potential abuse of Dominance:** It was reported that the tower companies were charging high fees for termination of fibre at their sites which was costly. This was reported as a potential consequence of abuse of dominance by the tower companies that operate in a highly concentrated market.

e) **High cost of in country transit and transport costs for connectivity**: A number of operators indicted that the cost of in country transit and transport costs for connectivity were quite high. This was mainly attributed to the dominant position held by the owners of the essential infrastructure.

f) **Challenges with Vertically Integrated Operators**: There was a reported under-pricing of services by vertically integrated operators on the market especially those providing wholesale data as well as infrastructure and retail data services which could potentially be anti-competitive market conduct arising from margin squeezing. Operators sought the Authority's intervention in providing the due remedies to address the challenges posed by the vertically integrated firms.

g) **Changes in HSS codes for Optic Fibre:** It was reported that the Tax authorities had changed the HS code for fibre cables which now required them to face taxes. The change of the HSS codes from 900.11.00 to 8544.70.00 meant that the cables now would face customs duty making the cost of deployment even higher.

h) **Impact of Covid-19 on Field Operations:** The Covid -19 pandemic led to disruptions in field operations for a number of operators as their staff had to work from home. This had adverse implications on maintaining service standards and consumer satisfaction.

i) **Unlicensed Operators in the Postal Sector:** The prevalence of unlicensed operators in the postal sector continued to be a noted concern. In addition some courier parcels were noted to be moved through the luggage section of most transporters. These practices were a threat on the commercial viability of the existing licenced operators that face costs for compliance.

j) **Technology and Delivery times for Postal articles:** There was a noted challenge associated with limited adoption of technology by postal and courier operators related to tracking and tracing parcels as well as delayed delivery of parcels. These challenges had an adverse effect on the consumer experience.

The outlook for the year 2022 based on the trends noted on the market as well as sentiments gathered from operators are summarized below:

a) **Forecast in uptake and Usage of ICT Services**: The Authority forecasts a positive outlook in the general uptake and use of ICT services in the subsequent review period. The number of active mobile network subscriptions is expected to increase from 20.3 reported at the end of 2021 to 20.9 million subscriptions at the end of 2022 and subsequently 21.2 million in 2023. In addition, the volume of domestic outgoing mobile voice call minutes is forecasted to increase from 24.4 billion minutes estimated for the end of 2021 to 26.2 billion projected for the year 2022 and could reach 28 billion minutes in 2023. These anticipated improvements in uptake and usage of ICT services are on the backdrop of increased investments by operators in the capacity and coverage of their networks, competitive pricing outcomes on the market as well as general improvement in demand for ICT services among other attributes. However, there are risks mainly with international voice traffic which has exhibited a sustained decline in the immediate past.

b) **Benefits of newly assigned Spectrum:** The Authority issued spectrum in the 800 MHz band to Airtel networks Zambia and MTN Zambia Ltd. The two companies are expected to deploy new services as well as enhance the quality of its services by leveraging on the new and additional spectrum. There are also plans underway to assign additional spectrum bands to enhance capacity, diversity of services on the market as well as reduce the cost of deployment for networks.

c) **Deployment of new Technologies and additional Infrastructure**: Operators are expected to continue deploying infrastructure aimed at increasing coverage and improving quality of services. Notably, the proportion of 4G/LTE sites is anticipated to continue increasing while more deployment of metro fibre networks is also expected. There are also some operators that have indicated that they have plans of commencing preparations for 5G networks. The Authority has committed to facilitating testing for 5G and will make the required resources available. The construction of the 1009 towers by the government is also expected to be concluded in 2022.

d) **Regulations and Guideline's Related to the recently enacted Laws:** Following the enactment of the Cyber Security and Cyber Crimes Act No. 2 of 2021 as well as the Electronic Communications and Transactions Act No. 4 of 2021, it is anticipated that a number of regulations and guidelines will be issued to facilitate the operationalisation of these laws. These regulations and guidelines will have a significant impact on how the sector is regulated as well as how electronic transactions are undertaken.

e) **New Licensing Framework:** The Authority has undertaken a review of the current licensing framework aimed at addressing some existing challenges and responding to new opportunities on the market. A regulatory impact assessment of the proposed amendments was recently concluded and the new licensing framework could be finalised and implemented by the end of 2022.

The above opportunities notwithstanding, a few notable risks were identified with a view to explore avenues for mitigation. These risks included the following:

a) **Continued decline in International Traffic:** While most of the ICT indicators point to a positive growth trajectory, international traffic volumes have consistently been on the decline. This trend is anticipated to continue in the subsequent period mainly as a result of intensified use of OTT applications such as WhatsApp for international calling. In order to mitigate the risk associated with reduced revenues, operators will have to be more innovative in embracing OTTs which offer an opportunity for new and increased revenue streams through data utilisation.

b) **Cyber Related Challenges:** As the uptake of ICT services increases, there are anticipated challenges associated with cyber related risks. In the recent past, these risks have largely been concentrated in the usage of digital financial services. As a deliberate strategy, efforts on awareness will need to be enhanced to mitigate such risks.

c) **Unlicensed courier operators:** The continued provision of courier services by unlicensed providers limits the viability of the courier enterprises in the country. The limited geographical presence of the Authority limits the effectiveness of inspections. In this regard, more awareness by consumers on the need to use licenced providers will be required to address this challenge**.**

1.0. RECENT GLOBAL DEVELOPMENTS IN THE ICT SECTOR

1.1. Global Trends in Mobile Cellular Subscriptions

The total number of global mobile cellular subscriptions increased from 107 per 100 inhabitants in 2020 to 110 per 100 inhabitants in 2021. The most significant increase was observed in the Americas where the penetration rate increased from 114 percent to 119 percent, representing an increase of 4 percent. On the other hand, the total number of mobile cellular subscriptions in Africa decreased by 1.2 percent between 2020 and 2021. Commonwealth Independent States (CIS) retained the highest number of mobile subscribers and the highest penetration rate at 4.88 billion and 146.2 percent respectively (see Figure 1)[1].

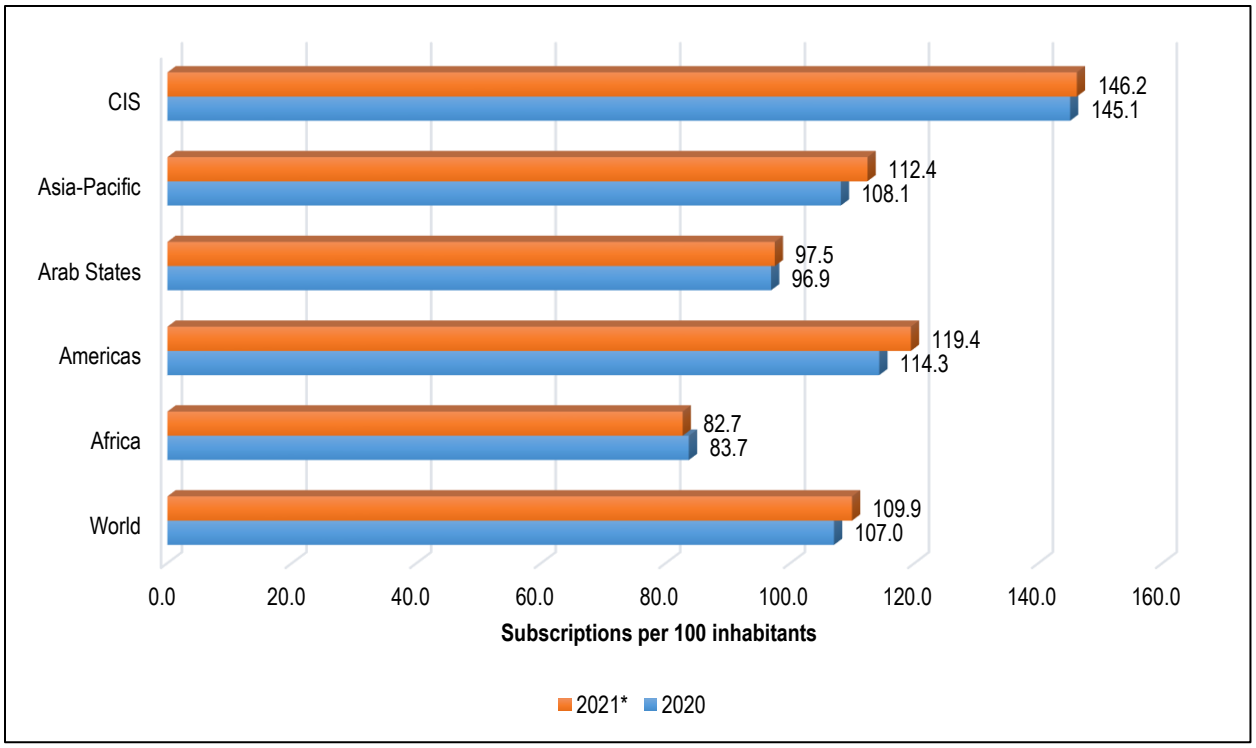


Figure 1: Mobile Cellular Penetration, 2020 - 2021

Source: ITU Report on Measuring Digital Development: Facts and Figures 2021

1.2. Trends in Global Internet Usage

The total number of internet users increased from 4.1 billion in 2020 to 4.9 billion people in 2021 representing 63 percent of the population. In 2020, the first year of the pandemic, the number of Internet users grew by 10.2 per cent, the largest increase in a decade, driven by developing countries where Internet use went up 13.3 per cent. In 2021, growth returned to a more modest 5.8 per cent, in line with pre-crisis rates. This growth was mostly attributed to developed countries were internet subscribers increased from 3.4 billion in 2020 to 3.7 billion in 2021 representing a growth rate of 8 percent. Developing countries also recorded a growth of 2.5 percent in internet subscribers, from 1.2 billion to 1.3 billion over the review period. Nonetheless,

[1] https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2021.pdf

this figure translated to at least 2.9 billion people remaining offline, 96 per cent of whom lived in developing countries (see figure 2)[2].

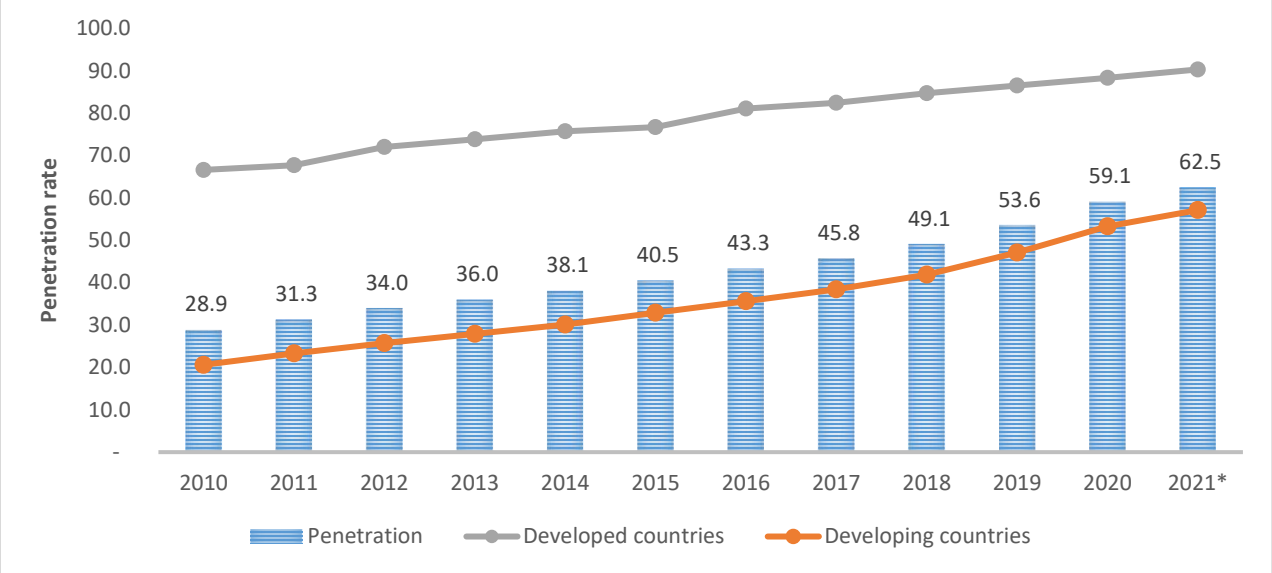


Figure 2: Proportion of individuals using the internet 2005 - 2021*

Source: ITU Report on Measuring Digital Development: Facts and Figures 2021

1.3. Global Network Broadband Coverage

The global population covered by a mobile cellular network increased marginally from 96.7 percent of the population in 2020 to 96.9 percent of the population in 2021. This increase was dominant in least developed countries and developing countries while the network coverage of developed countries remained constant. The population covered by an LTE/4G mobile network continued to increase in 2021 with an average of 87.6 percent of the global population covered by 4G while 95 percent of the population was covered by 3G mobile network. In Africa, 3G coverage remained dominant, increasing from 78.3 percent to 82.4 percent over the review period while 4G coverage increased from 40.7 percent to 49.2 percent.

[2] TU Report on Measuring Digital Development: Facts and Figures 2021

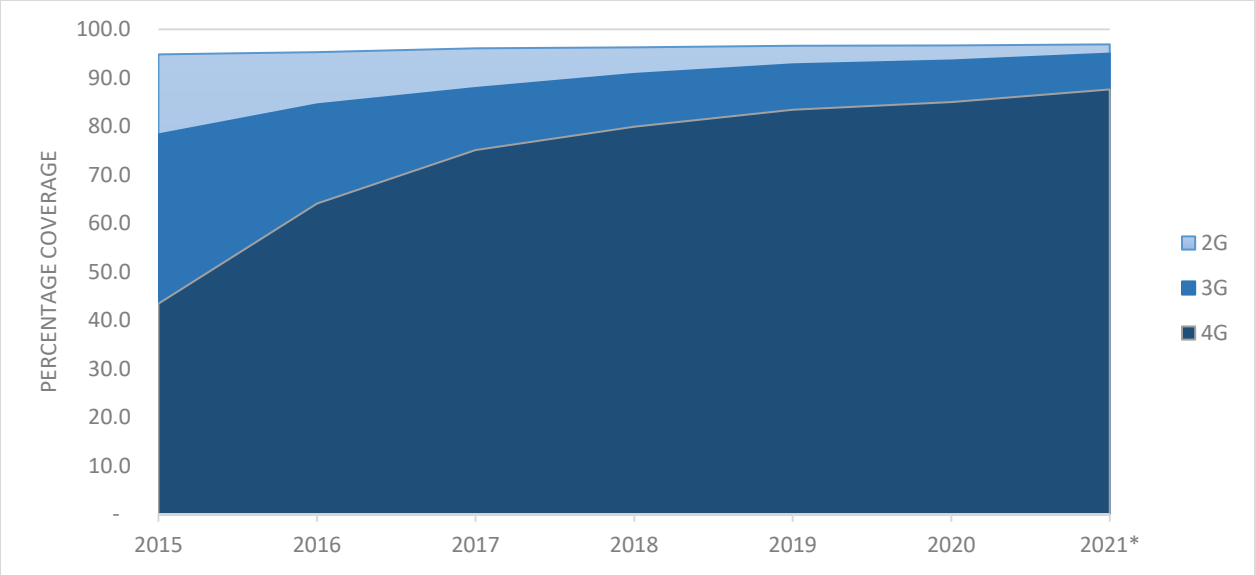


Figure 3: Trends in Network Population Coverage by Technology; 2015 - 2021

Source: ITU Report on Measuring Digital Development: Facts and Figures 2021

1.4. Performance in the Global Cybersecurity Index 2020

The Global Cybersecurity Index (GCI) is a composite index produced, analyzed and published by the International Telecommunication Union (ITU) to measure the commitment of countries to cybersecurity in order to raise cybersecurity awareness. The GCI is rooted in the ITU Global Cybersecurity Agenda (GCA) that was launched in 2007, and reflects its five pillars: legal, technical, organizational, capacity building, and cooperation. The GCI 2020 showed that 64 per cent of countries had adopted a National Cybersecurity Strategy (NCS) by year-end, while more than 70 per cent conducted cybersecurity awareness campaigns in 2020, compared to 58 per cent and 66 per cent, respectively, in 2018. According to the 2020 GCI estimates, Zambia scored 68.88 giving it a global rank of 73 and an African regional rank of 10. In the 2018 GCI survey, Zambia scored 43.6 with a global rank of 90 and an African regional rank of 12[3].

1.5. Global Disparities in the Affordability of ICT services

In 2018, the Broadband Commission for Sustainable Development revised the broadband price target of less than 5 percent of gross monthly GNI per capita to less than 2 percent to be achieved by 2025. According to an ITU 2020 Policy Brief, the global median prices of mobile broadband and fixed broadband have fallen by an average of 0.2 percent to 1.7 percent and 2.9 percent respectively. Developing countries are noted to be the main drivers of this decline in prices as mobile broadband prices reduced from 2.9 percent to 2.5 percent while fixed broadband prices declined from 3.1 percent to 2.9 percent between 2019 and 2020. In developed countries, the price of mobile broadband was estimated at 0.6 percent while fixed broadband was at 1.2 percent of monthly GNI per capita. The brief illustrates that despite the increasing affordability of broadband services, the disparities between developed countries and developing countries remain notable[4].

[3] https://www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx
[4] https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2020/ITU_A4AI_Price_Briefing_2020.pdf

1.6. Mid-Band Spectrum Required to Meet UN Targets

According to a study commissioned by the GSMA, the mobile industry will need an average of 2 GHz of mid-band spectrum this decade to meet the UN's International Telecommunications Union (ITU) data speed requirements. Achieving this will also minimise environmental impact and lower consumer costs of 5G. The study showed that policymakers should license spectrum to mobile operators in harmonised bands, such as 3.5 GHz, 4.8 GHz and, 6 GHz to meet the ITU's requirements by 2030. Without the additional spectrum, it will be impossible to realise the full potential of 5G in some cases. In other bands, the number of antennas and base stations needed will lead to higher carbon emissions and consumer prices. The additional mid band spectrum will lower the carbon footprint of networks by two-to-three times while enhancing the sustainable development of mobile connectivity[5].

1.7. 2020 Growth in Mobile Money Transactions.

The 2021 GSMA report on the State of the Industry Report on Mobile Money revealed a sharp increase in the number of mobile money transactions during the year 2020. The report showed that mobile money accounts grew by 13 percent to 1.2 billion in 2020 from 1 billion in 2019 while active accounts increased by 300 million representing an increase of 17 percent. The amount of transactions processed daily reached US$2 billion with the highest transaction values observed in Sub-Sahara Africa. This growth in mobile money usage is attributed to the limited access to cash experienced in 2020 when several countries locked down as the Covid-19 pandemic ensued. The growth was observed to be more prevalent in economies where governments provided significant pandemic relief to their citizens[6].

1.8. Postal Development Index Ranking

The UPU published its Postal development report for 2021 which included a ranking index for levels of postal development of various states. The index was based on big data and administrative data gathered by the UPU. The index focused on Reliability, Reach, Relevance and Resilience. For 2021, Ghana was ranked highest in the African region, based on the reliability, improved reach and a level of resilience of its postal network, moving closer to the global average. Guinea, Cameroon and Zambia were all reported to have made the largest relative gains in the Africa region, moving up by 36, 34 and 25 places, respectively. The report highlighted that countries with the most developed postal services are likely to continue to race ahead, diversifying their offering and eventually reaping the benefits of strongly interconnected global supply chains, boosted by e-commerce.[7]

1.9. 2021 Universal Postal Union the Congress

The UPU hosted its Congress in August 2021, an event that is held every 4 years. Zambia participated in this Congress and was elected as a member of the Council of Administration (CA) in the UPU drawn from the Africa Region. The country was also elected as the chair of committee 3 of the CA focusing on strategy and postal economics. This will entail coordinating discussions and work on competition, pricing and postal statistics. The committee will also be responsible for monitoring the implementation of the strategic plan and the development of the strategic plan for the subsequent period. A new management and leadership of the

[5] https://www.computerweekly.com/news/252503872/GSMA-calls-for-2GHz-of-mid-band-spectrum-to-meet-UN-targets
[6] https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Summary.pdf
[7] 2IPD Report 2021

UPU was also voted into office comprising Mr. Masahiko Hetoki of Japan as the Director General of the UPU and Mr. Marjan Osvald from Slovenia as the Deputy Director General.

1.10. Tenth Pan African Postal Union Plenipotentiary Session

The Pan African Postal Union held its 10th meeting during the 2021 year. The plenipotentiary meeting is held every four years to make major decisions such as the leadership and strategy of the organization. Zambia was re-elected as a member of PAPU's Administrative Council for a second and final four-year term in this position. In addition, Mr. Sifundo Moyo from Zimbabwe was elected as the new Secretary General for PAPU while Ms. Jessica Sengooba from Uganda was elected as the Assistant Secretary General.

2.0. SELECTED LOCAL DEVELOPMENTS IN THE ICT SECTOR

2.1. Issuance and Renewal of Licenses to Operators in the ICT and Postal Sector

As at end of December 2021, there were a total of 73 valid licenses in the ICT sector compared to 71 valid licenses that had been issued by the Authority at the end of December 2020 (See **Table 1**). The licences

constituted forty three (43) Network licences, twenty seven (27) Service with Network licences and three (3) Service without Network licences.

Table 1: Number of Valid Licenses Issued in the ICT Sector, 2020- 2021

Type of Licence	Coverage	Licenses 2020	Licences 2021
1. **Network (Service & Facilities)**	International	3	4
	National	28	28
	Provincial	4	4
	District	6	7
	Sub-Total	**41**	**43**
2. **Service (With a Network- Category A)**	National	19	20
	Provincial	2	2
	District	3	5
	Sub-Total	**24**	**27**
3. **Service (Without a Network- Category B)**	National	6	3
	Provincial	0	0
	District	0	0
	Sub-Total	**6**	**3**
	Overall Total	**71**	**73**

Source: ZICTA

During the period under review, three (3) licences were cancelled by the Authority due to the following reasons:

i. Viva Broadband Limited: Network (National) licence: Due to mergers and acquisitions;
ii. Viva Broadband Limited: Service (National) licence: Due to mergers and acquisitions;
iii. Preworx Limited: Service (National) licence: Down grade to service licence only.

