Shaping Africa's Digital Future:
The African Telecommunications Union's Role in Connectivity and Transformation

John Omo,
Secretary-General,
African
Telecommunications
Union

- **Quantum Technology Transforming Telecom in Africa**

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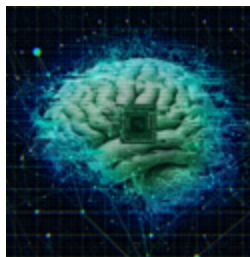
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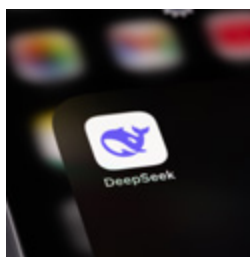
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John Omo, Secretary-General, African Telecommunications Union

Shaping Africa's Digital Future:
The African Telecommunications Union's Role in Connectivity and Transformation

The African Telecommunications Union (ATU) plays a pivotal role in shaping the continent's digital landscape. As a specialized institution under the African Union (AU), its mission is to drive the growth of telecommunications and information and communication technologies (ICTs) across Africa, focusing on improving connectivity and ensuring universal access.

ATU's membership structure is diverse, consisting of 52 African countries as full members and 50 Associate Members, including ICT operators, service providers, and other stakeholders in the telecommunications ecosystem. This broad representation allows the Union to effectively advocate for Africa's digital interests on the global stage, particularly in collaboration with the International Telecommunication Union (ITU). ATU acts as the primary representative of African nations at global forums, including major decision-making conferences that shape international ICT policies.

Headquartered in Nairobi, Kenya, the Union facilitates the exchange of knowledge, best practices, and technical expertise among its members. Through various initiatives, ATU works to promote the adoption of innovative technologies, foster regional integration, and address challenges related to infrastructure, regulation, and policy development. The organization is instrumental in advancing Africa's digital transformation agenda, which is crucial for unlocking the continent's socio-economic potential and ensuring that no one is left behind in the digital era.

By fostering collaboration among African governments, regulators, and industry players, ATU is dedicated to creating an inclusive and sustainable digital environment, supporting initiatives like the rollout of broadband networks, digital literacy programs, and the integration of ICT in key sectors such as healthcare, education, and agriculture. With its strategic role and far-reaching impact, ATU remains a cornerstone of Africa's ambition to become a digitally empowered continent.

Mandate, Objectives and Initiatives

The Union operates under 13 statutory objectives aimed at promoting robust ICT infrastructure and services across Africa. One of its core initiatives is the development of key policy and regulatory frameworks and strategies that aim to address Africa's ICT challenges, including the digital divide, limited infrastructure, high access costs, and low digital literacy and skills.

Africa's digital divide remains profound, with just 43% of the population having access to the Internet compared to the global average of 67%. Additionally, while nearly 85% of Africans have access to 3G networks, only approximately 60% are covered by 4G and even less by 5G. To bridge these gaps, ATU mobilizes funding and investment opportunities at both regional and global levels, fostering the growth of digital infrastructure and universal digital access.

Recognizing the ever-evolving nature of the digital landscape, ATU proactively implements human capacity development initiatives, collaborating with member states, associate members and ICT organizations. A notable example is the collaboration with the ITU and ITU Academy Centres such as AFRALTI and ESMT in 2023, which delivered a fully sponsored technical course in Digital Sound Broadcasting to 100 students across all Member States. Such initiatives enhance digital skills and empower Member States to leverage ICTs effectively.

ATU's coordination of Africa's participation in global telecommunications/ICT fora has been more than commendable and with tangible results. Under ATU's coordination, African countries successfully recovered their lost satellite resources and rolled out the optimisation of the FM Sound broadcasting plan (the GE84 Plan), acquiring 18,326 new usable radio frequencies for FM sound broadcasting.

At the WTSA-24 in New Delhi, ATU coordinated and facilitated Africa's submission of a remarkable 37 African common proposals, three of which were adopted. The Resolutions are expected to address Africa's standardization challenges and promote fair and equal access to and utilization of digital technologies.

ATU also facilitates regional and global partnerships and collaboration, enhancing the exchange of expertise and best practices, harmonization of strategies and policies and joint capacity building and infrastructure development. Recently, the Union hosted a delegation from the Caribbean Telecommunications Union (CTU), alongside sub-regional ICT organizations and regulators from Kenya and Tanzania to explore, among others, opportunities for collaboration in policy harmonization, capacity building and ICT

development in Africa and the Caribbean.

Contribution to Africa's Digital Transformation

ATU, in close collaboration with its members, has made a monumental contribution to the expansion of ICTs and the development of digital economies across the African continent. The Union's efforts have been vital in expanding mobile broadband infrastructure and services, reaching millions of individuals who were previously offline. This critical infrastructure expansion is not just about connectivity; it is about giving African nations the tools and resources needed to foster innovation, economic growth, and inclusive development. By bridging the digital gap, ATU has directly supported the socioeconomic uplifting of previously underserved communities, enabling

them to access new opportunities for education, healthcare, and entrepreneurship.

The Union's policy and regulatory support has been a cornerstone in advancing digital connectivity, with a focus on improving digital literacy and skills, strengthening cybersecurity frameworks, and facilitating the deployment and integration of emerging technologies across Africa. ATU's strategic guidance has been instrumental in ensuring that African nations are not left behind in the global digital revolution. Thanks to these transformative policy frameworks, Africa's digital divide is steadily shrinking. The population with Internet access is growing at an unprecedented rate, and this surge in connectivity is creating more job opportunities, boosting

entrepreneurship, and ultimately driving the growth of a robust and sustainable economy across the continent.

One of the Union's most significant contributions has been its leadership in the migration from IPv4 to IPv6. This migration is crucial for addressing the continent's growing demand for IP addresses, which are necessary to connect more devices to the Internet. By providing African countries with sufficient IP addresses, ATU has helped to future-proof Africa's digital infrastructure, increasing efficiency and scalability in the use of digital technologies. This initiative is laying the groundwork for a more connected Africa that is better equipped to meet the demands of an increasingly digital world. Moreover, ATU's framework for e-skilling has

been a game-changer, facilitating the integration of ICTs into school curricula across the continent. This program is designed to ensure that everyone, including persons with disabilities and special needs, has

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ATU will remain at the forefront, driving Africa's digital transformation and empowering its people to thrive in the global digital economy

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equal access to e-learning resources and training programs, thus fostering greater inclusivity and equality in digital education.

In addition to these groundbreaking initiatives, ATU has launched the 4th Industrial Revolution (4IR) Strategy, which serves as a comprehensive roadmap for Africa's adoption and integration of advanced technologies. The 4IR strategy aims to equip African countries with the tools they need to succeed in the digital age, ensuring that the continent benefits from innovations such as artificial intelligence, blockchain, and the Internet of Things (IoT). ATU has also published a white paper on connectivity and accessibility best practices in Africa, offering valuable insights into improving digital connectivity, particularly in relation to submarine cables. This document provides a blueprint for enhancing connectivity across Africa, ensuring that all regions, including rural and remote areas, benefit from the digital revolution.

Furthermore, the Union has established a common digital security policy and set of standards for network security and information systems, addressing Africa's pressing cybersecurity challenges. By providing these essential guidelines, ATU is helping to safeguard Africa's

digital infrastructure from emerging cyber threats and vulnerabilities. These standards are particularly important as African nations continue to digitize their economies and increase their reliance on digital technologies. ATU's proactive approach to cybersecurity has positioned it as a key player in the continent's efforts to protect sensitive data and ensure the security of digital transactions and communications.