The following licences were issued for the first time in 2021:

i. Beeline Telecom: Network (International) licence;
ii. Beeline Telecom: Service (National) licence;
iii. Savenda Telecommunication Limited: Network (National) licence;
iv. Savenda Telecommunication Limited: Service (National) licence;
v. Africa Union Mobile: Network (National) licence;
vi. Africa Union Mobile: Service (National) licence;
vii. Globalconnect Zambia Limited: Network (National) licence;
viii. Globalconnect Zambia Limited: Service (National) licence;
ix. Universal Talktime Limited: Network (District) licence;
x. Universal Talktime Limited: Service (District) licence.

2.2. Issuance and Renewal of Licences to Operators in the Postal Sector

As at December 31, 2021, ZICTA had issued a total of 49 valid licenses in the Postal sector compared to 35 valid licenses that had been issued at the end of December, 2020 (See **Table 2**). A total of 14 new licences were issued in 2021 while no existing licences were due for renewal or cancelled.

Table 2: Number of Valid Licenses Issued in the Postal Sector: 2020 - 2021

	Licence Type	Licences 2020	Licences 2021
1.	Public Postal Operator	1	1
2.	International & Domestic Courier Licence	18	22
3.	Domestic Courier Licence	14	18
4.	Local Courier Licence	2	8
	Total	**35**	**49**

Source: ZICTA

2.3. Award of 800MHz Frequency Band Radio Spectrum to MTN Zambia

The Zambia Information and Communications Technology Authority (ZICTA) awarded MTN Zambia radio frequency spectrum in the 800 MHz frequency band in accordance with Section 54(6) of the ICT Act No. 15 of 2009. This additional spectrum, awarded to MTN Zambia at a cost of US$13.5million, was intended to complement the utilization of existing spectrum and improve the quality of voice and data services. Mobile broadband coverage was also expected to improve in both rural and urban areas as the spectrum band supports a longer range and superior indoor coverage. In the last quarter of 2020, Airtel Zambia Limited was also awarded radio spectrum in the same frequency band at a cost of US$12.5 million. The additional spectrum awarded to these Mobile network operators was expected to pave way for the introduction of Fifth generation (5G) mobile networks.

2.4. Beeline Telecom Licensed as Zambia's Fourth Mobile Phone Operator

Beeline Telecom Limited, a wholly Zambian owned company, was in February 2021 awarded a network license in the international market segment and a service license in the national market segment. The entity was awarded the license after a thorough evaluation process as outlined in the Authority's Licensing guidelines of 2017.The entrance of a fourth mobile network operator onto the market is likely to have a positive effect on the affordability, quality of service and innovation in the sector as competition intensifies[8].

2.5. Trends in Mobile Money Adoption and Usage

The increase in adoption and usage of mobile money services as observed in the recent past, continued during the year 2021. The total number of active mobile money subscribers in the country increased from 8.6 million in 2020 to 9.8 million subscribers in 2021 representing a growth rate of 15 percent. This performance

[8] https://satelliteprome.com/news/zambia-awards-beeline-telecom-fourth-mobile-licence/

was mainly attributed to the continued reliance on electronic and mobile platforms to send and receive funds as well as payment of utility services such as electricity, water and pay TV subscriptions. The value of mobile money transactions increased significantly from ZMW 105.6 billion recorded at the end of 2020 to ZMW 169.4 billion at the end of 2021 reflecting an increase of 60.39 percent. Similarly, the volume of mobile money transactions increased from 747 million transactions at the end of 2020 to 834 million transactions at the end of 2021 reflecting an improvement of 11.74 percent (see Table 3).

Table 3: Trends in Volumes and Values of Electronic Money Transactions

Transactions	2018	2019	2020	2021	YtD change
Volumes (Number)	303,955,243	522,829,070	746,500,187	843,121,817	**11.73%**
Values (ZMW)	22,191,565,753.86	49,576,813,972.80	105,619,623,780.67	169,402,432,643.17	**60.4%**
Active Subscribers	3,443,973	4,852,040	8,607,461	9,867,409	**14.63%**

Source: Bank of Zambia

2.6. Enactment of various ICT related Legislation

The Government of the Republic of Zambia enacted four pieces of legislation that will enhance the regulation of the ICT sector in 2021. These legislation included: the Cyber Security and Cybercrimes Act number 2 of 2021, the Data Protection Act number 3 of 2021; the Electronic Communications and Transactions Act number 4 of 2021 following the repeal of the Electronic Communications and Transactions Act number 21 of 2009; and the Electronic Government Act number 41 of 2021. The legislation will allow for the expansion of the ZICTAs' regulatory mandate as well as provide for the deployment of various emerging technologies in the country. Additionally, these legislations will enhance security and safety for consumers as well as enhance the rights of data subjects among benefits.

2.7. Communication Towers constructed under the SMART Zambia Initiative

The Government of the Republic of Zambia continued to roll out communication towers in a bid to complete the Phase II of the SMART Zambia communication tower project which was set to increase geographical network coverage to 92 percent. As at the end of 2021, a total of 823 communication towers had been constructed and on-air out of the 1009 towers expected upon completion of the project. The initiative was set to improve access to ICT services, the quality of service as well as uptake of ICT related services across the country.

2.8. Digitalisation of Prisons by Zambia Correctional Services

Zamtel signed a Memorandum of Understanding with the Zambia Correctional Services that will enable the operator to provide a variety of digital services in all correctional facilities. Specifically, the partnership will allow for the provision of a management system that will run a fleet management system, an inventory management system and an eLearning platform for the inmates. Additionally, the operator will put in place an inmate booking and tracking system and a closed user group for the correctional facility staff members. The use of digital services in correctional facilities will allow the correctional officers to effectively monitor the movement of inmates and consequently enhance the facility's security measures. Additionally, the use of

eLearning platforms by prisoners and correctional staff will enhance the adoption of ICTs in the country and enhance the prisoners' rehabilitation process to adequately equip them for reintegration into society.

3.0. DEVELOPMENTS IN THE MACROECONOMIC ENVIRONMENT

3.1. Economic Growth

The local economy is estimated to have recorded a positive growth rate of 3 percent in 2021 after a decline of 3 percent in economic activity was recorded in 2020[9]. The ICT sector was observed to be one of the main industries that had a significant impact on the increased economic activity experienced during the year. The observed increase in economic activity had a positive impact on the ICT sector as it increased the demand for ICT services across all sectors of the economy. Economic growth was projected to continue on a positive trajectory and would support the continued adoption and usage of ICT services in the country.

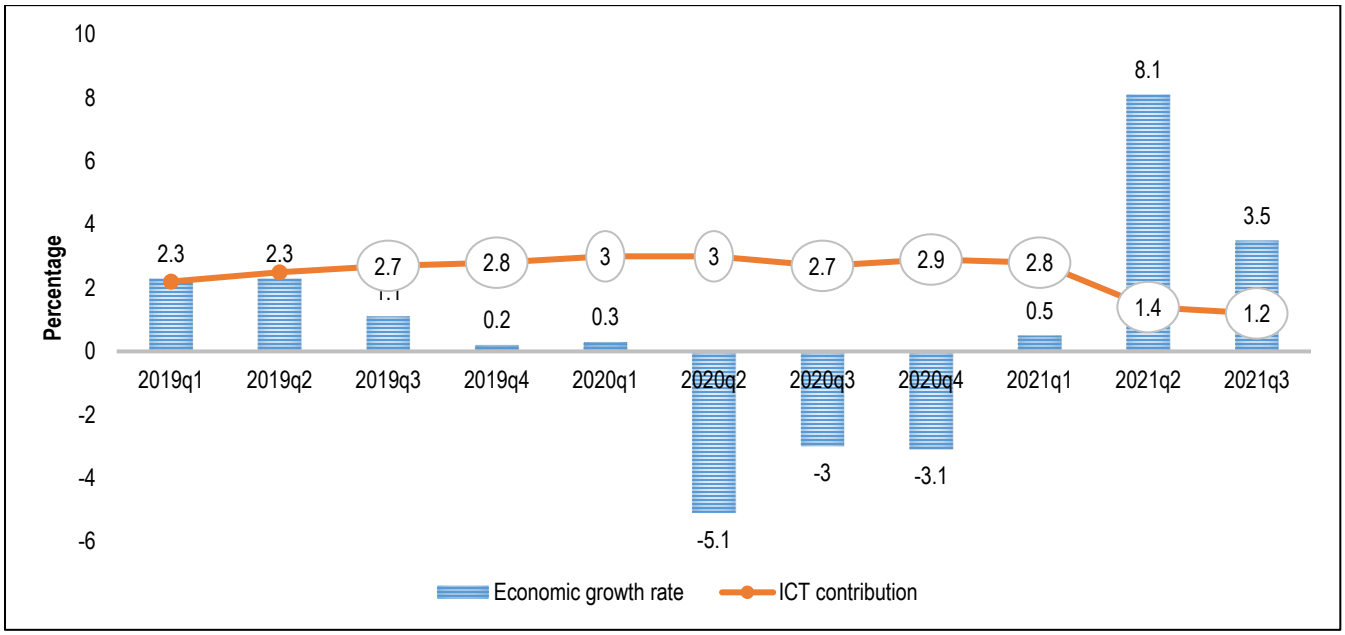


Figure 4: Economic Growth Performance; 2019q1 to 2021q3

Source: Constructed using Zambia Statistical Agency Data

3.2.Inflation Rate Performance

The general increase in the price of goods and services as measured by the Consumer Price Index (CPI) declined marginally over the year from 19.2 percent in December 2020 to 16.4 percent in December 2021. Categorically, the rate of increase in the average annual price decreased by 2.8 percentage points to 16.4 percent at the end of 2021. The decline in the inflation rate was attributed to a decrease in food inflation from 20.2 percent to 19.9 percent and non-food inflation which remained significantly lower during the year closing off at 12.1 percent. The reductions in both food and non-food inflation rates are attributed to the appreciation of the local currency thereby reducing the cost of internationally sourced inputs and goods. In the Information and Communications industry, there was a slight reduction of 1 percentage point in the sectors' inflation rate from 2.6 percent in December 2020 to 2.5 percent in December 2021. The reduction in the overall rate of

[9] Monetary Policy Statement, July- December 2021.

price increases in the country is expected to reduce the cost of supplying of ICT services thus improving quality of services, investment opportunities and affordability of the services. Additionally, a reduction in price changes is expected to have a positive impact on consumer spending by creating more stability in the overall expenditure patterns and thus, the consumption of ICT products.

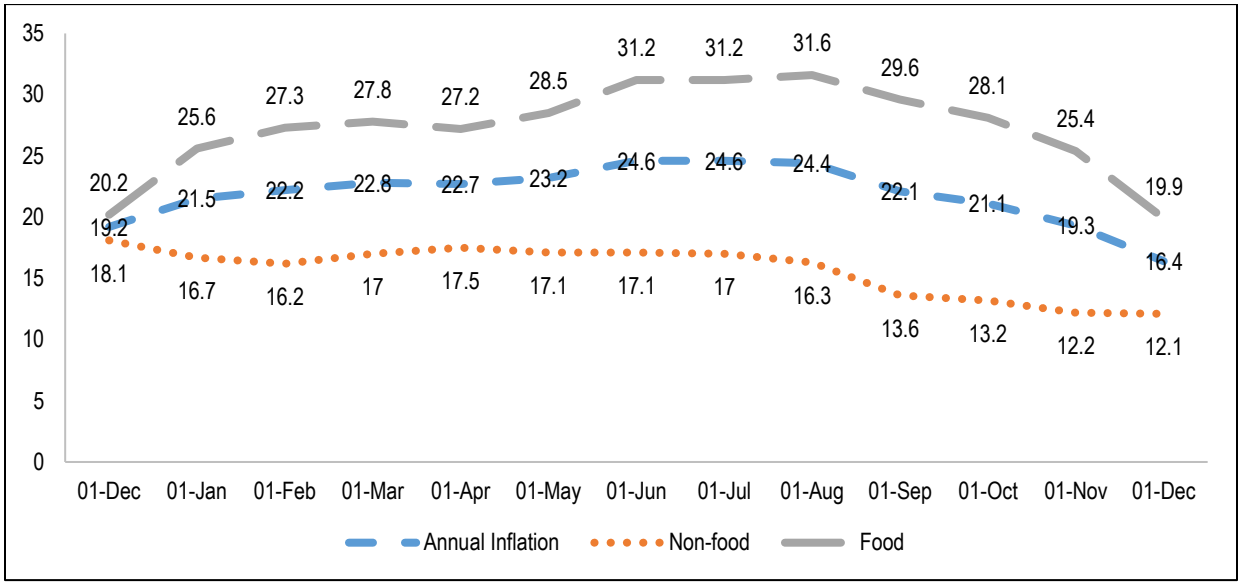


Figure 5: Inflation Performance; Dec 2020 – Dec 2021

Source: Constructed using Zambia Statistics Agency Data

3.3.Performance of the Foreign Exchange Market

A significant decline in the Zambian currency relative to its major trading currencies was observed in 2021. Particularly, the Zambian currency was trading at its lowest rate of ZMW15.9 per United States Dollar (USD), ZMW 15.89 per Britain Pound (GBP) and ZMW 1.07 per South African Rand (ZAR) in August 2021, a significant decline from the currency exchange rate recorded in January, 2021. Generally, the currency appreciated by an average of 20 percent between December 2020 and December 2021 from ZMW/USD21.17 to ZMW/USD16.67; ZMW/GBP28.4 to ZMW/GBP22.38; ZMW/ZAR1.45 to ZMW/ZAR1.10. The positive performance of the local currency was attributed the increase in foreign reserves at the Central Bank due to the increased purchase of gold reserves and the acquisition of $1.3 billion of Special Drawing Rights (SDR) from the International Monetary Fund (IMF) and the positive economic sentiments following the attainment of a staff level agreement between the Zambian Government and the IMF on an extended credit Facility arrangement. For the ICT sector, the local currency appreciation is expected to reduce the costs of internationally sourced inputs thus improving the profitability and affordability of services in the industry. This positive performance is more likely to increase investment opportunities in the sector amongst existing suppliers of ICTs as well as potential investors.

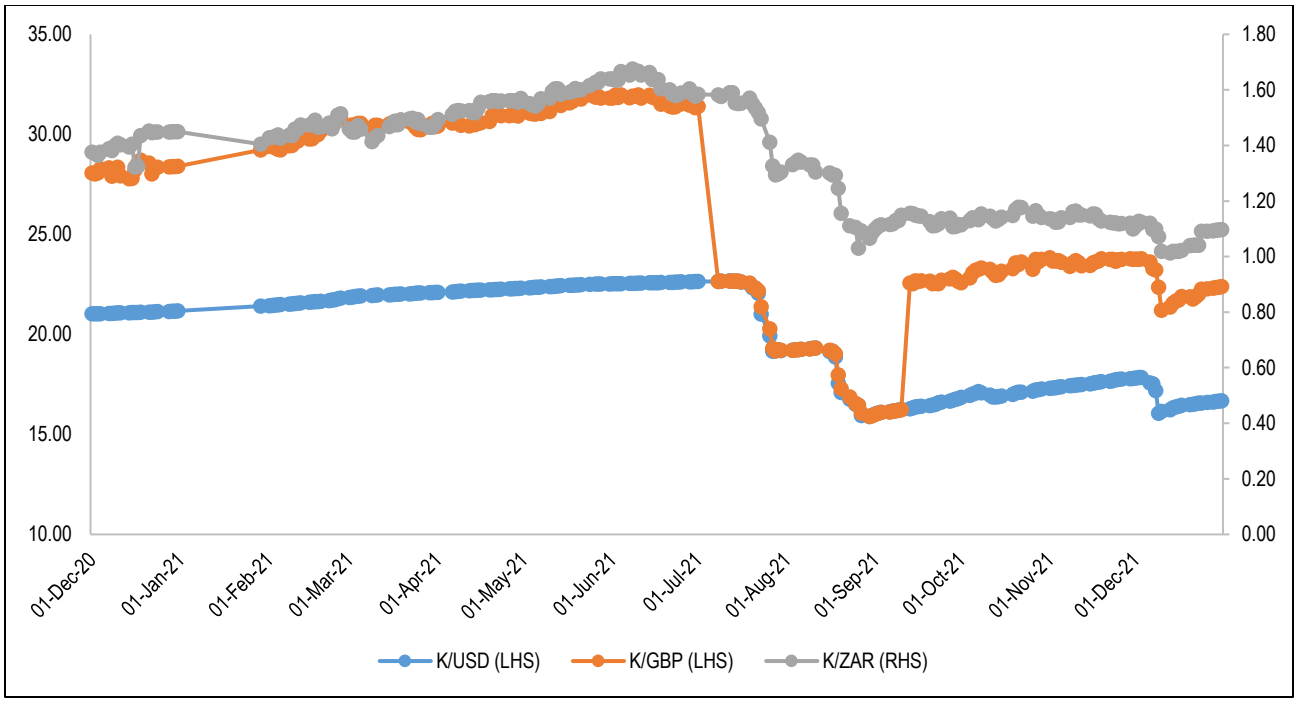


Figure 6: Exchange Rate Performance; Dec 2020 to Dec 2021

Source: Constructed using Bank of Zambia data

3.4.Average Lending Rates and Monetary Policy Rates.

The average commercial bank lending rates, which reflect the countries average cost of borrowing, remained relatively stable throughout the year 2021 averaging 25.6 percent, a slight decline from the average lending rate of 27.3 percent recorded in 2020. The most significant increase was observed in the first quarter of 2021, were average lending rates reached a peak of 26.6 percent whilst the lowest rate was observed in the second quarter at 23.36 percent representing a range of 3.2 percentage points. Generally, the average commercial bank lending rates increased from 24.8 percent at the end of 2020 to 25.86 percent at the end of 2021 reflecting an increase of 7 percent over the review period. On the other hand, the monetary policy rate, which is an interest rate that provides a base for the commercial bank lending rates, increased significantly over the review period. The policy rate, which was set at 8 percent in December 2020, was increased by 50 basis points in February, 2021 and a further 50 basis points in November 2021 to 9 percent. This increase, which was aimed at anchoring inflation rates, led to the overall increase in the average lending rates. The increase in the rate of borrowing generally reduces the incentive for investment thus it is expected to affect the ICT sector negatively.

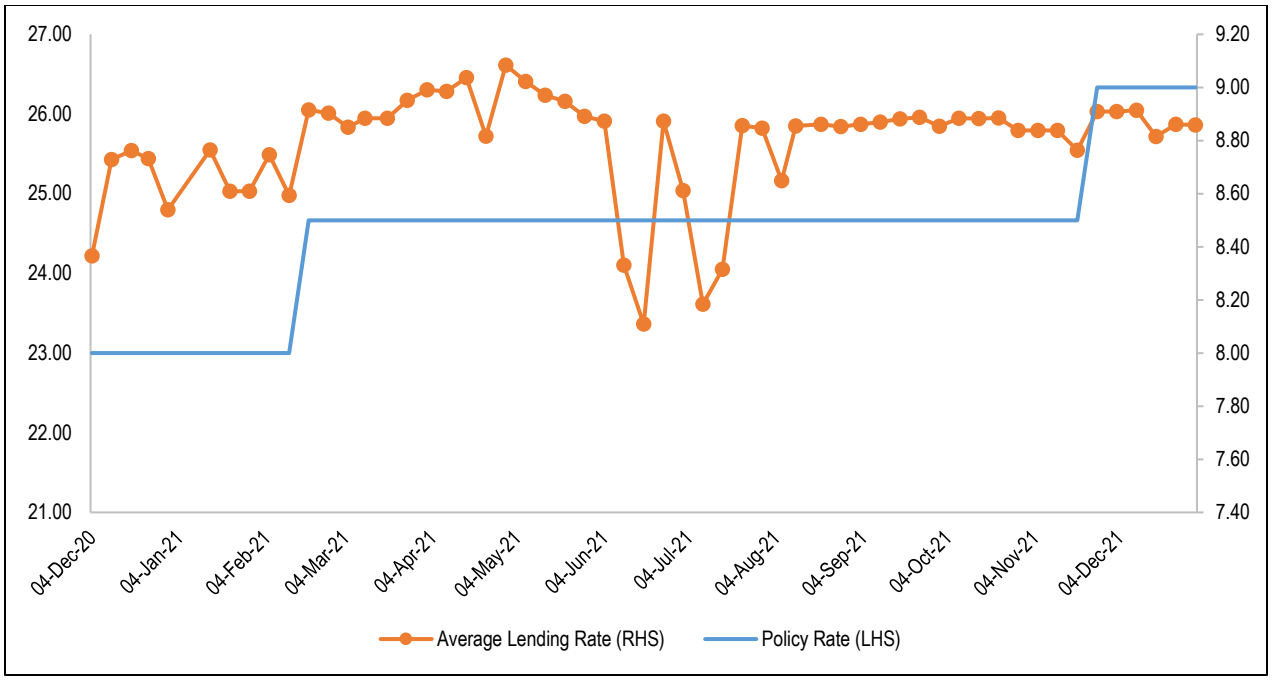


Figure 7: Commercial Bank Lending Rates and Policy Rates; Dec 2020 to Dec 2021

Source: Constructed using Bank of Zambia data

3.5.Access to Commercial Bank Credit in the ICT sector.

The allocation of commercial bank local currency credit to the Transport, Storage and Communications sector remained relatively stable during the year 2021 at an average of 8 percent, a 0.4 percentage point decrease from the average allocation of 2020. During the review period, local currency credit allocated to the sector increased marginally from ZMW3.55 billion at the beginning of 2021 to ZMW3.59 billion at the end of 2021 representing an increase of 1 percent. On the other hand, the foreign currency credit allocated to the Transport, Storage and Communication sector continued to decrease during the review period declining by 46 percent from USD 105 million to USD 56 million. The proportion of foreign currency credit allocated to the sector also decreased 12 percent at the end of 2020 to 6.5 percent at the end of 2021. This was also a significant decline from the average foreign currency credit allocated to the sector in 2020 were allocated credit averaged USD 120 million and that of 2021 averaged USD 77 million. The overall decrease in the foreign currency credit could indicate a decline in investment in the ICT sector which is expected to have a negative effect on accessibility, diversity and quality of services. On the other hand, the slight increase in local currency credit to the sector could entail an increase in domestic investment which is expected to have a positive impact on the performance of the ICT sector.