ATU's commitment to building capacity in cybersecurity and ICT human resource development is evident through its organization and co-organization of specialized workshops and Africa Cyber Defense Forums. These forums bring together industry leaders, policymakers, and cybersecurity experts to discuss the latest trends, share best practices, and develop strategies for addressing Africa's unique cybersecurity challenges. Through these collaborative efforts, ATU is shaping Africa's cybersecurity landscape and ensuring that the continent is prepared to tackle the growing threat of cybercrime.

Recognizing the transformative potential of 5G and other emerging technologies, ATU has been at the forefront of efforts to prepare African countries for the deployment of 5G

networks. Through its Task Group on Emerging Technologies, the Union has released a detailed report on 5G preparedness and relevant use cases across Africa. This report highlights the current state of 5G deployment in various African countries, outlining the national strategies being employed to accelerate the development of 5G networks and identifying the challenges that are hindering widespread adoption. By providing a comprehensive overview of the 5G landscape, ATU is helping policymakers, industry leaders, and other stakeholders to make informed decisions about the future of 5G in Africa.

The Union's work on 5G is particularly important because 5G has the potential to drive sustainable and inclusive economic growth, which is a key objective of Africa's Agenda 2063 and the United Nations Sustainable Development Goals. However, the success of 5G will depend heavily on the pace and scale of its deployment. As the report highlights, collaboration and cooperation among African countries and other stakeholders will be critical to ensuring that 5G is deployed in a way that benefits all sectors of society. Meaningful deployment of 5G requires more than just the expansion of mobile broadband services; it necessitates the development of complementary advanced technologies, the creation of awareness among users (especially businesses and institutions), and the addressing of socioeconomic challenges that affect ICT advancement across the continent.

While ATU remains committed to developing and advocating for relevant frameworks to support Africa's digital transformation, the responsibility for the successful implementation of these strategies lies with the individual Member States. ATU will continue to play a central role in providing the necessary guidance and support to help countries implement these frameworks and ensure their adoption across the continent. However, the Union acknowledges that the true power of these initiatives will be realized only when Member States take ownership of the implementation process, adapting the frameworks to their unique national contexts and fostering an environment of innovation, inclusivity, and sustainable growth.

ATU's efforts in advancing digital connectivity, fostering technological innovation, and promoting cybersecurity have had a profound and lasting impact on the African continent. Through its visionary leadership and collaborative approach, the Union has not only helped to bridge Africa's digital divide but has also laid the groundwork for a brighter, more prosperous digital

future for all Africans. As the digital landscape continues to evolve, ATU will remain at the forefront, driving Africa's digital transformation and empowering its people to thrive in the global digital economy.

Looking into the Future

Despite the significant challenges that continue to impact Africa's digital connectivity—such as affordability issues, gaps in digital infrastructure, and fragmented regulatory policies—the continent's digital future is undeniably promising. Africa's vast potential lies not only in its growing population and expanding middle class but also in its considerable human capital, expertise, and untapped resources. These elements, when harnessed effectively, hold the key to leveraging digital connectivity for inclusive and sustainable development across the continent.

The African Telecommunications Union (ATU), guided by its strategic vision for the period 2023-2027, is steadfastly prioritizing key areas critical to the continent's digital future. These include improving infrastructure and connectivity, expanding digital services, enhancing cybersecurity and data management, creating an enabling regulatory environment, and fostering ICT human capacity development. Each of these pillars plays a crucial role in ensuring that Africa's digital ecosystem becomes resilient, secure, and accessible for all.

Advancing digital connectivity in Africa requires more than just technological investment—it demands a comprehensive, multistakeholder approach. ATU's role in these endeavors is crucial, as it works to align efforts between governments, regulatory bodies, ICT operators, and other stakeholders. The Union's efforts are deeply interconnected with broader socioeconomic factors such as education, employment, healthcare, and economic development. The potential of ICT to transform lives, livelihoods, and entire economies is

immense, but this transformation cannot occur in a vacuum. It depends on addressing the systemic issues that inhibit widespread access to digital tools and services.