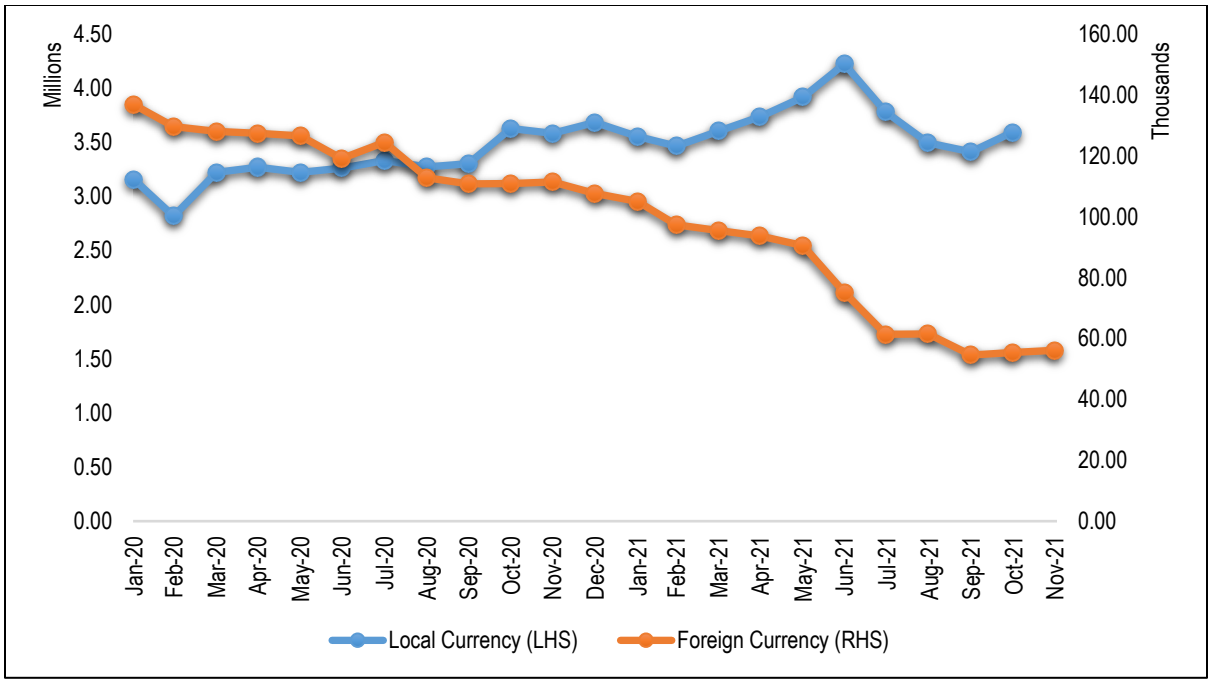


Figure 8: Commercial Bank Credit allocated to Transport, Storage and Communication Sector; 2020 to 2021

Source: Constructed using Bank of Zambia data

3.6.Foreign Capital Investments and Investor Perceptions

According to the Private Sector Foreign Investment Survey, a net outflow of private sector foreign liability of USD 73.8 million was recorded in 2020 relative to a net inflow of USD 357.1 million in 2019. The decline in private sector inflows was mostly attributed to loan repayments in the mining, manufacturing and electricity sector as well as a reduction in foreign direct investment in various sectors that came as a result of the Covid-19 pandemic. In the Information and Communications sector, there was a net inflow of FDI amounting to $11.4 million in 2021 relative to the net outflow of $19.2 million recorded in 2019. The positive outturn reflects an increase in investment in the sector despite the overall decline in the economies foreign inflows over the review period. On the other hand, the was a general deterioration in the perception of service delivery which declined from 40.1 percent in 2020 to 38.3 percent in 2021 while the perception on the ease of doing business increased from 43.5 percent in 2020 to 48.4 percent in 2021. The overall investor perception suggested that most investors in the financial, manufacturing and service sector would not recommend Zambia to another entity as an investment destination. The ICT sector appears to be performing better with regards to the increasing investment in the sector which is expected to increase access and quality of ICT services. However, the declining investor perception in the country is likely to have a negative impact on other sectors thereby reducing the demand for ICT services.

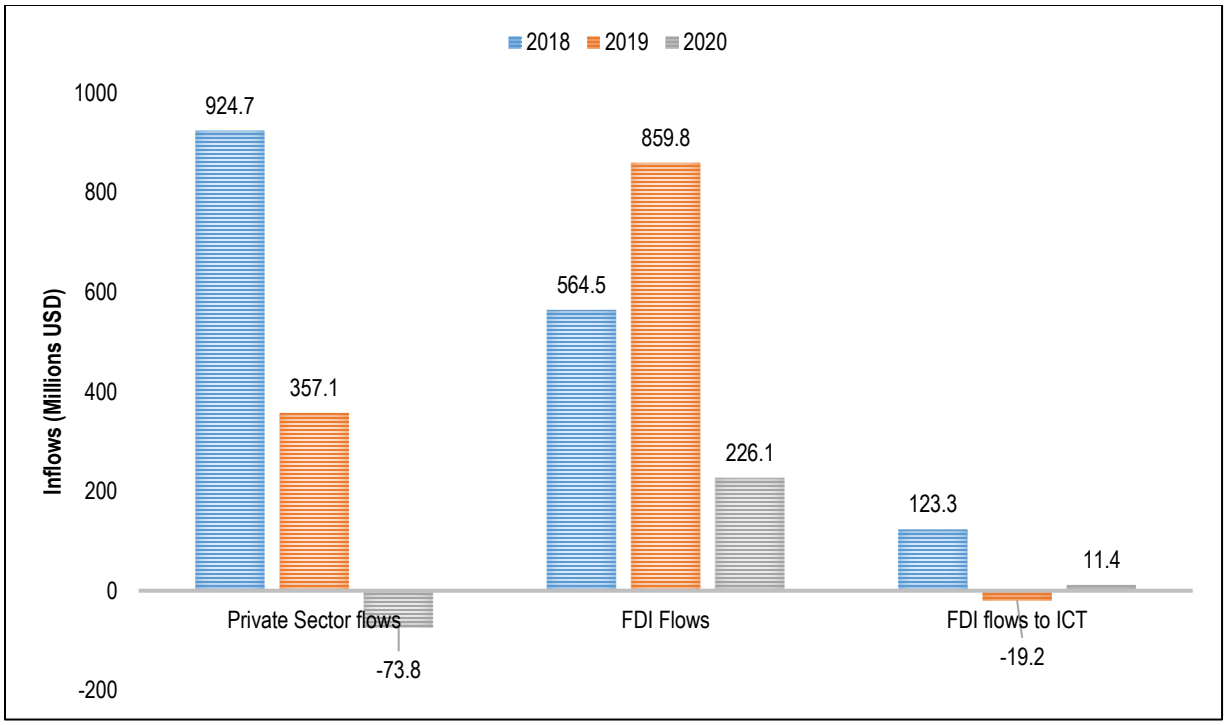


Figure 9: Private Investment Performance: 2018 - 2020

Source: Constructed using Bank of Zambia reports

3.7. Taxation Regimes affecting the ICT sector

The Government of the Republic of Zambia in its 2022 National Budget introduced a number of tax and non-tax measures with the aim of increasing revenues while encouraging growth and development. Specifically, the standard corporate income tax was reduced from 35 percent to 30 percent across all sectors including the ICT sector for entities with an annual taxable income below K250 million while those exceeding K250 million maintained a tax rate of 40 percent. The personal income taxes were adjusted downwards as the non-taxable income threshold was increased from ZMW4,000 to ZMW4,500. To increase tax revenues, the collection point for Value Added Taxes (VAT) on mobile phones which was previously done at the point of entry and point of sale has been moved to the point of registration with ZICTA. Additionally, ICTs will be adopted in the collection of tax revenues in various government services so as to increase tax compliance and reduce leakages. The reduction of corporate income taxes is expected to increase economic activity as well as provide funds for reinvestment thereby spurring economic activity. Similarly, increased efficiency in tax collection will increase public revenues and expenditure thereby promoting economic growth and development. This increase in economic activity, coupled with the increase in consumers' disposable incomes, is expected to increase the demand and usage of ICT services. On the other hand, maintenance of a higher corporate tax rate for ICT suppliers with a taxable income exceeding ZMW250 million is likely to reduce the incentive and opportunity for investment in the sector.

4. PERFORMANCE OF THE ICT SECTOR

4.1 Mobile Telephone Services Market

4.1.1. Active Mobile Network Subscription

The total number of active mobile network subscriptions increased from 19.1 million reported at the end of 2020 to 20.2 million at the end of 2021 representing a growth rate of 6.0 percent This subscription level represents an improvement in the mobile penetration rate from 107 subscriptions per 100 inhabitants in 2020 to 110 subscriptions per 100 inhabitants in 2021 (see Error! Reference source not found.10). The performance was mainly explained by increased investments in telecommunication coverage infrastructure, heightened competition among the service providers and the increased adoption of SIM card based technologies. The increased uptake of ICT services among both corporate and individual customers during the COVID-19 pandemic also complemented this surge in adoption.

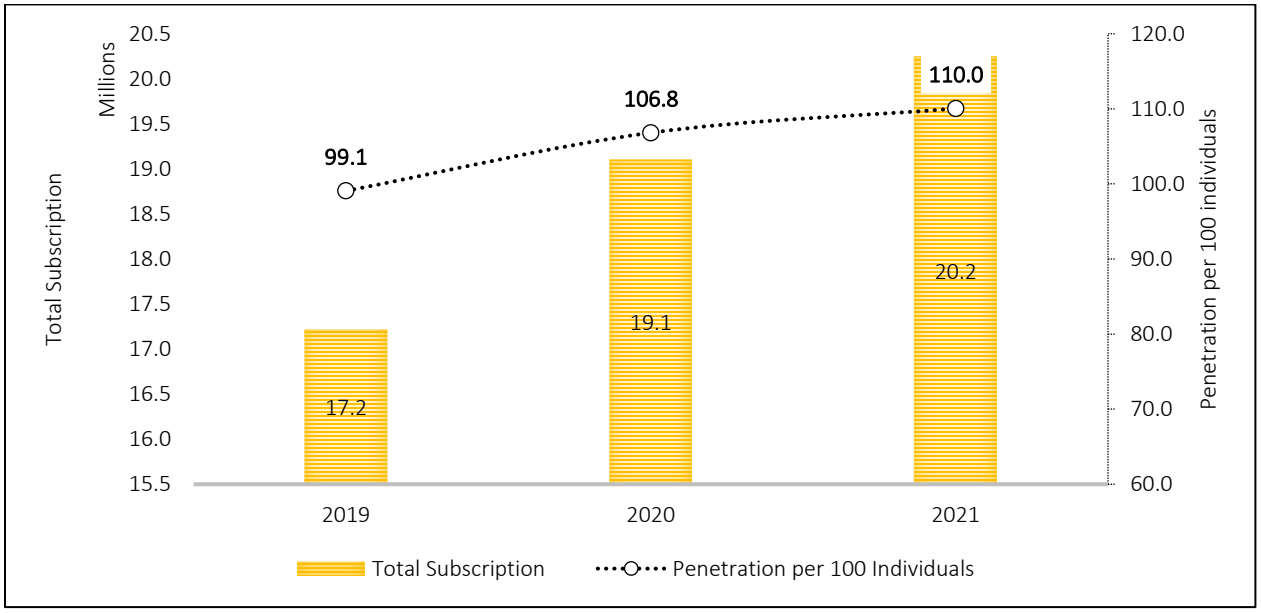


Figure 10: Trends in Mobile Subscription: 2019 to 2021

4.1.2. Market Shares of Mobile Telephone Subscriptions and Trends in Market Concentration

MTN Zambia Limited and Airtel Zambia Limited continued to have the largest market share of subscriptions with 42.3 percent and 39.7 percent respectively. On the other hand Zamtel maintained the least market share in mobile network subscriptions of 17.9 percent. The market experienced minimal variation in the competition landscape among the three mobile network operators as evident from the trend in the Herfindahl-Hirschman Index (HHI)[10] . The HHI observed very minor movements in the period 2020 and 2021 ranging between about 0.368 and 0.369. This is consistent with movements in market shares among the three operators reflecting a negligible shift in concentration.

[10] The Herfindahl-Hirschman Index is a composite measure of concentration computed as the sum of squared shares firm in total subscription. Its value lies between 0 and 1 with magnitude signaling a decrease in competition or concentration of market power in a few firms.

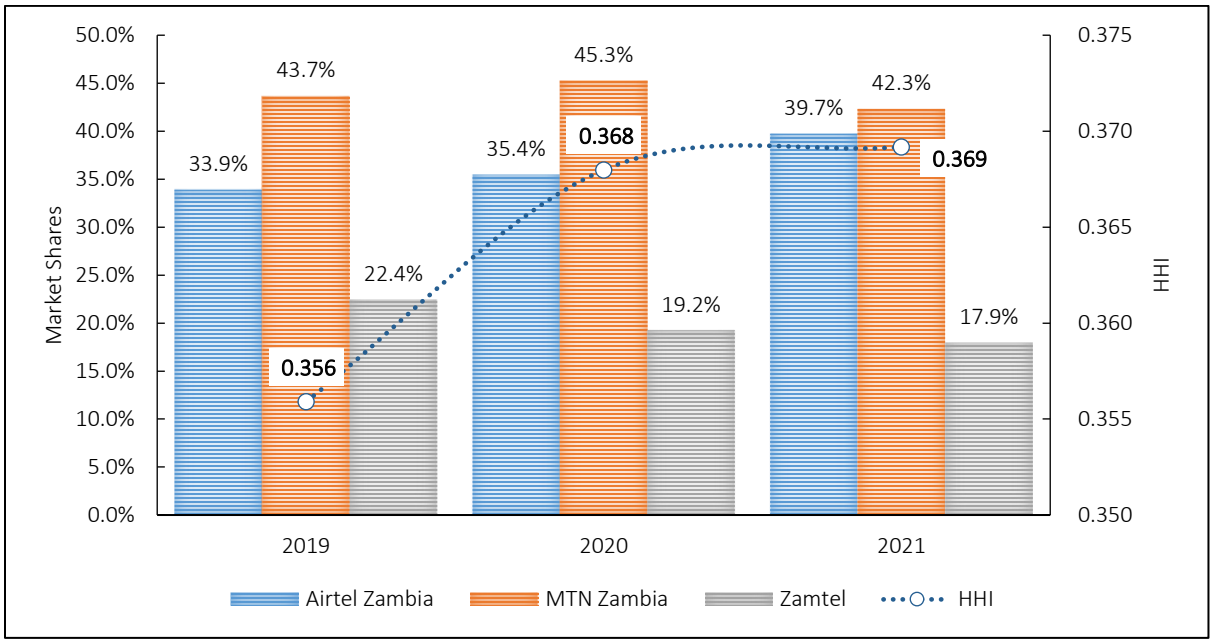


Figure 11: Trends of subscription-based MNO market shares and HHI: 2019 to 2021

4.1.3. Unique Mobile Subscribers

The total number of unique mobile network subscriptions recorded at the end of 2021, measured by the count of unique identification numbers in the consolidated consumer registration database for all the three mobile network operators, was 7.5 million. This subscriber base represents a unique mobile penetration rate of 40.6 percent and is 69.4 percentage points lower than the multiple subscription penetration rate of 110.0 percent. The operator with the largest number of unique subscriptions was Airtel Zambia at 4.9 million subscriptions, followed by MTN Zambia and Zamtel at 4.5 million and 1.6 million unique subscriptions respectively. The intensity of multiple subscriptions across all the three operators was estimated at 2.7 subscriptions per unique subscription. ZAMTEL had the highest intensity of multiple subscription of 2.2 while Airtel Zambia and MTN Zambia both had intensities of 1.8 (see Table 4).

Table 4: Extent of multiplicity of SIM cards in MNO Subscription: 2020 to 2021

	Operator	Multiple Subscription	Unique Subscription	Intensity Ratio of SIM Multiplicity
Dec-21	MTN Zambia	8,569,227	4,493,314	1.9
	Airtel Zambia	8,043,806	4,890,461	1.6
	Zamtel	3,634,078	1,633,587	2.2
	Across All	**20,247,111**	**7,477,715**	**2.7**
Sep-21	MTN Zambia	8,609,934	4,524,055	1.9
	Airtel Zambia	7,733,147	4,784,526	1.6
	Zamtel	3,738,947	1,641,432	2.3

	Across All	**20,082,028**	**7,420,568**	**2.7**
Jun-21	MTN Zambia	8,871,612	4,525,251	2.0
	Airtel Zambia	7,184,544	4,406,802	1.6
	Zamtel	3,629,689	2,761,260	1.3
	Across All	**19,685,845**	**7,497,322**	**2.6**
Mar-21	MTN Zambia	8,803,330	4,518,294	1.9
	Airtel Zambia	6,859,760	4,328,827	1.6
	Zamtel	3,598,140	2,613,228	1.4
	Across All	**19,261,230**	**7,387,336**	**2.6**
Dec-20	MTN Zambia	8,656,154	4,528,440	1.9
	Airtel Zambia	6,771,906	4,283,603	1.6
	Zamtel	3,676,148	2,472,760	1.5
	TOTAL	**19,104,208**	**7,375,091**	**2.6**

Source: Operator submissions

4.1.4. Mobile Cellular Voice Traffic

The total domestic incoming traffic on mobile telephone networks increased from 2.4 billion minutes reported in 2020 to 2.9 billion minutes recorded in 2021 representing an increase of 19.5 percent. Similarly, the total domestic outgoing traffic increased from 21.4 billion minutes reported in 2020 to 24.4 billion minutes recorded in 2021 representing an increase of 14.1 percent. The increase in the domestic traffic were mainly on account of heighted volume based bundled price offers that are often discounted and received wide adoption as well as the increased traffic during the covid-19 pandemic.

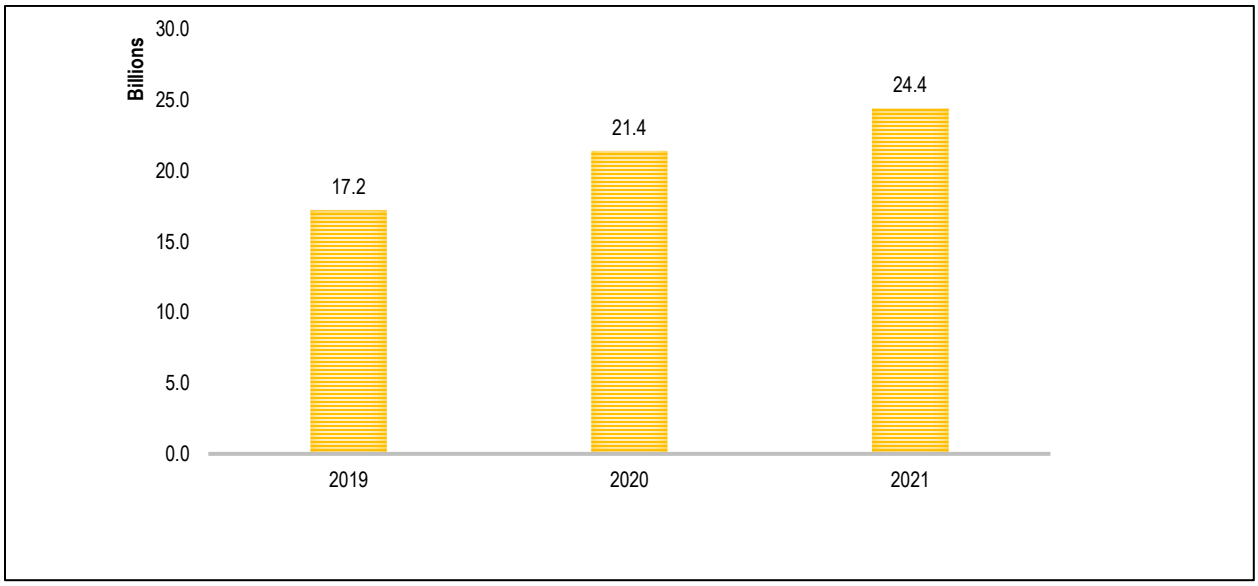


Figure 12: Trends in Domestic Outgoing Traffic Minutes: 2019 to 2021

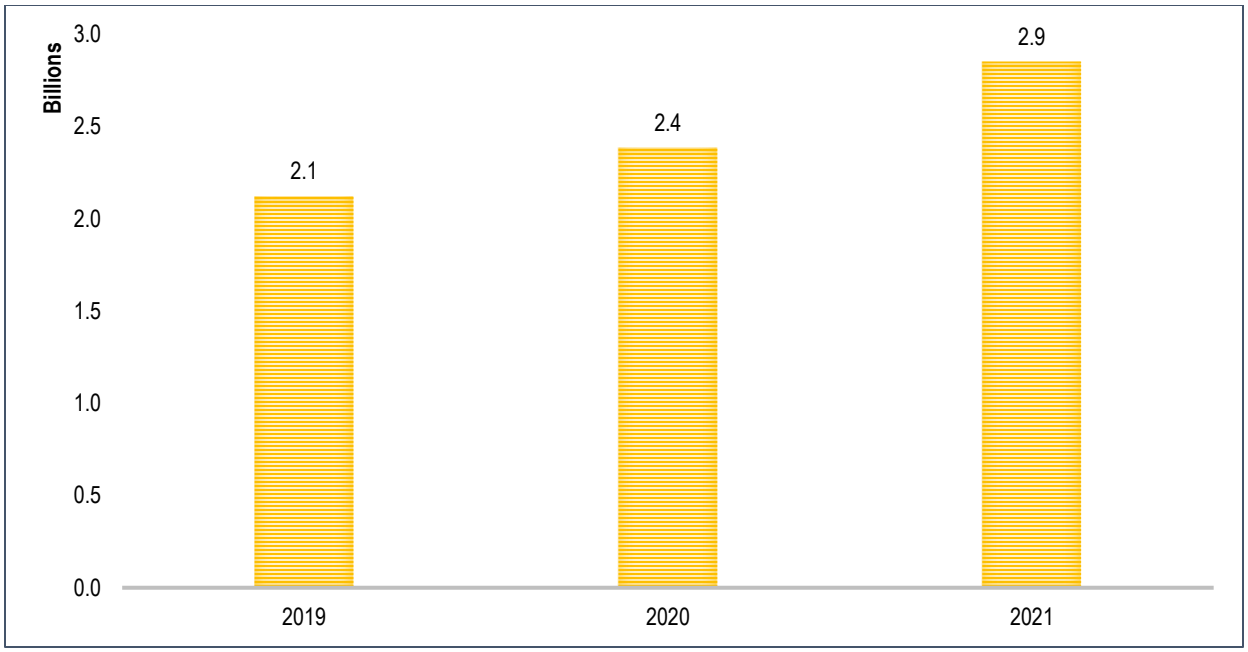


Figure 13: Trends in Domestic Incoming Traffic Minutes: 2019 to 2021

On the other hand, international incoming traffic reduced from 21.6 million minutes reported in 2020 to 18.6 million minutes in 2021 reflecting a reduction of 13.6 percent. Correspondingly, international outgoing traffic also declined from 21.2 million minutes reported in 2020 to 17.4 million minutes in 2021 reflecting a reduction of 17.9 percent (See **Figure 14**). The decline in international traffic was partly attributed to the increasing adoption and use of internet-based applications like WhatsApp, facetime, Skype and Viber to make international voice calls.