African countries must address key challenges such as illiteracy, unemployment, and poverty, all of which directly affect the accessibility and effectiveness of digital connectivity. Socioeconomic disparities—exemplified by income inequalities, a pronounced digital gender gap, and urban-rural divides—continue to perpetuate cycles of inequality, denying large portions of the population the opportunity to engage meaningfully in the growing digital economy. These gaps not only hinder individual progress but also undermine the potential for Africa to compete on a global scale, as its workforce and consumers are left behind in the digital age.

The future of Africa's digital transformation hinges largely on the collective will and coordinated actions of its countries. As the most unconnected continent in the world, Africa faces an urgent need for enhanced collaboration, cooperation, and partnerships between governments, private sector players, and international organizations. ICT actors must move beyond addressing isolated challenges, recognizing that tackling one issue without addressing others will yield minimal results. For instance, investing in state-of-the-art digital infrastructure is futile if it is not complemented by robust cybersecurity measures and initiatives to bridge the digital literacy and skills gap. Similarly, creating high-tech environments will not make a meaningful impact if the foundational issues of accessibility and affordability remain unaddressed.

The future of Africa's digital ecosystem belongs to those who are willing to think beyond narrow interests and work together towards shared goals. Collaboration is not just a strategic advantage; it is an absolute necessity. To unlock the

continent's full digital potential, African countries, regional bodies like ATU, and the global community must foster an inclusive, collaborative, and forward-thinking approach. It is only through this united effort that Africa can overcome its current challenges and chart a course toward a prosperous and connected future.

This is a future where digital technologies are not only tools of innovation but also instruments of social and economic justice, ensuring that every African citizen has the opportunity to participate in and benefit from the global digital economy. 𝕋ℝ

> ATU's proactive approach to cybersecurity has positioned it as a key player in the continent's efforts to protect sensitive data and ensure the security of digital transactions

Addressing Africa's Telecom Talent Gap

The telecommunications industry in Africa has experienced rapid growth, driven by advancements in technologies like 5G, IoT, and cloud services. This expansion has created a surge in demand for skilled professionals to manage and innovate within the growing digital ecosystem. However, a significant challenge is emerging: the shortage of qualified telecom professionals. This talent gap threatens to undermine the continent's digital transformation and limit its ability to leverage new technologies.

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The Growing Demand for Telecom Talent

Africa's telecom sector has achieved significant progress in infrastructure, connectivity, and mobile services. The adoption of 4G networks, mobile money services like M-PESA, and the push toward 5G are driving demand for telecom talent. Telecom companies need network engineers, data scientists, cybersecurity experts, software developers, and cloud engineers to manage infrastructure and support next-generation technologies.

The digitalization of industries such as agriculture, finance, healthcare, and education has further increased the need for telecom professionals. These sectors rely on strong telecom infrastructure, making skilled professionals essential for maintaining and enhancing services. Expanding mobile broadband into rural areas requires an even more specialized workforce to manage these projects effectively.

Despite this rising demand, Africa could face a shortage of 300,000 telecom professionals by 2025, risking delays in the rollout of essential services and technologies.

Key Factors Contributing to the Telecom Talent Gap

Several factors contribute to the shortage of skilled telecom professionals in Africa. One major issue is the lack of specialized educational programs in emerging telecom technologies like 5G, IoT, and cybersecurity. Many universities and technical institutes do not offer courses in these areas, meaning graduates often lack the necessary skills.

Moreover, Africa struggles to retain talent, as skilled professionals are often lured to better-paying opportunities in developed markets or international companies.

Gender imbalance also contributes to the talent gap, with women underrepresented in technical roles like engineering and network management. Encouraging more female participation in the telecom industry is crucial to diversifying the workforce and expanding the talent pool.