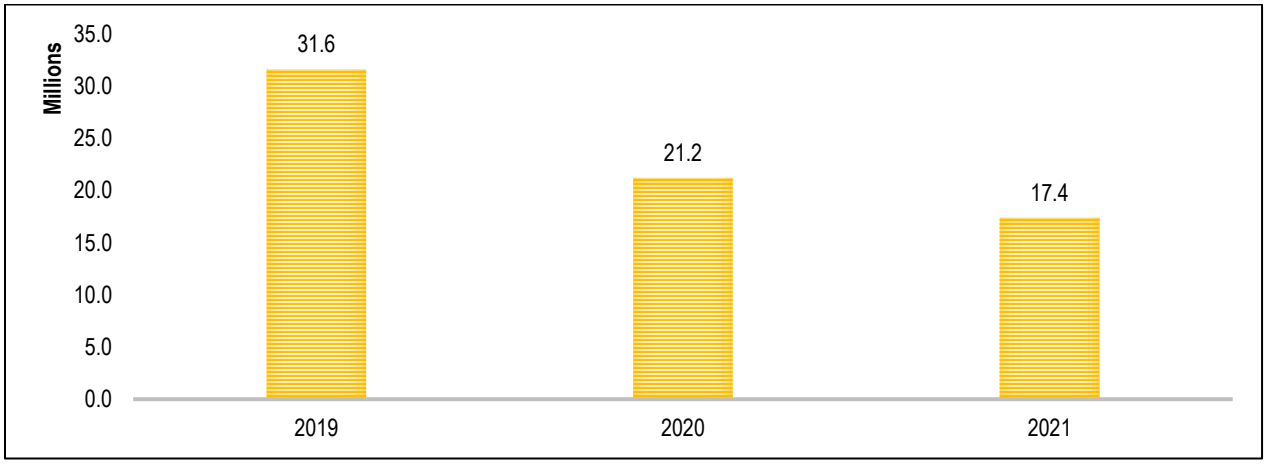


Figure 14: Trends in International Outgoing Traffic Minutes: 2019 to 2021

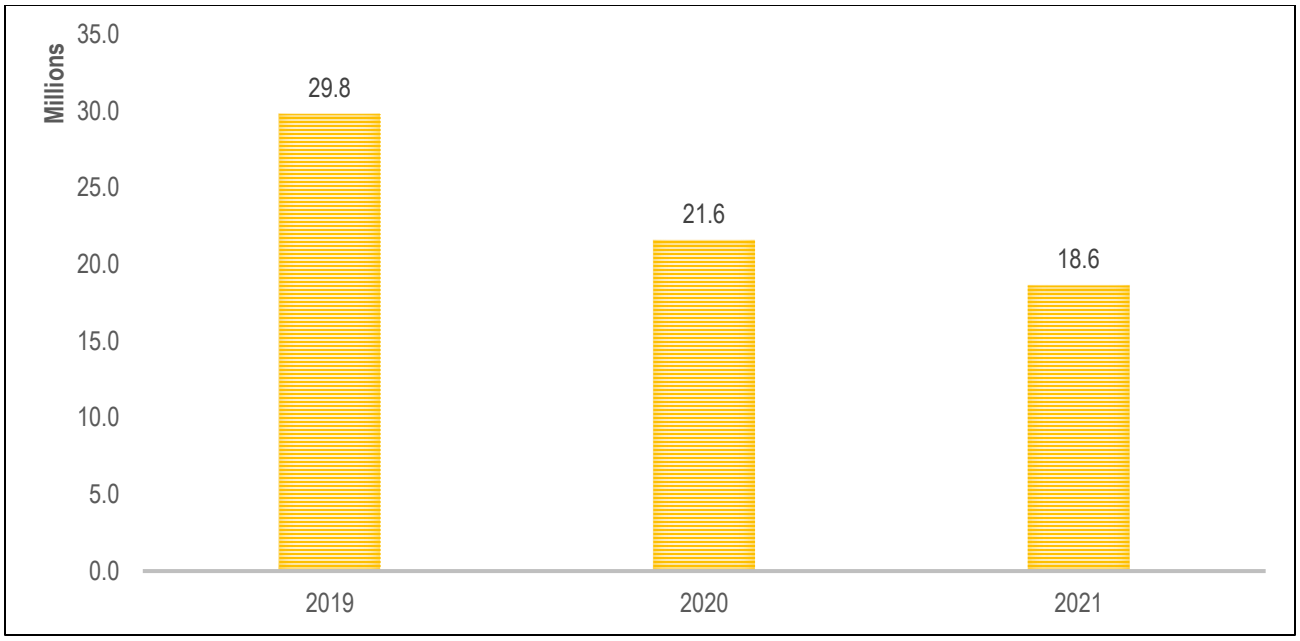


Figure 15: Trends in International Incoming Traffic Minutes: 2019 to 2021

4.1.5. Mobile Voice Tariffs

The average headline mobile voice call tariffs declined from ZMW1 in 2020 to ZMW0.84 per minute for both on-net and off-net calls during peak hours, while the off-net off-peak tariffs reduced further to ZMW0.80. On the other hand, the effective tariff, measured as a ratio of revenues to outgoing voice traffic, increased marginally from ZMW0.22 in 2020 to ZMW0.28 in 2021. The increase in the effective tariff came as a result of the slower growth in usage of mobile voice calls in 2021.

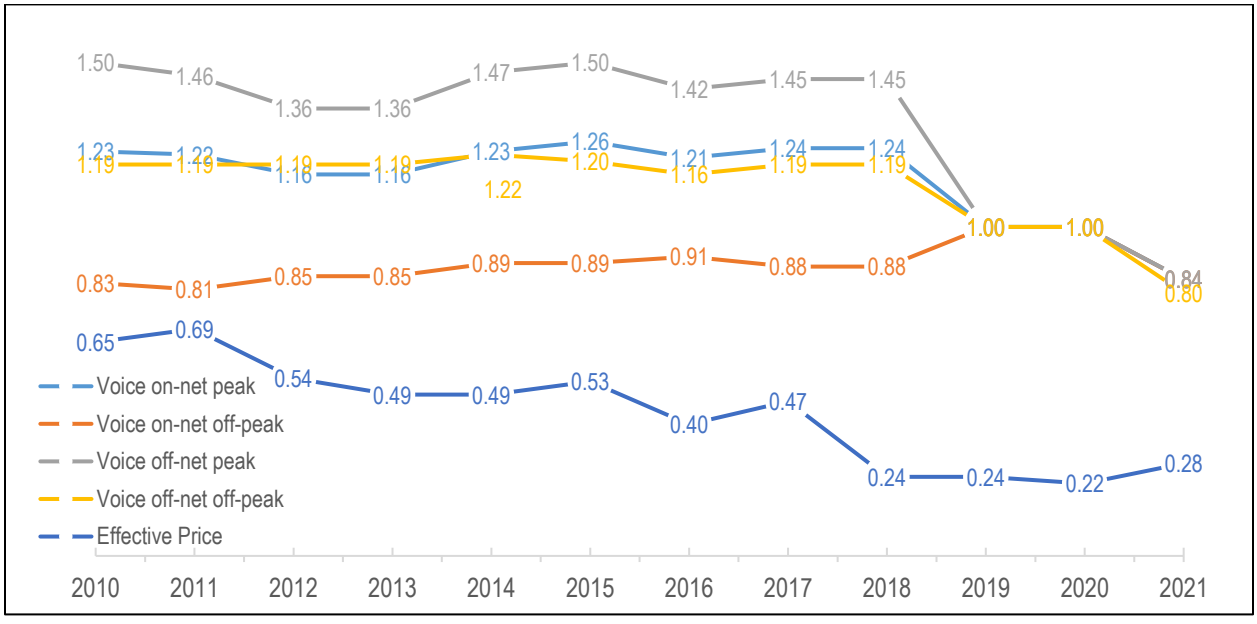


Figure 16: Mobile Voice Tariffs 'Per Minute in ZMW': 2010 to 2021

A benchmarking of headline tariffs on mobile voice services across eighteen countries drawn from the SADC and COMESA regions revealed that the tariffs in Zambia remained relatively competitive. Zambia ranked 'seventh' on peak On-net; 'eighth' on Off-peak On-net calls, 'fifth' on Off-peak On-net and 'sixth' on Off-peak Off-net. The differences in the tariffs applied are partly due to differences in consumption taxes applied across the countries and movements in the exchange rates. Over the years, operators in most countries have significantly reduced the headline tariffs on their networks, presumably to cost reflective levels. As operators continue to adopt more cost effective technologies and competition continues to deepen in most markets margins are expected to reduce leading to more competitive pricing outcomes.

Table 5: Benchmarking of Mobile Voice Tariffs in US dollars

Country	On-net/Peak	Rank	On-net/Off-Peak	Rank	Off-net/ Peak	Rank	Off-Net/Off-Peak	Rank
Angola	*0.06188*	*9*	*0.059403*	*9*	*0.074751*	*10*	*0.07178*	*13*
Botswana	*0.110504*	*16*	*0.060348*	*10*	*0.110504*	*16*	*0.060348*	*8*
DR Congo	*0.004569*	*1*	*0.004569*	*1*	*0.004842*	*1*	*0.004842*	*1*
Kenya	*0.023416*	*4*	*0.022992*	*5*	*0.026186*	*3*	*0.025762*	*4*
Lesotho	*0.121735*	*17*	*0.102919*	*17*	*0.121735*	*17*	*0.102919*	*16*
Madagascar	*0.041274*	*6*	*0.041274*	*7*	*0.061498*	*7*	*0.061498*	*10*
Malawi	*0.10157*	*15*	*0.10157*	*16*	*0.106426*	*15*	*0.104387*	*17*
Mauritius	*0.020385*	*3*	*0.020385*	*4*	*0.104387*	*14*	*0.053983*	*7*
Mozambique	*0.089557*	*14*	*0.089557*	*15*	*0.095197*	*13*	*0.095197*	*15*
Namibia	*0.060787*	*8*	*0.060787*	*11*	*0.060787*	*6*	*0.060787*	*9*
Nigeria	*0.078761*	*13*	*0.078761*	*14*	*0.078761*	*12*	*0.078761*	*14*
Rwanda	*0.03667*	*5*	*0.013802*	*2*	*0.040212*	*4*	*0.017344*	*3*
Seychelles	*0.269845*	*18*	*0.128029*	*18*	*0.308208*	*18*	*0.161389*	*18*
South Africa	*0.064886*	*10*	*0.064886*	*12*	*0.064886*	*8*	*0.064886*	*11*
Swaziland	*0.075163*	*12*	*0.041176*	*6*	*0.075163*	*11*	*0.041176*	*5*
Tanzania	*0.015925*	*2*	*0.01598*	*3*	*0.015925*	*2*	*0.01598*	*2*
Uganda	*0.068668*	*11*	*0.068668*	*13*	*0.069448*	*9*	*0.069448*	*12*
Zambia	***0.047012***	***7***	***0.044362***	***8***	***0.047012***	***5***	***0.047012***	***6***

Source: Various MNO Websites

4.1.6. Telecommunication Infrastructure

The total number of telecommunication sites in the country increased from 10,574 reported in 2020 to 11,478 sites in 2021 representing an increase of 8.5 percent. The largest proportion of the sites in 2021 continued to be 2G sites accounting for 39.7 percent followed by 3G sites at 31.9 percent. Only 28.4 percent of the telecommunication sites were 4G/LTE sites. However, the proportion of 4G/LTE sites continued to increase overtime, from 2,758 sites reported at the end of 2020 to 3,258 sites reported at the end of 2021 representing an improvement of 18.1 percent.

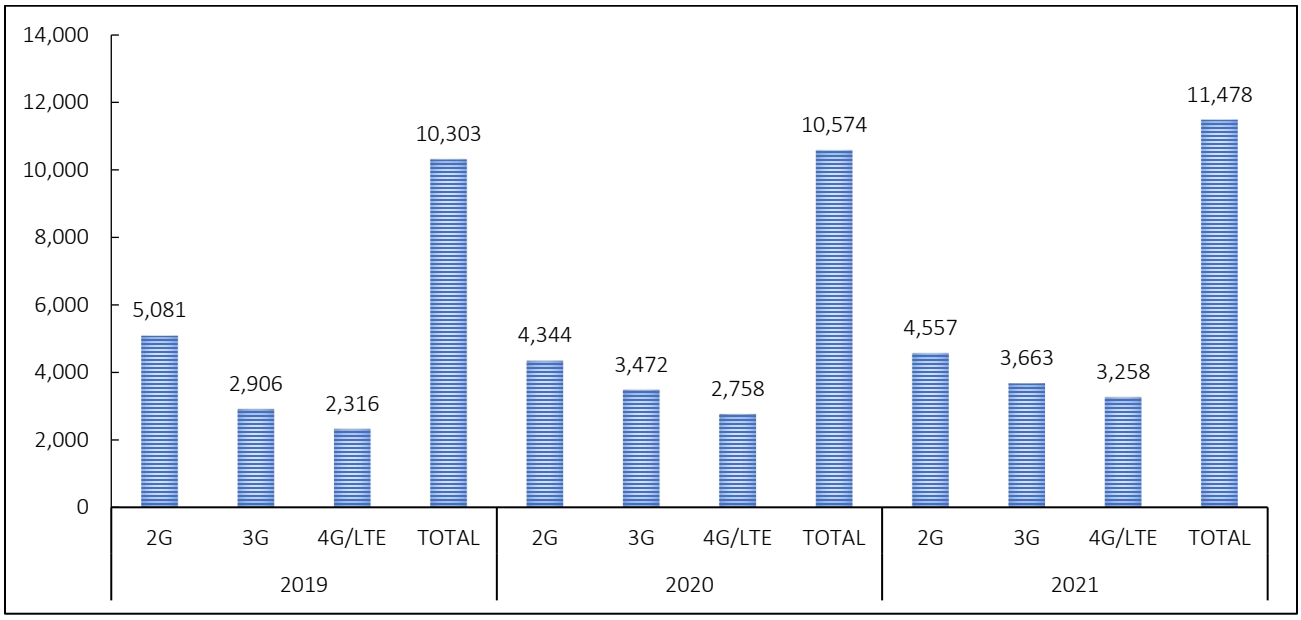


Figure 17: Telecommunication Sites by Type of Technology: 2019 to 2021

4.1.7. Mobile Revenue Performance

The total revenue from the mobile network operators (MNOs) increased from ZMW 5.3 billion in 2020 to ZMW 6.6 billion in 2021 representing a year-on-year increase of 24.3 percent. The increase in total revenues in 2021 was attributed to the increase in revenues by all the three MNOs. Airtel Zambia contributed the largest share of the total revenue followed by MTN and the least was Zamtel. Over half of the total revenue for the MNOs in 2021 was attributed to Airtel Zambia and the remaining portion was shared between MTN Zambia and Zamtel.

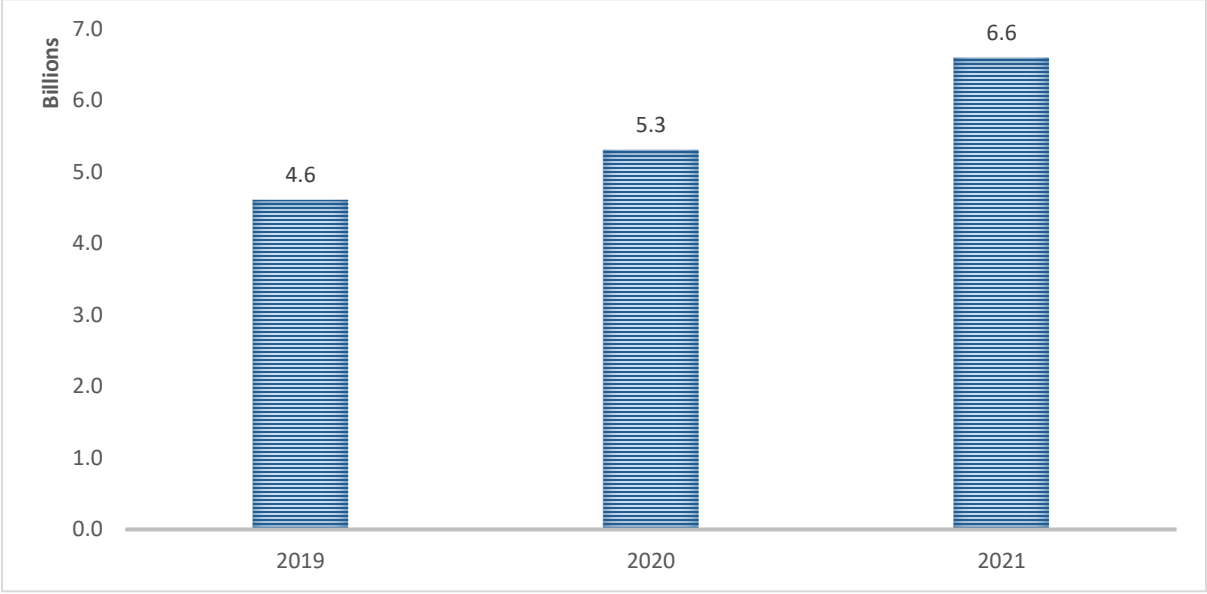


Figure 18: Trend in MNO Total Revenue Performance: 2020 to 2021

Airtime sales and data services were the main contributors to MNO revenue, together accounting for 79.0 percent of the revenue in 2021. Overall revenues from all services increased on a year-on-year basis except for revenues from value added services (VAS), call termination and product sales.

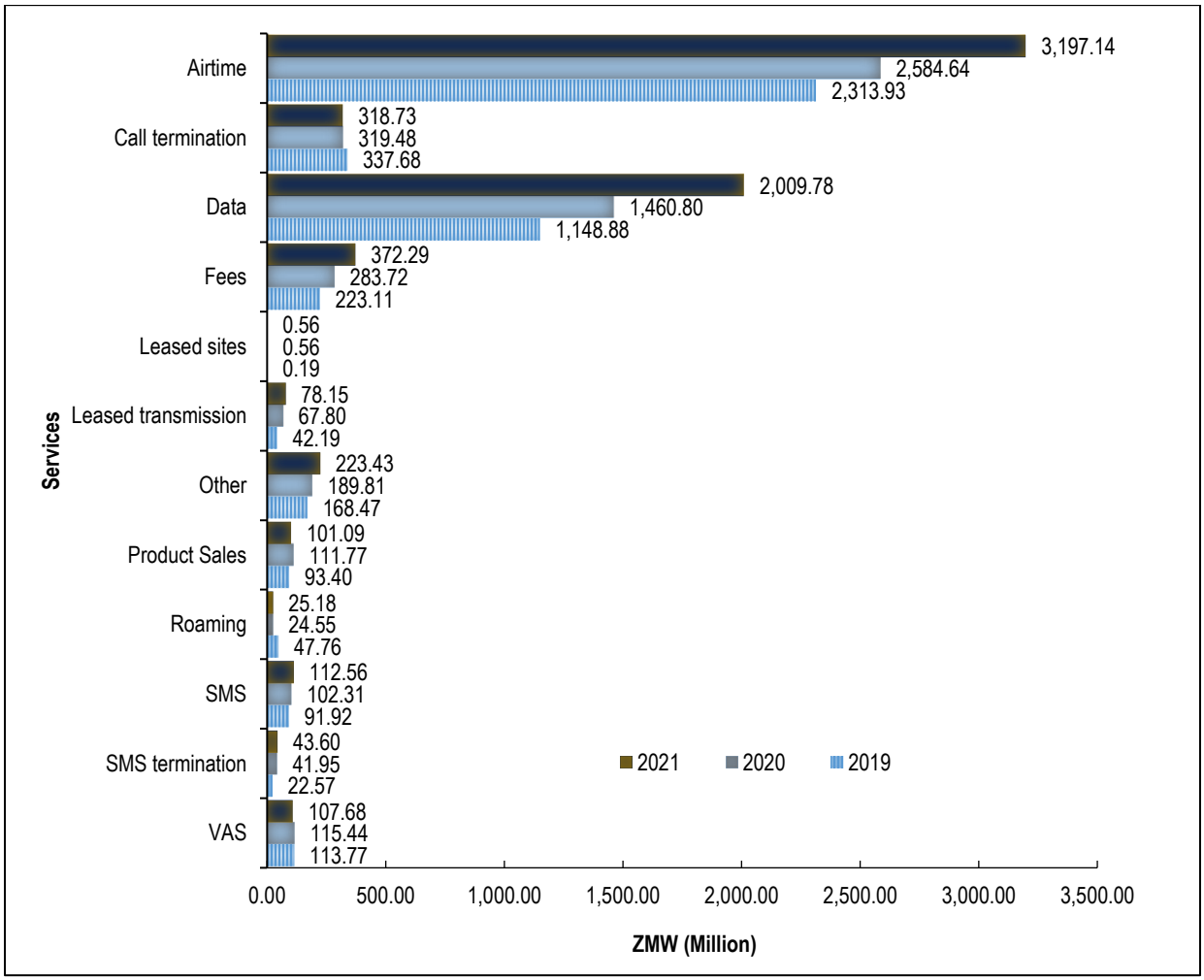


Figure 19: Contribution to Total Revenue by Service for MNOs: 2019 to 2021

4.1.8. MNO Average Revenue per User

The Average Revenue per User (ARPU), obtained from the ratio of the total revenue accrued by the operators and the total outgoing traffic, increased from ZMW278 reported in 2020 to ZMW325 recorded in 2021 reflecting an increase of 17.1 percent. Overall the ARPU for all MNOs increased by about 18 percent on average. The differences in ARPU across operators reflect the extent to which the operators are able to derive revenue from individual subscribers.

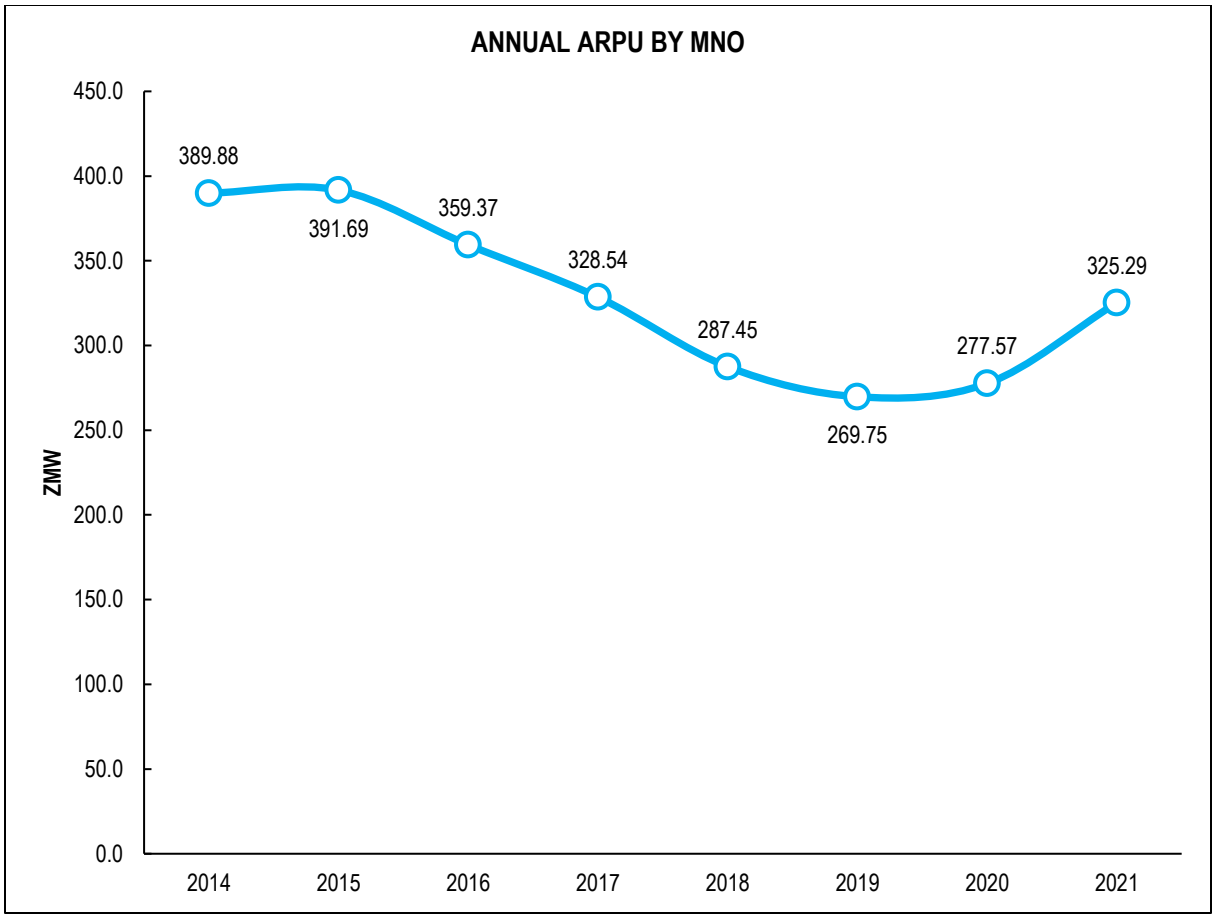


Figure 20: MNO Average Revenue per User: 2013 to 2021

4.2 Fixed Telephony Market

4.2.1. Active Public Switched Telephone Network Subscriptions

The subscription to public switched telephone network (PSTN) also known as fixed telephone services continued on a negative growth trajectory during the period under review. The total number of active fixed line subscriptions dropped from 72 thousand lines in 2020 to 66 thousand lines in 2021 reflecting a decline of 8.3 percent. This performance reflects a deterioration in fixed telephony penetration rates from 0.40 per 100 inhabitants reported in 2020 to 0.36 per 100 inhabitants in 2021 (see Figure 21). The decline in PSTN subscriptions and weakening penetration rates is largely attributed to the continued switching from the use of fixed telephone to mobile telephone services.

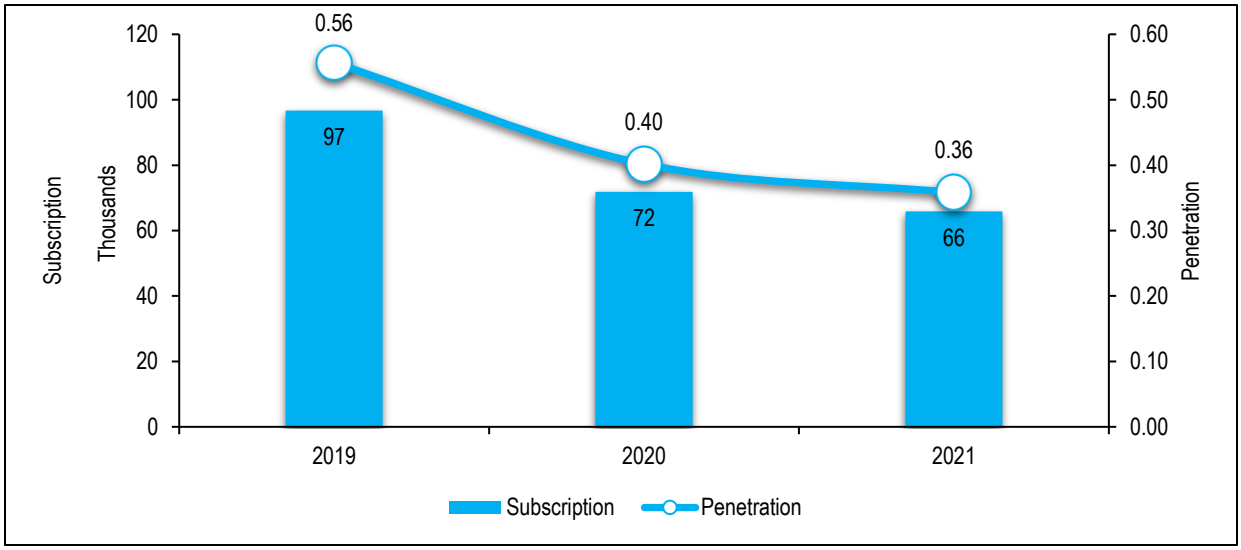


Figure 21: PSTN Subscription and Penetration Rates: 2020 to 2021

4.2.2. PSTN Traffic

The total number of domestic outgoing minutes from PSTN reduced from 19.3 million minutes in 2020 to 11.7 million minutes in 2021 reflecting a decline of 39.2 percent. Similarly, the total number of domestic incoming minutes on PSTN reduced from 15.7 million minutes in 2020 to 11.7 million minutes in 2021 reflecting a decline of 25.3 percent. However, there was a marginal increase in international outgoing traffic minutes. The total number of international outgoing minutes increased from 1.3 million minutes in 2020 to 1.4 million minutes in 2021 representing an increase of 7.4 percent (see **Figure 22**). The decline in both outgoing and incoming domestic traffic from the PSTN could mainly be explained by the continued transitioning by subscribers from the fixed telephone services to mobile telephone services. The increase in international outgoing traffic could be associated with regional or global corporate communication as the services were largely owned by corporates.

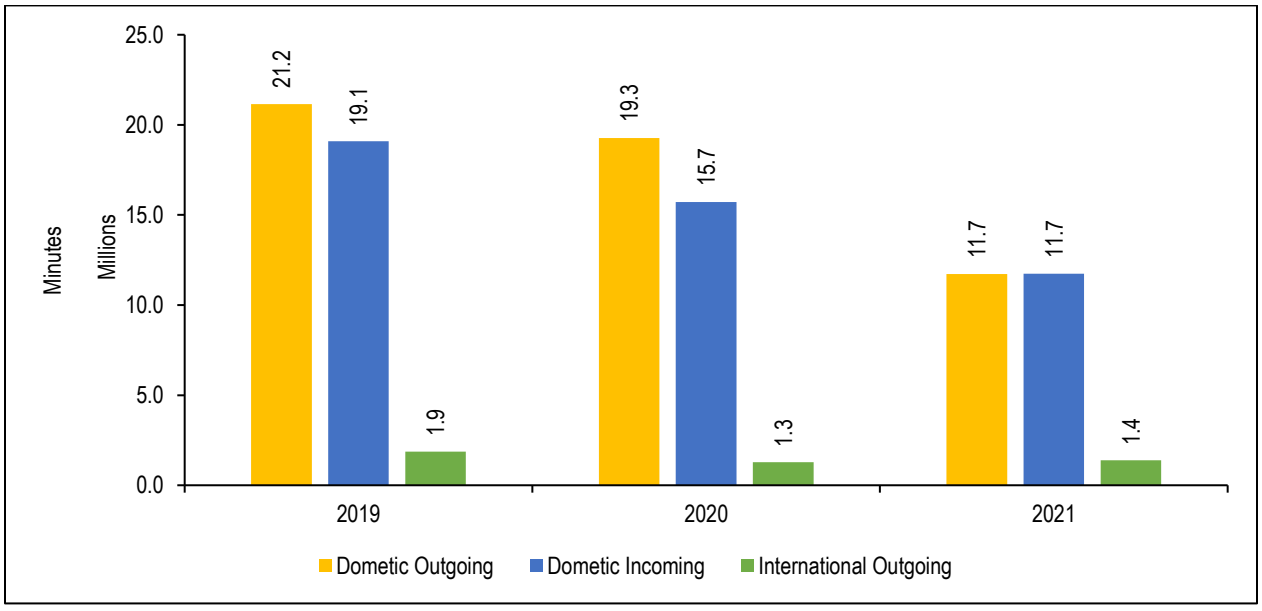


Figure 22: Traffic for PSTN Services: 2019 to 2021

4.2.3. Revenue from Public Switched Telephone Network Services

The PSTN services recorded a decrease in revenue during the period under review on a year to date basis. In 2021, the total revenue generated from PSTN services reduced from 57.0 million in 2020 to 47.2 million in 2021 reflecting a reduction of 17.2 percent on a year on year basis. The decline in revenues from fixed telephony services could mainly be explained by the continued decline in both subscription and usage of fixed telephony services (see **Figure 23**).

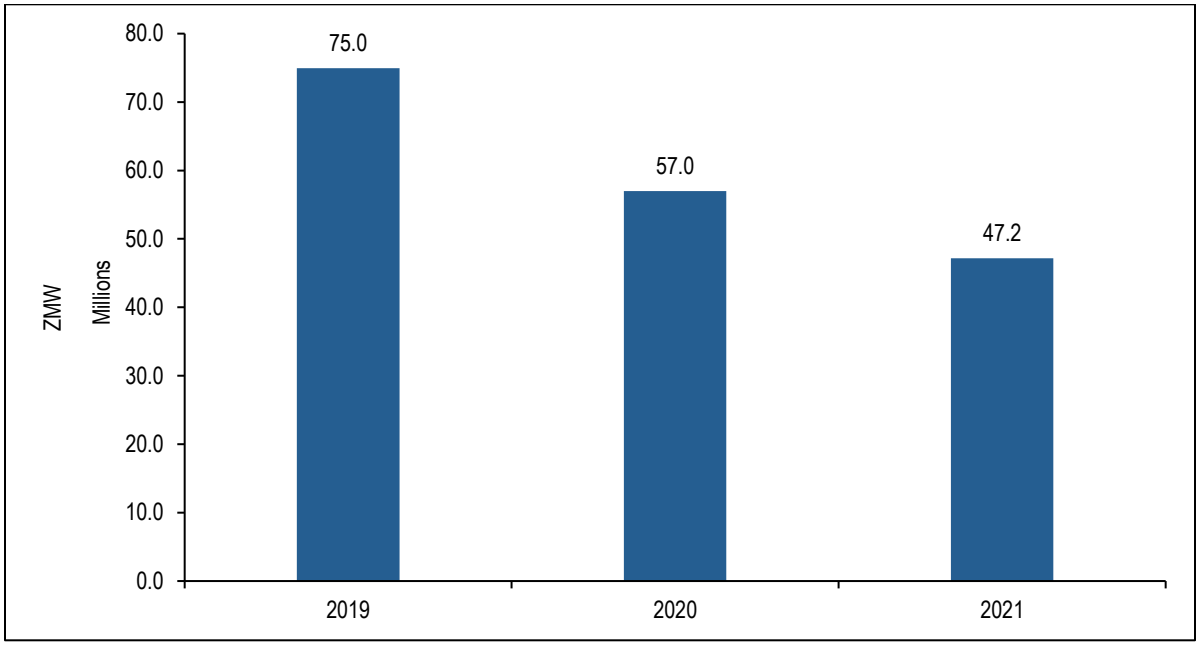


Figure 23: Revenue Performance for PSTN Services: 2019 to 2021

4.3 Internet Services

4.3.1. Fixed and Mobile Internet Subscription

The total number of active internet subscriptions in the country increased from 10.3 million subscriptions reported at the end of 2020 to 10.4 million recorded at the end of 2021 representing a growth of 1.3 percent. The total number of active internet subscriptions reflected a decrease in the internet penetration rate from 57.6 per 100 inhabitants reported in 2020 to 56.7 per 100 inhabitants attained in 2021 due to the adjustment in the estimated population size. The majority of internet users remained mobile internet subscriptions, accounting for nearly 99 percent of internet users. Subscription to fixed internet services declined from about 82.3 thousand subscriptions reported in 2020 to 80.6 thousand subscriptions in 2021 representing a reduction of 2.1 percent. On the other hand mobile internet subscriptions increased from 10.2 million in 2020 to 10.4 million in 2021. It is anticipated that future investments among service providers leading to extensive coverage of 3G/4G networks and the increased adoption of these emerging technologies will lead to further improvements in internet adoption.

The majority of users with fixed internet subscription are corporates mainly due to reliability and capacity of the services. However, the high cost associated with fixed Internet services serves has deterred most potential household users. Therefore, most households prefer mobile Internet to fixed Internet. In addition, providers of mobile internet services are also providing enterprise solutions leading to some corporates switching between services.

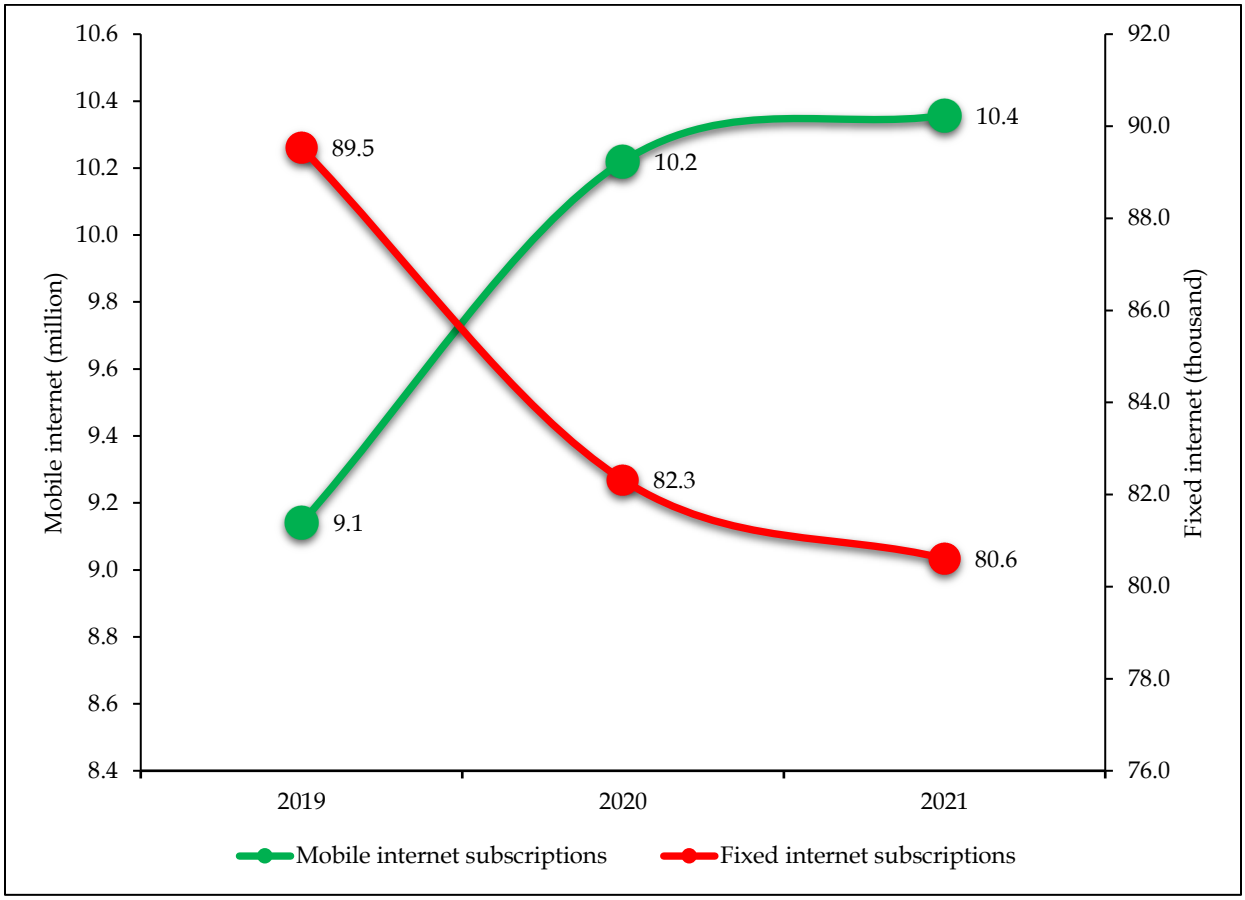
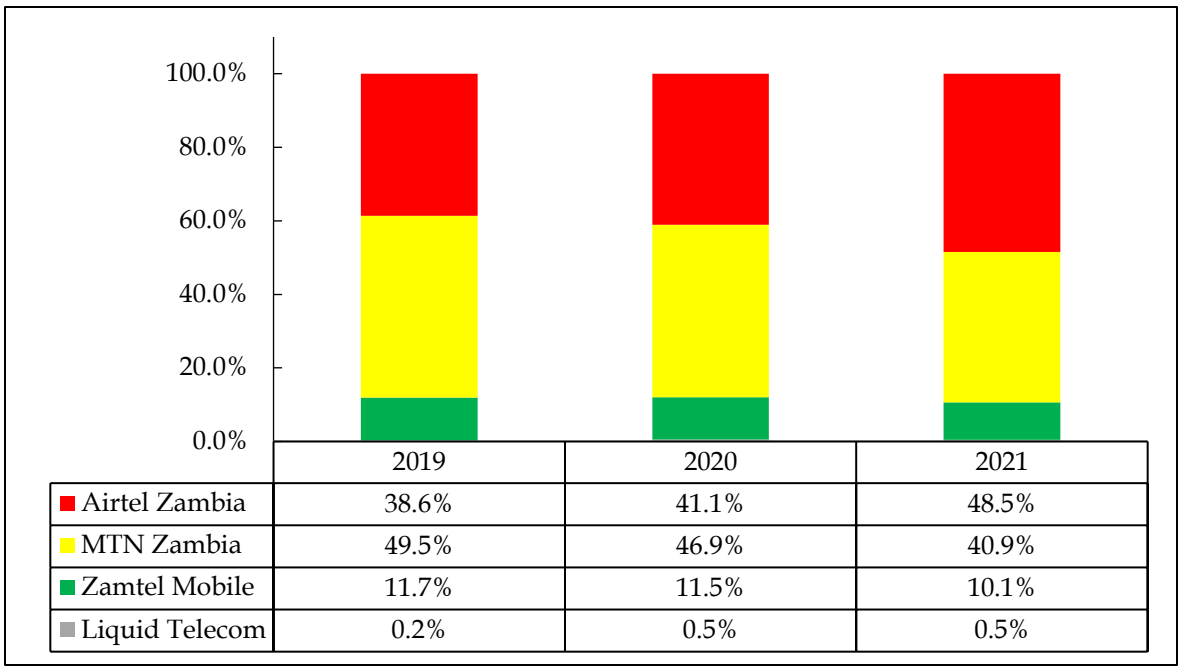


Figure 24: Trends in Internet Subscription; 2019 to 2021

4.3.2. Mobile Internet Market Shares

MTN Zambia and Airtel Zambia continued to have relative dominance in the shares of mobile internet users accounting for nearly 89 percent of mobile subscriptions with the mobile internet access on the market. Airtel Zambia had the largest market share of mobile internet users accounting for 48.5 percent followed by MTN Zambia with 40.9 percent share of the market. Overall, the market shares for mobile Internet services remain dominated by MNOs despite the participation of fixed internet services providers providing the service mainly via the fixed modems. This is mainly on account of the huge subscriber bases for MNOs as well as extensive mobile cellular network coverage. Airtel Zambia reported an increase in mobile internet market share of about 7.4 percentage points in 2021. However, all the other mobile internet service providers recorded declines in mobile internet subscription during the period under review, with MTN Zambia reporting the largest

reduction in market share of 6.0 percentage points while the market share for Zamtel reduced by 1.4 percentage points. Further, increased competition in mobile internet service market has driven innovation in product and service offerings, coverage, quality of service and pricing.



	2019	2020	2021
Airtel Zambia	38.6%	41.1%	48.5%
MTN Zambia	49.5%	46.9%	40.9%
Zamtel Mobile	11.7%	11.5%	10.1%
Liquid Telecom	0.2%	0.5%	0.5%

Figure 25: Trends in Market Shares of Mobile Internet Subscription: 2019 to 2021

A benchmarking of the price for a data bundle and average consumption bundles constituting data and voice minutes was carried out to determine the competitiveness of the services in the country. A data bundle consisting of at least a 2GB monthly bundle and a data and voice bundle consisting of at least 150 mins, 70 SMS and 1.5 GB valid for a month was considered in the assessment. Zambia ranked sixth (6th) with regards to pricing of a monthly data bundle relative to fourteen other countries, indicating relative of the country competitiveness with respect to affordability. The price of the average consumption bundle for Zambia was estimated at 5 percent of the country's Gross National Income (GNI). The average data bundle price was noted to be significantly above the UN broadband Commission target of 2 percent of GNI.

Table 6: Regional Benchmarking of Data and Voice Bundles

Country Name	Price 2GB Data Monthly Validity (USD)	Rank	Price of Data and Voice consumption Bundle as % of GNI	Rank
Angola	3.798887	7	2.130217	2
Botswana	13.99472	15	2.593335	4
DR Congo	0.285785	1	2.16719	3
Eswatini	9.803922	13	4.542579	8
Kenya	2.585445	3	3.536944	5
Lesotho	8.402187	11	21.31054	15
Madagascar	4.849162	10	8.051278	12
Mozambique	4.394485	9	18.88168	14
Namibia	13.12958	14	3.71815	7
Nigeria	2.630298	4	1.843667	1
Rwanda	2.367684	2	5.804454	11
South Africa	9.751309	12	3.537518	6
Tanzania	4.003418	8	5.719271	10
Uganda	2.922581	5	14.81587	13
Zambia	3.060506	6	5.072835	9

4.3.3. Fixed Internet Services Market

The fixed internet services market remained highly concentrated despite having over 17 licensed providers. Zamtel, MTN Zambia and Liquid telecom accounted for nearly 97 percent of the subscriptions for the fixed internet services. The focus of most ISPs continued to be corporate clients as opposed to individuals given the strong competition from mobile internet services.

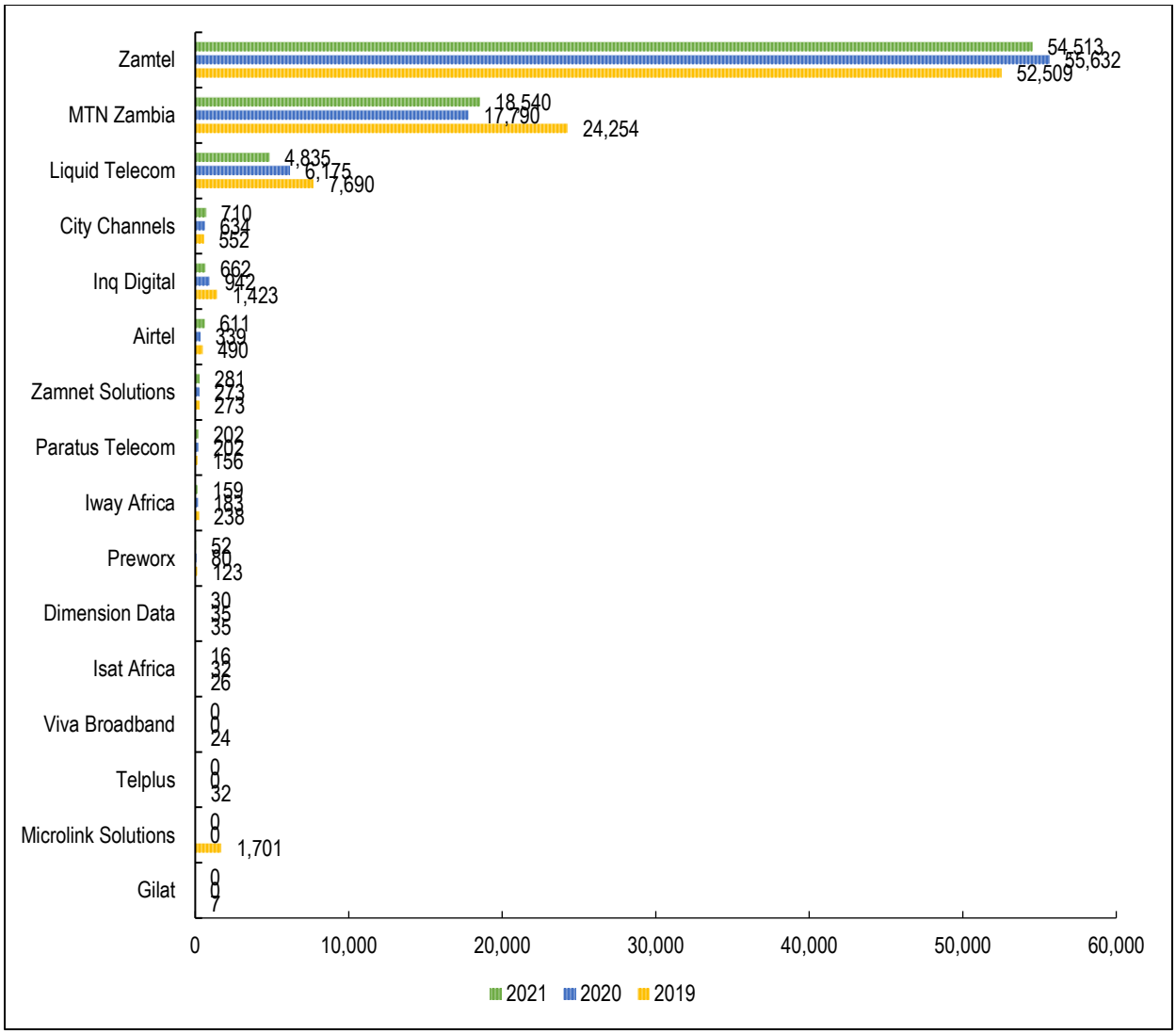


Figure 26: Market share of subscribers by Internet Service Provider: 2019 to 2021

4.3.4. Bandwidth Capacity and Utilisation

The Lit/equipped capacity among the mobile network operators increased from to 103,100 Megabits per second (Mbps) reported in 2020 to 181,740 Mbps in 2021 representing a growth rate of 76.3 percent. Further, the capacity usage increased from 65,460Mbps in 2020 to 89,280 Mbps in 2021 reflecting a growth rate of 36.4 percent. Consequently, the throughput volume of data increased significantly from 199,150 terabytes (TB) reported in 2020 to 274,990TB in 2021 representing a growth of 38.1 percent.

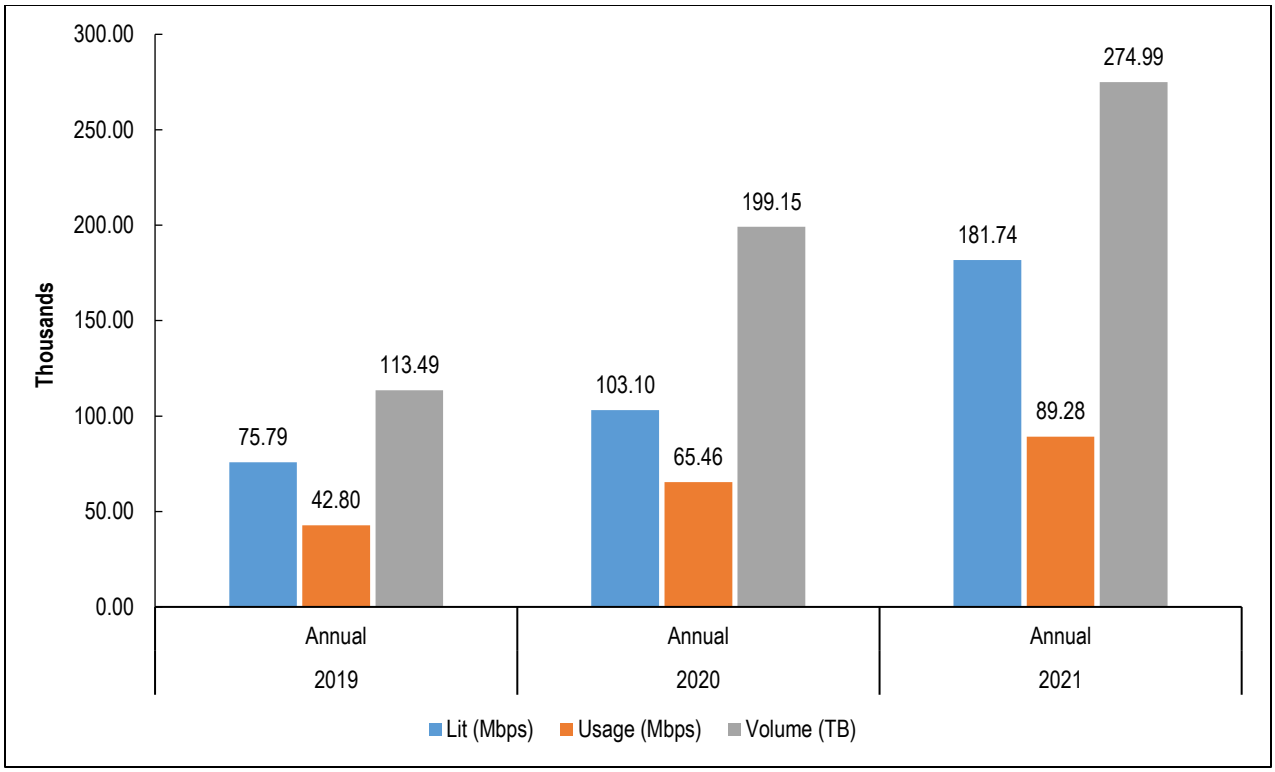


Figure 27: Bandwidth capacity and utilization by MNO: 2019 to 2021

Throughput volumes among internet service providers have increased consistently over time. The throughput volumes for mobile ISPs was nearly ten-fold higher than the fixed ISPs in 2021, nine-fold higher in 2020 and five-fold higher in 2019. Comparatively, there is more data usage among mobile internet providers than fixed internet providers.

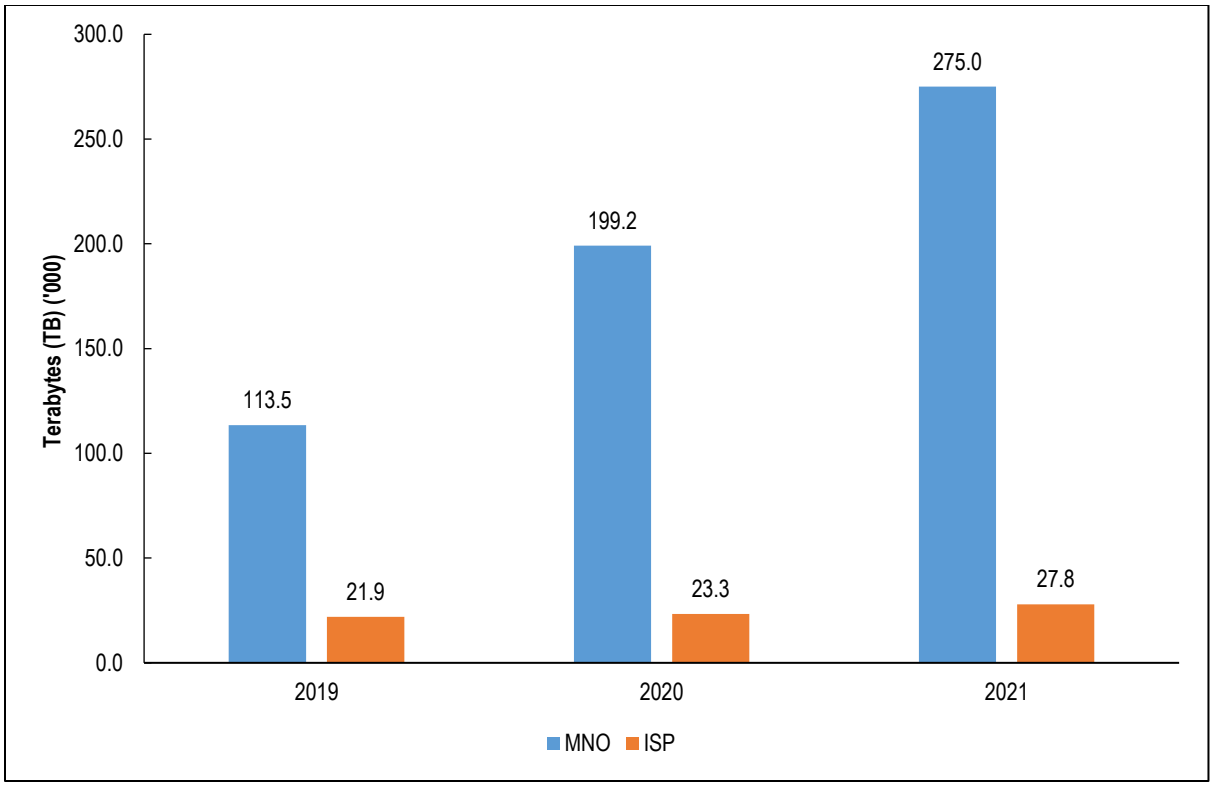


Figure 28: Data throughput volumes: 2019 to 2021

4.4 Passive Infrastructure

4.4.1. Ownership of Tower Infrastructure

The total number of telecommunication towers in the country increased from 3,309 reported at the end of the 2020 to 3,417 at the end of the 2021, representing an overall increase of 3.3 percent. This overall increase in the total number of towers was mostly attributed to IHS Zambia, Infratel, Airtel Zambia and ZICTA whose tower ownership increased over the review period by 1.1 percent, 3.6 percent, 235 percent and 1.8 percent respectively. Particularly, Airtel's tower ownership increased from 17 at the end of 2020 to 57 at the end of 2021 representing a two fold increase over the review period. IHS Zambia retained the highest number of towers of 1,768 translating to a proportion of 52 percent trailed by Infratel that owned 1,253 towers, representing a proportion of 36.7 percent at the end of 2021. The number of towers owned by Zesco and Zamtel remained unchanged during the review period. The overall increase in the number of telecommunication towers is expected to increase access to mobile networks as well as the quality of that network.

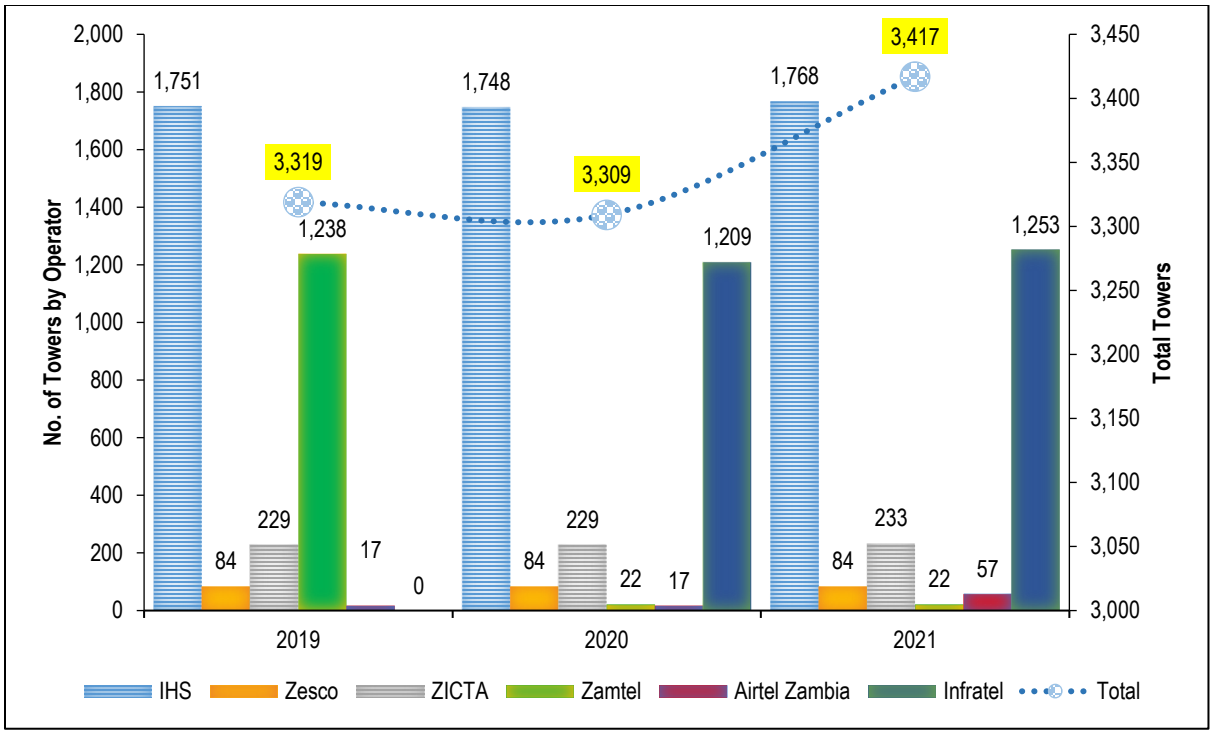


Figure 29: Trends of Tower Infrastructure: 2019 to 2021

4.4.2. Financial Performance of Passive Infrastructure Providers

A positive performance in the revenues of infrastructure providers was recorded in 2021. The overall revenues in the subsector increased by 48 percent from ZMW 1 billion at the end of 2020 to ZMW 1.5 billion at the end of 2021. The increase in revenues in the subsector are in tandem with the increases in the number of towers and enhanced by the increase in colocation agreements within the sector.

Table 7: Revenue (ZMW '000') Performance of Passive Infrastructure Providers: 2019 to 2021

Operator	2019	2020	2021	YTD % Change
Total Revenue	587,558	1,049,098	1,552,759.89	48%

4.5 Data Storage Facilities

4.5.1. Capacity and Utilisation of Data Storage Facilities

The cloud services subsector continued to be predominantly characterised by 2 licensees, Netone and Infratel while other licenses continued to provide this service as a Value Added Service (VAS) during the year 2021. The physical racks capacity of both firms remained constant while the total usage increased by 2 percentage points. The operators own data storage also increased marginally over the review period with capacity increasing by 0.3 percent and 2.3 percent respectively. On the other hand, the total bandwidth usage capacity increased from 50 Mbps at the end of 2020 to 55 Mbps at the end of 2021 while usage decreased by 3.5 percent over the review period. The overall improvement in capacity of data storage and bandwidth usage indicates an increased opportunity for the increased creation and usage of ICT based services. The number of customers in the subsector reduced. Despite the decline in customers, the overall revenue performance of the subsector increased from ZMW 40 million at the end of 2020 to ZMW 54 million at the end of 2021 representing a growth of 35 percent.

Table 8: Data Centre service providers' performance statistics: Dec 2020 to Dec 2021

PERIOD	Operator	Physical Racks		Own Data Storage		Bandwidth Usage		Customers	Revenue
		Capacity	Usage	Capacity	Usage	Capacity	Usage	Number	ZMW'000
2020	Q4	237	26%	5.02 PB	0.98 PB	50 Mbps	96%	239	18,237.23
	Total	237	29%	5.01 PB	0.97 PB	50 Mbps	99%	239	39,875.50
2021	Q1	237	31%	5.02 PB	0.99 PB	55 Mbps	95%	236	12,885.27
	Q2	237	31%	5.02 PB	0.99 PB	55 Mbps	95%	229	11,863.63
	Q3	237	31%	5.02 PB	0.99 PB	55 Mbps	95%	229	14,688.76
	Q4	237	31%	5.02 PB	1.00 PB	55 Mbps	95%	231	14,521.11
	Total	237	31%	5.02 PB	0.99 PB	55 Mbps	95%	231	53,958.76
YTD Change		0.0%	1.4%	0.3%	2.3%	10.0%	-3.5%	-3.3%	35.3%

4.6 Transmission Network Market

4.6.1. Network Capacity and Utilization in the Transmission Network Market

The total network transmission capacity held by operators increased marginally between December 2020 and December 2021 from 633.5 Gbps to 640.2 Gbps representing a growth rate of 1.1 percent. The total network utilization also increased over the review period from 95.2 Gbps to 98.3 Gbps, reflecting an increase of 3.2 percent. The increase in transmission capacity was mostly attributed to changes from Zamtel, whose capacity increased by 28.4 percent from 23.5 Gbps to 30.2 Gbps while that of the other operators remained constant. Similarly, the overall network transmission utilization increase was as a result of changes by Zamtel from 18 Gbps to 21.4 Gbps (see **Table 9Error! Reference source not found.**). Despite the positive performance by Zamtel during the year, Fibercom retained the highest network transmission capacity and utilization with a market proportion of 62 percent and 47 percent respectively.

Table 9: Trend in Network Transmission Capacity and Utilization: June 2020 to June 2021

YEAR	QUARTER	PARAMETER	TOTAL
2020	Q4	*Capacity (Gbps)*	632.6
		Utilisation (Gbps)	89.9
	(Average)	*Capacity*	**633.5**
	(Average)	*Utilisation*	**95.2**
2021	Q1	*Capacity (Gbps)*	640.2
		Utilisation (Gbps)	96.5
	Q2	*Capacity (Gbps)*	640.2
		Utilisation (Gbps)	98.1
	Q3	*Capacity (Gbps)*	640.2
		Utilisation (Gbps)	95.1
	Q4	*Capacity (Gbps)*	640.2
		Utilisation (Gbps)	103.4
	(Average)	*Capacity*	**640.2**
	(Average)	*Utilisation*	**98.3**
YTD %age Change		*Capacity*	**1.1%**
		Utilisation	**3.2%**

Source: Operator submissions

4.6.2. Wholesale Transmission Infrastructure

As at the end of 2021, there were a total of eight (8) operators in the wholesale transmission infrastructure market. Fibercom retained the most extensive fibre-optic network coverage in the country extending to a total length of over 12,000 km with various international gateways. Liquid Intelligent Technologies owned significant fibre network with a total length of over 8,000 km. MTN and Airtel Zambia continued to collaborate on an underground metropolitan network in Lusaka while ZAMTEL retained its extensive network with access to several international submarine cables. Other operators in the subsector included Smartnet which had a total of 1,583.09 km of optic fibre and Paratus Telecom who owned 157.09 km of fibre with 130.91km of backbone ring fibre as at end of 2021.

4.6.2.1. Fibrecom Fibre Network

Fibrecom has deployed over 12,000 km of optic Fibre cables countrywide enabling a wide coverage and making it the only network that has directly connected all 10 provincial centres. The operator has continued to intensify its optic-fibre network in the Eastern, Northern and Central areas of the country. Through submarine cables, Fibercom has interconnected its optic fibre network internationally to Namibia, Botswana, Zimbabwe, Malawi, Angola and Tanzania (see Figure 32).

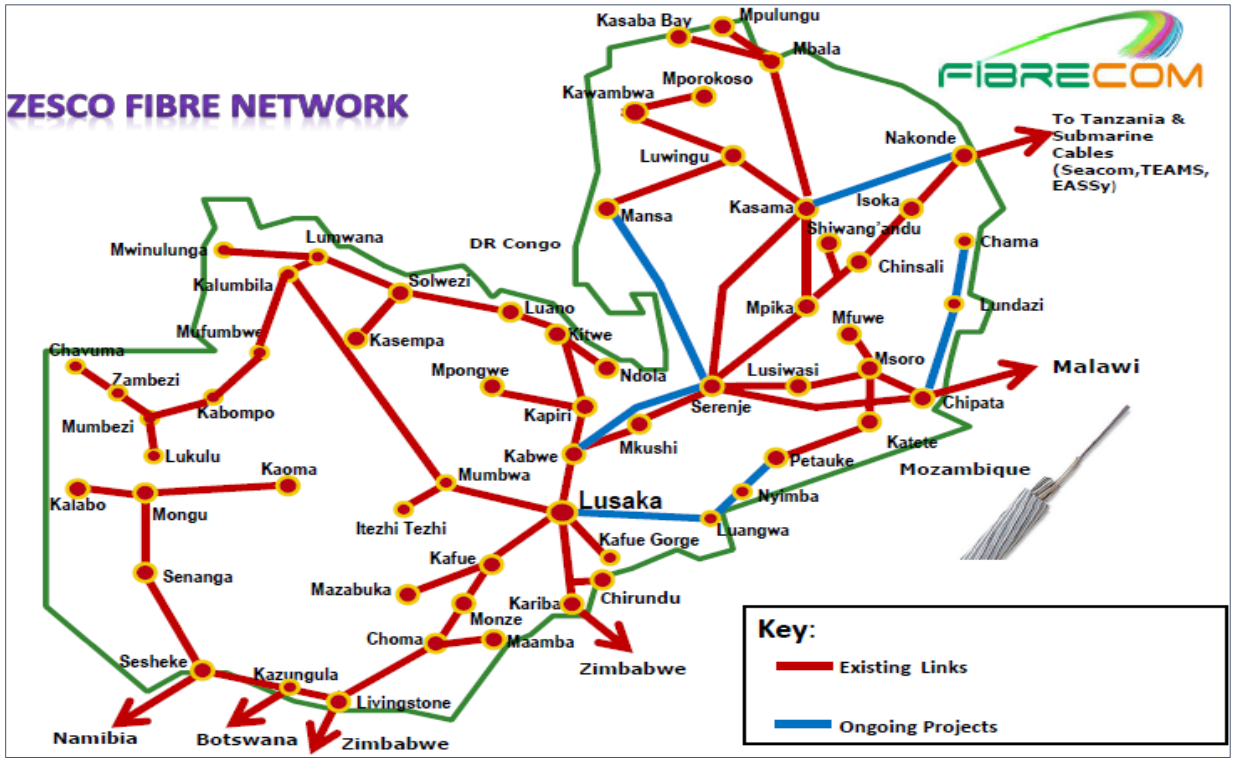


Figure 30: Fibrecom Network Map: 2021

4.6.2.2. Liquid Telecom Network

Liquid Telecom had deployed a total optic fibre length of 8,195.6 km countrywide as at the end of 2021. The backbone network is linked to 29 ring fibre metro networks with several microwave single points-of-presence (PoP). The network also has various international links through gateways at Livingstone, Nakonde, Chililabobwe and Sesheke. These gateways provide links to Zimbabwe, Tanzania and Democratic Republic of Congo. **Figure 31** below illustrated the extent of Liquid Telecom fibre network in 2021.

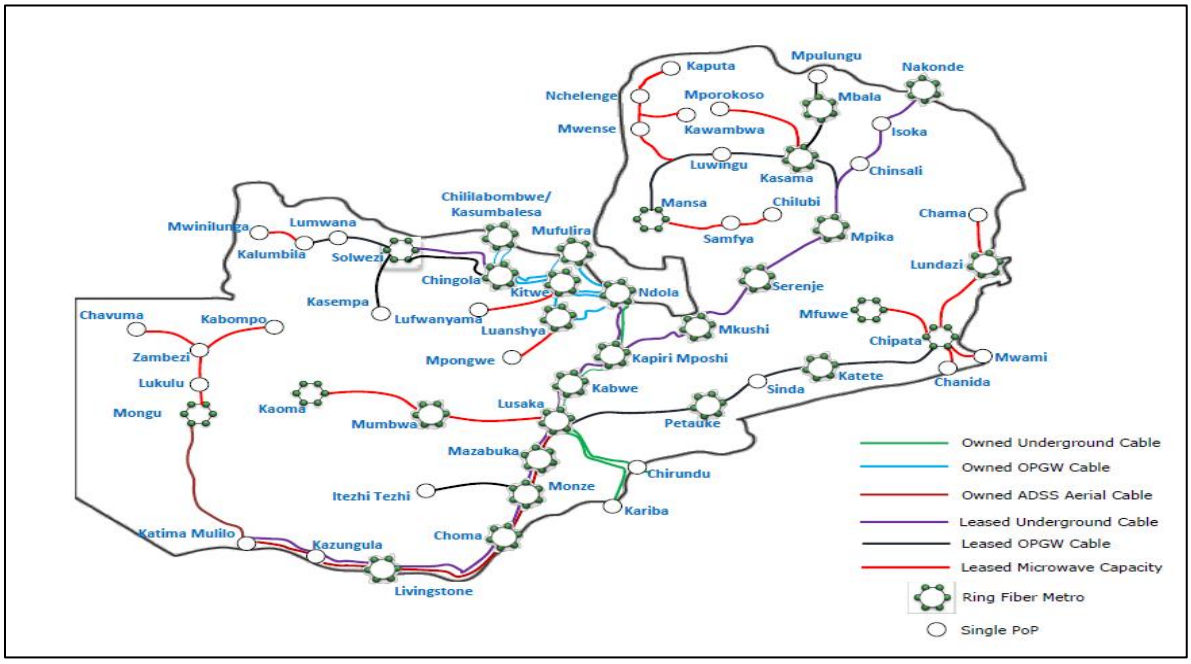


Figure 31: Liquid Technologies Metro and Backbone Network Diagram, 2021

4.6.2.3. Zamtel Fibre Network

Zamtel fibre network is similarly extensive, covering most areas along the line of rail, with access to several international submarine cables. These links have enabled access to undersea fibre-optic cables since 2011. The international fiber links connect to the Democratic Republic of Congo, Tanzania, Zimbabwe, Namibia and Botswana (see Figure 34).

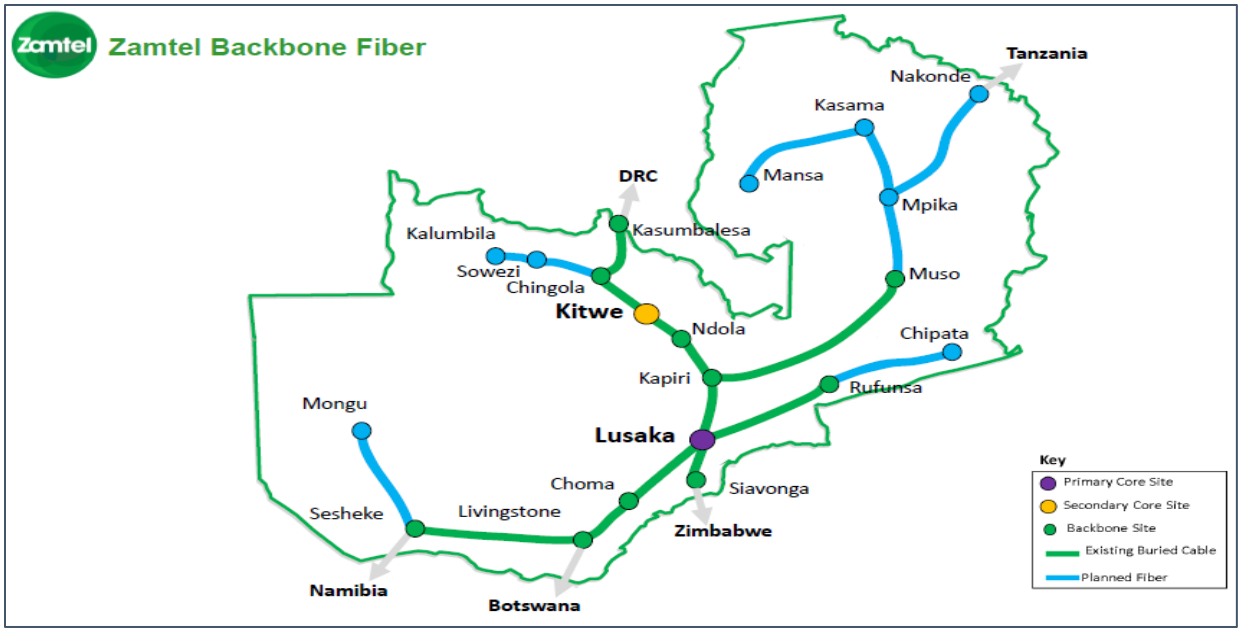


Figure 32: Zamtel Fibre Backbone Infrastructure

4.6.2.4. Airtel Networks Fibre Network

Airtel Zambia had, at the end of 2021, rolled out optic fiber network in all major towns of the country. The network also plans to expand its fiber network to other towns in the Luapula, Muchinga and North Western Provinces. Similarly, the national and international traffic fibre rings are planned for the next phase of expansion.

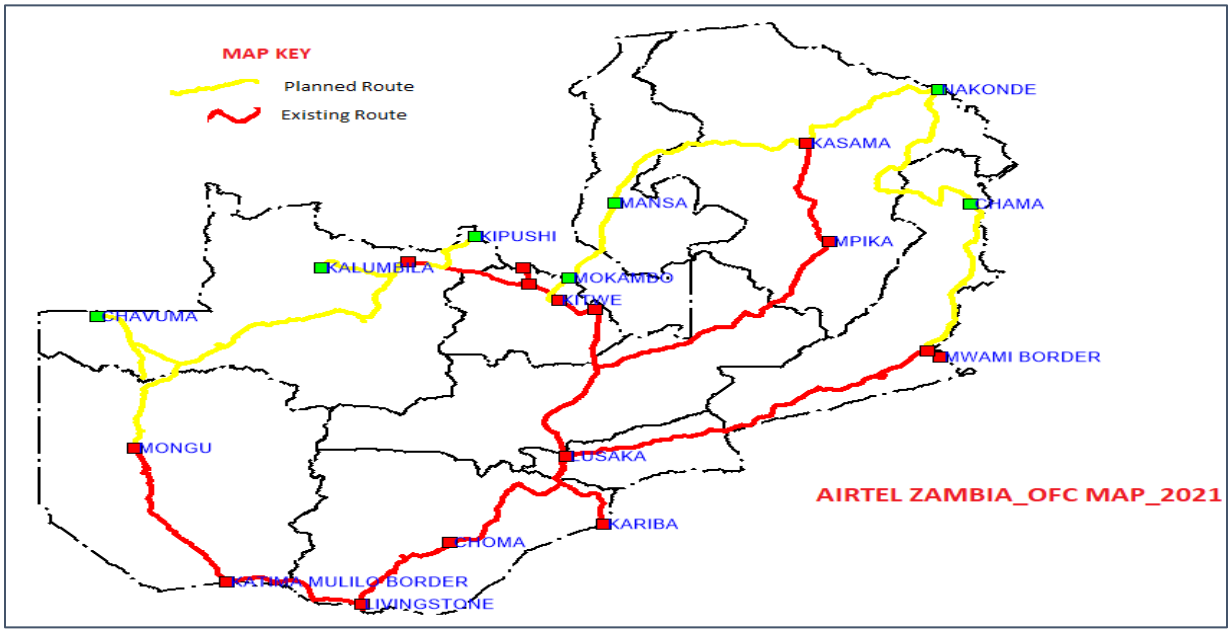


Figure 33: Airtel Network Planned and Existing Fibre Network Infrastructure

4.6.2.5. MTN Zambia Fibre Network

As at the end of 2021, MTN Zambia retained ownership of optic fiber network located mostly in the northern part of the country including the Copperbelt, Central, Lusaka, North-Western, Northern and Muchinga Provinces. The total infrastructure deployed by the operator as at end of 2021 was 3,136km in backbone fiber, 482km of metro fiber and 288.65km of FTTH fiber. Backbone Fiber located in the Western and Southern Provinces was mostly co-owned with Airtel Zambia. MTN Zambia has an international gateway for data to interconnect beyond the Zambian borders to Zimbabwe, Namibia, Tanzania, Botswana and the Democratic Republic of Congo (DRC) (see **Figure 32**).

Figure 34: MTN Zambia Aerial and Underground Backbone Fibre Network

4.7 Employment in the ICT Sector

Overall employment among licensees increased in 2021 compared to 2020. The total number of persons employed among licensees increased from 1,662 in 2020 to 1709 in 2021 representing an improvement of 2.8 percent. The overall increase was attributed mainly to the increase in full-time employment reported by MNOs, wholesale carriers and infrastructure operators (towers and data centres). Specifically, from 2020 to 2021, employment increased by 4.0 percent among MNOs, 5.6 percent among wholesale carriers and 3.1 percent among infrastructure operators. However, a decline in employment of 5.5 percent was reported among ISPs during the same period. This decline was mainly on account of some mergers and acquisitions among the ISPs as well as a slowdown in employment during the Covid -19 pandemic period.

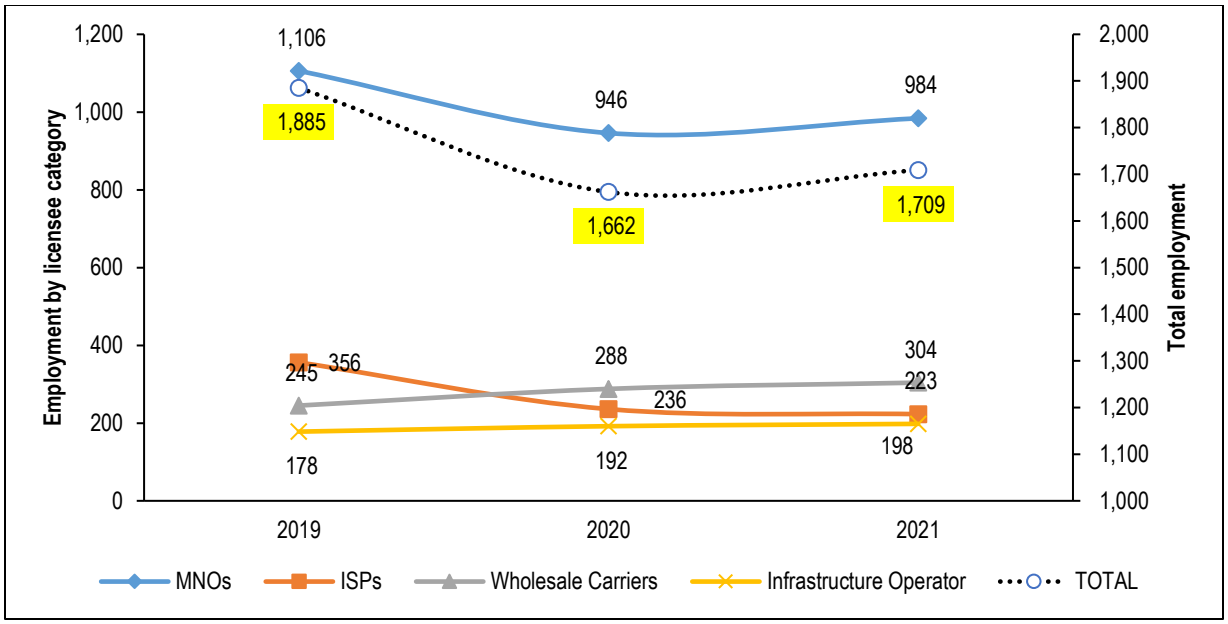


Figure 35: Employment in the ICT Sector: 2019 to 2021

5. Postal and Courier Services

5.1. The Public Postal Operator, Zampost

5.1.1. Developments by Zampost to improve Postal Services in 2021

5.1.1.1. Implementation of a new postal management system (e-Zampost)

In order to transform the service offerings of the Post Office, a new postal management system was installed by Zampost in 2021. The system was implemented to automate the services offered by the Post Office and would facilitate for the implementation of virtual Post boxes. This was aimed at improving customer experience through enhanced track and trace capabilities and e-Registration of postal items.

5.1.1.2. Implementation of Government Express

Zampost implemented this service as an end-to-end automated system for the conveyance of mail within and outside government departments. The service was developed as an extension of Zamposts' Expedited Mail Service (EMS) and was aimed at improving the movement of both Corporate and Government mail.

5.1.1.3. Re-introduction of Western Union/ Money Gram

In the 2021 financial year, Western Union and Money Gram services were re-introduced in some Post Offices. The re-introduction of international money transfer services is expected to increase convenience and ease of access to international remittance, thereby adding to Zamposts' revenue streams. By the close of 2021, these services were operational in 69 Post Offices.

5.1.1.4. EMS Delivery Transport Recapitalization

In 2021, Zampost re-enforced its EMS fleet in order improve the last mile delivery capabilities. The fleet increased to a total of 25 motorbikes, 10 buses and 30 mail vans.

5.1.1.5. Introduction of Agency Banking

Zampost introduced agency banking in the Postal network in an attempt to foster financial inclusion especially in underserved areas. The Corporation collaborated with five (5) banks; Zambia National Commercial Bank (ZANACO), First National Bank (FNB), Atlasmara, Standard Chartered Bank and Zambia National Building Society (ZNBS).

5.1.1.6. Rehabilitation of the Post Boat

Zampost invested in water transport by rehabilitating and operationalizing two water vessels on Lake Bangweulu and Lake Kariba. This mode of transport was aimed at facilitating the movement of people, cargo and conveyance of mail particularly in underserved communities and other densely populated highlands. These services are offered along Samfya, Chishi, Mbababala, Chilubi and Siavonga areas.

5.1.2. Zampost Traffic

Domestic Ordinary Mail deliveries increased from 8,076 mails in 2020 to 38,587 mails in 2021 reflecting a 378 percent improvement. The EMS services recorded the largest improvement in volume of items delivered from 149 thousand in 2020 to 358 thousand in 2021 representing a growth rate of 139 percent.

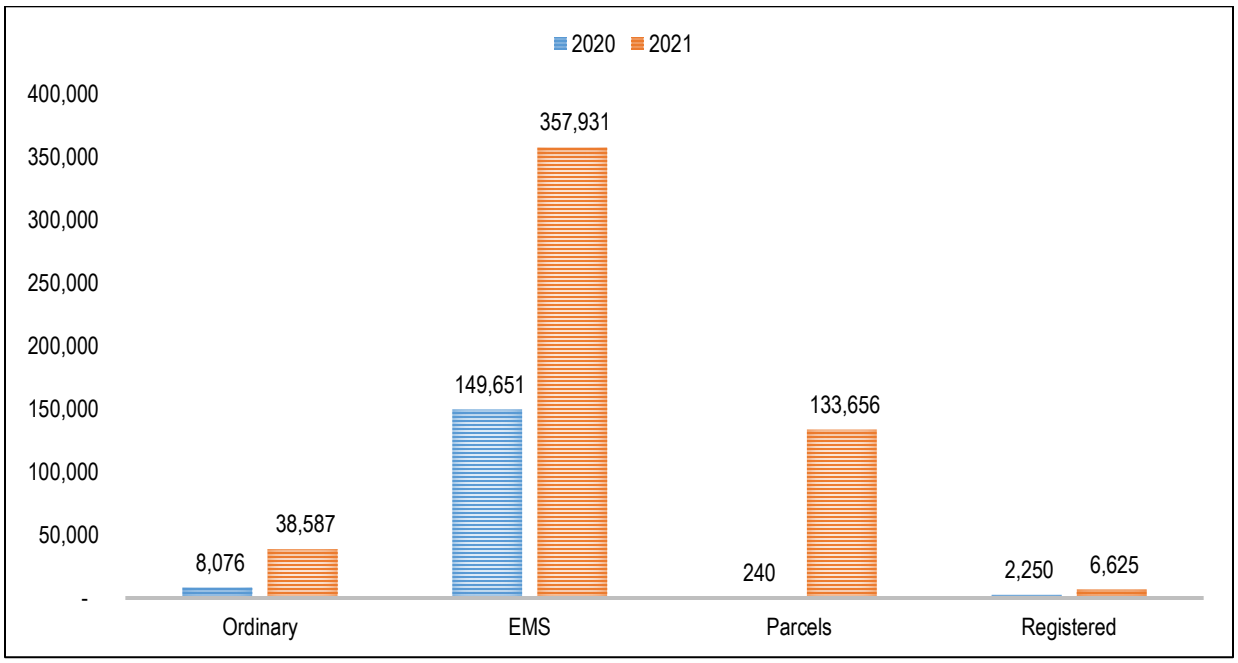


Figure 36: Domestic Mail Delivery 2020 and 2021 – No. of items Delivered

In 2020, the operations of Zampost were adversely affected the Covid-19 pandemic, leading to the operator suspending several services. The most affected services were those related to international deliveries which were severely affected by the low availability of airline services. In 2021, most airline services were restored, which led to a significant improvement in international mail deliveries. Zampost experienced a significant improvement in international mail volumes due to the commencement of airline traffic (see **Table 10**).

Table 10: International Mail Deliveries: 2020 to 2021 (*Number of items Delivered*)

	2020		2021	
	Incoming (Qty)	Outgoing (Qty)	Incoming (Qty)	Outgoing (Qty)
Ordinary	N/A*	146,068	151,183	84,345
EMS	3,693	105	4,468	2,907
Parcels	N/A	91	932,477	8,522
Registered	N/A	760	24,456	12,914
Small Pkts	N/A	N/A	50,603	45,144

M-Bags	N/A	N/A	518	73

5.1.3. Zampost Revenue and Employment Performance

In 2021, Zampost recorded total revenue amounting ZMW 20.5 million and had a total staff complement of 694 employees.

5.2. Courier Services

5.2.1. Traffic by Courier Service Providers

Domestic deliveries from within the country dominated the courier market. This was indicative of an increased usage of courier services within the country. Furthermore, 2021 was characterized by significant market entry of operators that ranged from micro to small-sized enterprises. The rapid increase of operators and subsequently traffic in the courier market can be attributed to the persistence of the Covid-19 pandemic which led to restricted physical movements that were substituted by delivery services. Only 5 percent of all international deliveries were sent outside Zambia. The remaining 95 percent was all inbound, depicting a high level of local consumption of foreign goods. Only seven (7) operators out of twenty four (24) international licensed operators had deliveries going out of the country. The most significant of these on the basis of volume were Fedex, Amezam and Mercury Couriers.

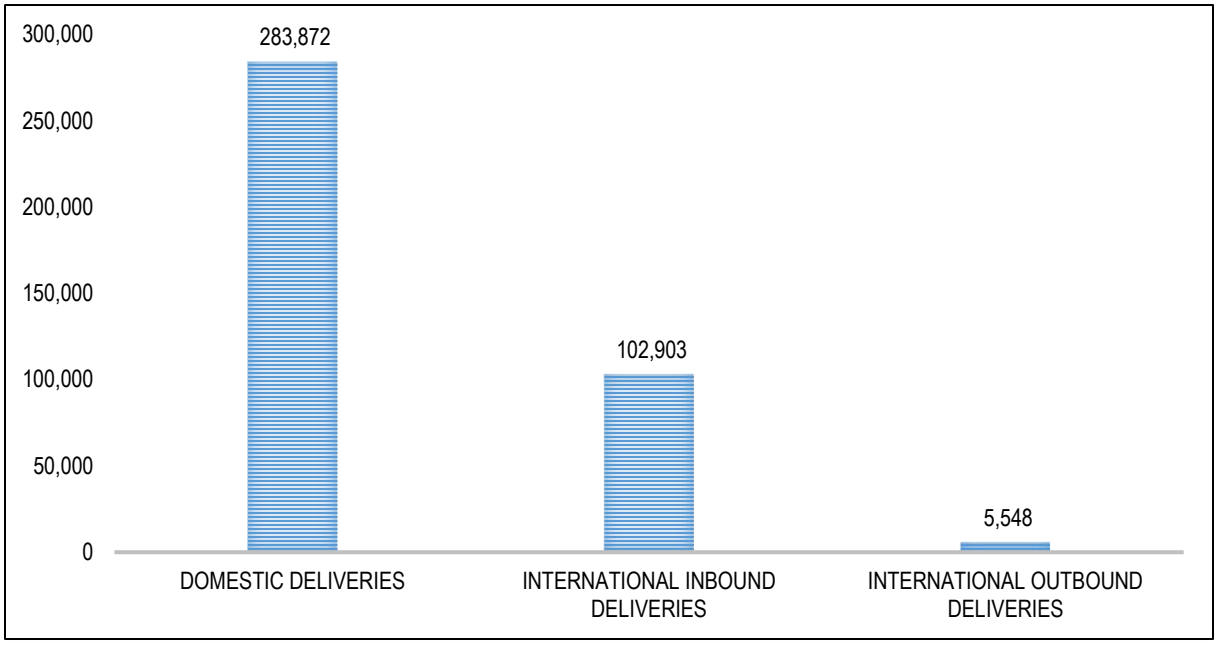


Figure 37: Courier Traffic 2021 *(Number of items Delivered)*

5.2.2. Revenue Performance

The total revenue from the courier providers considered amounted ZMW 145.3 million. DHL had the largest revenue share from among all the licensed courier operators amounting K91 million. Except for Mercury and Oneworld, the other providers reported revenues below ZMW10 million in 2021.

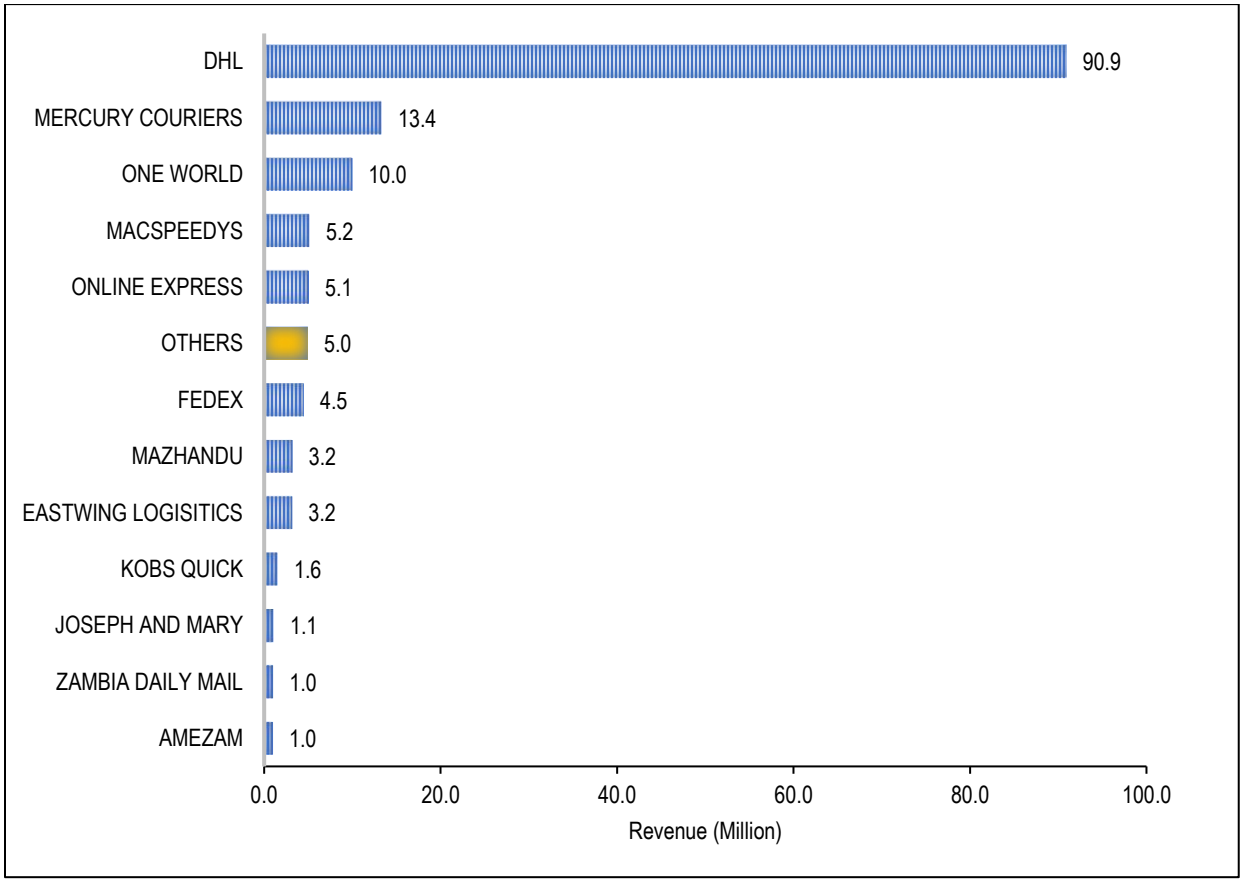


Figure 38: Courier Revenue 2021 (ZMW)

5.2.3. Coverage of Postal Services

The most served provinces were Lusaka, Copperbelt and Southern Provinces. In Lusaka Province, a total of 23 Post Offices existed where a minimum of[11] 41 private sector couriers reported to have presence. The most served province however, was the Copperbelt with 30 post offices and a minimum of 57 courier offices. Southern Province had 18 post offices and a minimum of 54 courier offices present (see Figure 39).

Zampost had presence wherever private sector couriers were operating and covered more areas than the private couriers. This extensive coverage provides an opportunity or ZAMPOST to act as an agent on behalf

[11] A 'minimum of' is used in cognizance of the fact that not all couriers submitted the required information and that more have been licensed since the collection of the information.

of various couriers. It was also noted that most couriers did not have fully established offices in towns and municipalities but relied on individuals who acted as agents.

All the provinces had at least 6 Post Offices and a minimum of 8 courier operators. However, 32 districts did not have a single operator serving them with postal or courier services. Western Province and Muchinga Province had the least percentage and thus the least served districts. Western Province had 7 out of its 16 districts unserved whereas Muchinga Province had 4 out of its 9 districts unserved. In total, Zampost was present in 84 districts whereas courier operators were present in at least 54 districts, all of which have a Post Office.

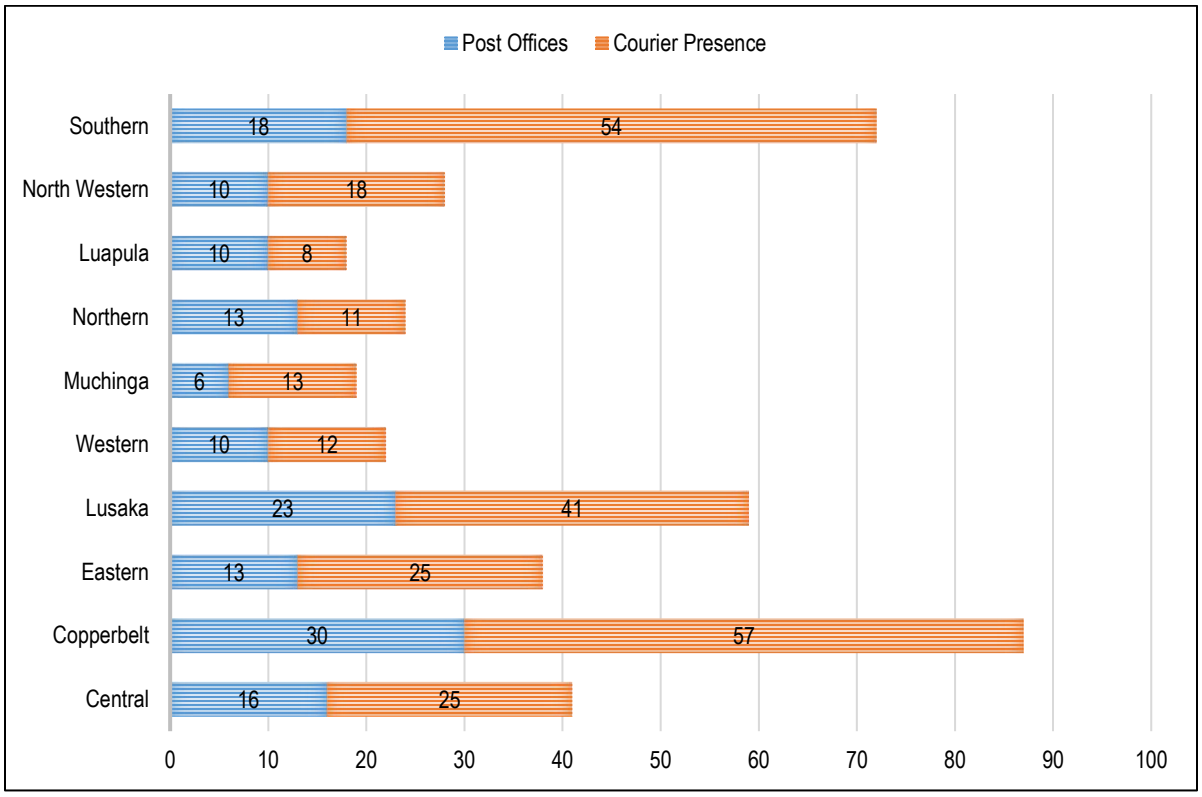


Figure 39: Post Office/ Courier Presence 2021 – Number of Post/Courier Offices per Province

6. SECTORIAL POLICY AND REGULATORY REVIEW

6.1 Positive Developments on the Market

a) **Increased demand for Cloud Services:** Operators noted that there was an increased demand for cloud services especially following the increased awareness on the importance of such platforms during and after the COVID-19 pandemic. A number of private and public owned entities have started adopting such technologies as part of their business continuity strategies.

b) **Enactment of New Legislation**: It was established that the enactment of the Cyber Security and Cyber Crimes Act No. 2 of 2021; the Data Protection Act No. 3 of 2021 and the Electronic Transactions Act No.4 of 2021 were positive developments on the market. Notably, the prospect of increased demand for data storage services following the requirement to host data locally was noted as an important opportunity for the growth of the sector.

c) **Increased demand for ICT services**: The sector was observed to have recorded a significant increase in the demand for ICT services. This was particularly observed through the continued increase in the subscriber base as well as increased demand for video conferencing platforms using applications such as google meet, Zoom and Microsoft teams.

d) **Increased deployment of Infrastructure**: Operators reported that they had continued to invest significantly in tower infrastructure and fibre deployments to support increased uptake and usage of ICT services. A number of providers of mobile telecommunication services deployed tower infrastructure to support their 4G investments while the fibre deployments were aimed at improving the quality of service.

e) **Review of Licensing Framework:** The initiative by the Authority to review the licencing framework was noted as a positive development by the operators. It was noted that the licensing framework should continuously be reviewed to ensure that it reflects the current structure and business models adopted by the industry.

f) **Alignment of Prices with Ability and Willingness to Pay:** The alignment of prices for various ICT services with the ability to spend by consumers through the price segmentation adopted by most operators was noted as a positive development. This ensured that operators maximise their revenues while consumers also maximised value and benefits based on their ability and willingness to pay.

g) **Impact of the Covid-19 pandemic on E-commerce:** The providers of courier services in the country indicated that there was an observed general improvement in the uptake of e-commerce services. This was evident from the increased traffic in the movement of parcels.

h) **Increased Geographical spread of Courier Providers**: There was a noted improvement in the geographical spread of courier service providers. This was largely attributed to new entrants that were licenced by the Authority and had the positive impact of ensuring that courier services are provided closer to where they are most required.

6.2 Challenges Observed on the Market

a) **Deterioration in the Macro economic Environment:** Operators continued to highlight the challenges associated with the prevailing macro-economic environment. Notably, the depreciation of the local currency, rising inflation and high interest rates were noted to have increased the cost of acquiring key inputs for their operations as well as limited their prospects on profitability.

b) **Delays in Issuance of Statutory Instruments:** There was a noted concern on the delayed issuance of statutory instruments that would operationalise the new legislation on cyber security, data protection and electronic transactions.

c) **Increased requirements for Spectrum**: There was an indication that operators would need more spectrum resources allocated to support the maintenance of quality of service following the increased subscriber base as well as their deployment plans. The specific bands sought were noted to be the 2100mhz, 2600mhz and 900mhz

d) **High cost of Fibre termination fees at towers and potential abuse of Dominance:** It was reported that the tower companies were charging high fees for termination of fibre at their sites which was costly. This was reported as a potential consequence of abuse of dominance by the tower companies that operate in a highly concentrated market.

e) **High cost of in country transit and transport costs for connectivity**: A number of operators indicted that the cost of in country transit and transport costs for connectivity were quite high. This was mainly attributed to the dominant position held by the owners of the essential infrastructure.

f) **Challenges with Vertically Integrated Operators**: There was a reported under-pricing of services by vertically integrated operators on the market especially those providing wholesale data as well as infrastructure and retail data services which could potentially be anti-competitive market conduct arising from margin squeezing. Operators sought the Authority's intervention in providing the due remedies to address the challenges posed by the vertically integrated firms.

g) **Changes in Harmonised System (HS) codes for Optic Fibre:** It was reported that the Tax authorities had changed the HS code for fibre cables which now required them to face taxes. The change of the HS codes from 900.11.00 to 8544.70.00 meant that the cables now would face customs duty making the cost of deployment even higher.

h) **Impact of Covid-19 on Field Operations:** The Covid-19 pandemic led to disruptions in field operations for a number of operators as their staff had to work from home. This had adverse implications on maintaining service standards and consumer satisfaction.

i) **Unlicensed Operators in the Postal Sector:** The prevalence of unlicensed operators in the postal sector continued to be a noted concern. In addition some courier parcels were noted to be moved through the luggage section of most transporters. These practices were a threat on the commercial viability of the existing licenced operators that face costs for compliance.

j) **Technology and Delivery times for Postal articles:** There was a noted challenge associated with limited adoption of technology by postal and courier operators related to tracking and tracing parcels as well as delayed delivery of parcels. These challenges had an adverse effect on the consumer experience.

6.3 Proposed Initiatives to Address any Risks or Challenges

a) **Costs related to Deployment of Fibre to Towers:** The Authority was requested to intervene in the potential abuse of dominance arising from increased costs to terminating fibre at towers.

b) **Costs of in country transit and transport costs for connectivity:** the Authority was requested to review the costs applied for in country transit and transport costs for connectivity. These costs were reported to be uncompetitive and increased the cost of doing business.

c) **Provision of Spectrum:** The Authority was requested to consider assigning any available spectrum resources to the operators to support their network deployments as well as improve quality of service.

d) **Collaboration in Sensitisation on Security of Tower Infrastructure:** The Authority was requested to take interest in sensitising the public on securing critical telecommunication infrastructure. The increasing trend of vandalism on key infrastructure such as generator sets, solar panels as well as other components by communities required consented efforts by all stakeholders.

e) **Engagement of Taxation in the Sector:** The Authority was implored to continue its engagements with the Government on harmonising the corporate taxes, as well as reducing customs duties on key inputs such as fibre cables.

f) **Address challenges of Abuse of dominance:** Operators requested the Authority to investigate the existence of abuse of dominance among vertically integrated firms as well as costs of in-country transit or transport costs for connectivity.

g) **Timely Issuance of Statutory Instruments related to the new legislation**: The Operators requested the Authority to assist with ensuring that the relevant statutory instruments for the new laws on cyber security and cybercrimes, data protection and electronic transactions are issued.

h) **Address Challenges of Unlicensed Postal operators**: It was recommended that the Authority should do more to address the challenge of unlicensed providers of courier services in the country. In order to support further growth in the postal sector, the operators requested the Authority to encourage the general populace to adopt e-commerce.

7. Outlook for the ICT Sector in 2022

A number of key opportunities as well as notable risks have been identified for the ICT sector in the subsequent year. Deliberate efforts by all actors will be necessary if the opportunities should be realized and risks mitigated. The identified opportunities include the following:

Forecast in uptake and Usage of ICT Services: The Authority forecasts a positive outlook in the general uptake and use of ICT services in the subsequent review period. The number of active mobile network subscriptions is expected to increase from 20.3 reported at the end of 2021 to 20.9 million subscriptions at the end of 2022 and subsequently 21.2 million in 2023. In addition, the volume of domestic outgoing mobile voice call minutes is forecasted to increase from 24.4 billion minutes estimated for the end of 2021 to 26.2 billion projected for the year 2022 and could reach 28 billion minutes in 2023. These anticipated improvements in uptake and usage of ICT services are on the backdrop of increased investments by operators in the capacity and coverage of their networks, competitive pricing outcomes on the market as well as general improvement in demand for ICT services among other attributes. However, there are risks mainly with international voice traffic which has exhibited a sustained decline in the immediate past.

Benefits of newly assigned Spectrum: The Authority issued spectrum in the 800 MHz band to Airtel networks Zambia and MTN Zambia Ltd. The two companies are expected to deploy new services as well as enhance the quality of its services by leveraging on the new and additional spectrum. There are also plans underway to assign additional spectrum bands to enhance capacity, diversity of services on the market as well as reduce the cost of deployment for networks.

Deployment of new Technologies and additional Infrastructure: Operators are expected to continue deploying infrastructure aimed at increasing coverage and improving quality of services. Notably, the proportion of 4G/LTE sites is anticipated to continue increasing while more deployment of metro fibre networks is also expected. There are also some operators that have indicated that they have plans of commencing preparations for 5G networks. The Authority has committed to facilitating testing for 5G and will make the required resources available. The construction of the 1009 towers by the government is also expected to be concluded in 2022.

Regulations and Guideline's Related to the recently enacted Laws: Following the enactment of the Cyber Security and Cyber Crimes Act No. 2 of 2021 as well as the Electronic Communications and Transactions Act No. 4 of 2021, it is anticipated that a number of regulations and guidelines will be issued to facilitate the operationalisation of these laws. These regulations and guidelines will have a significant impact on how the sector is regulated as well as how electronic transactions are undertaken.

New Licensing Framework: The Authority has undertaken a review of the current licensing framework aimed at addressing some existing challenges and responding to new opportunities on the market. A

regulatory impact assessment of the proposed amendments was recently concluded and the new licensing framework could be finalised and implemented by the end of 2022.

The above opportunities notwithstanding, a few notable risks were identified with a view to explore avenues for mitigation. These risks included the following:

Continued decline in International Traffic: While most of the ICT indicators point to a positive growth trajectory, international traffic volumes have consistently been on the decline. This trend is anticipated to continue in the subsequent period mainly as a result of intensified use of OTT applications such as WhatsApp for international calling. In order to mitigate the risk associated with reduced revenues, operators will have to be more innovative in embracing OTTs which offer an opportunity for new and increased revenue streams through data utilisation.

Cyber Related Challenges: As the uptake of ICT services increases, there are anticipated challenges associated with cyber related risks. In the recent past, these risks have largely been concentrated in the usage of digital financial services. As a deliberate strategy, efforts on awareness will need to be enhanced to mitigate such risks.

Unlicensed courier operators: The continued provision of courier services by unlicensed providers limits the viability of the courier enterprises in the country. The limited geographical presence of the Authority limits the effectiveness of inspections. In this regard, more awareness by consumers on the need to use licenced providers will be required to address this challenge**.**