Bridging the Talent Gap: Solutions and Strategies

A multifaceted approach is required to address the telecom talent gap. Key steps include investing in education and training programs aligned with the telecom sector's demands. Universities, technical colleges, and vocational institutes must collaborate with telecom companies to develop curricula that cover emerging technologies like 5G, cloud computing, and AI. Internship and apprenticeship programs can provide valuable hands-on experience.

Governments and telecom operators must also support local talent development through public-private partnerships, training hubs, and certification programs. Continuous professional development is vital to keeping up with technological advancements, and telecom companies should invest in upskilling their workforce through online courses and industry conferences.

Promoting gender diversity is another important solution. Programs that encourage women to pursue STEM education and telecom careers— through scholarships, mentorship, and networking events—can help address the gender gap and bring diverse perspectives to innovation.

Additionally, attracting and retaining talent can be achieved by offering competitive salaries, better working conditions, and career development opportunities. Telecom companies should provide clear career paths, flexible working arrangements, and incentives to retain top talent.

The Role of Regional Collaboration

Regional collaboration is crucial in addressing the telecom talent shortage. African countries can share resources and knowledge to build a unified approach to workforce development. Multinational telecom companies operating in several markets can collaborate on training initiatives and best practices to build a pan-African talent pipeline.

Regional partnerships can also tackle disparities in telecom skills between urban and rural areas. Local governments and companies can work together to establish training programs in remote regions, ensuring talent is developed where it's most needed.

While Africa's telecom talent gap is a significant challenge, it also offers an opportunity to rethink how talent is nurtured across the continent. By investing in education, creating career opportunities, promoting gender diversity, and encouraging regional collaboration, Africa can bridge the telecom talent gap and build a workforce that drives its digital transformation. Equipping its people with the necessary skills will support the region's digital future and sustain its telecom infrastructure for years to come. **TR**

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Boosting Connectivity: Côte d'Ivoire Advances Telecom Expansion

While Ivorian telecom operators are required to ensure nationwide coverage, some areas remain underserved. To bridge this gap, the government has intensified pressure as part of its digital transformation agenda.

Orange, MTN, and Moov Africa will deploy 240 small-scale radio sites across Côte d'Ivoire to enhance coverage. This initiative stems from financial penalties imposed in 2021 for failing service quality standards—Orange was fined USD 11.2 million, MTN USD 5 million, and Moov Africa USD 4 million. Rather than paying the fines, the operators agreed to reinvest in network expansion.

The project aligns with the government's goal to connect 240 villages in 2025 under the National Rural Connectivity Program (PNCR). While 4G coverage reached 91.5% of the population in 2023, GSMA's 2024 Mobile Connectivity Index rated the country's network coverage at 85.2%.

With CFA18 billion allocated to PNCR's second phase and CFA13.2 billion redirected from fines, effective implementation remains key. Operators, historically reluctant to invest in rural areas due to low profitability, now face close monitoring from regulatory committees.

Globacom Expands Network Infrastructure to Boost Connectivity Across Nigeria

Nigerian telecommunications company Globacom has intensified its nationwide network expansion project to ensure improved customer experience.

The current phase of network upgrade, launched last year, involves the nationwide rollout of new sites and the modernization of existing infrastructure to deliver higher speeds and enhanced data experiences for a growing number of Nigerians.

In response to the recent increase in telecom tariffs, Globacom stated that it is committed to building world-class telecommunications infrastructure and offering its customers the most competitive rates for voice and data services.

The company added that the network upgrade entails the entire scope of Telecoms infrastructure enhancements, from the core network to access network, transmission and IP network, fiber network, metro access, and backbone infrastructure, as well as passive equipment expansion like power and environment.

In the last few months, the company has successfully rolled out hundreds of new sites in Lagos, Ogun, Nasarawa, Rivers, Edo, Ogun, Delta, Cross River, Kaduna, Kano, Rivers, and Abuja.

The upgrade was undertaken to expand network capacity, provide more resources for subscribers for improved voice and data, andboost customer experience in areas where there is congestion.

Nigeria's Internet Data Usage Exceeds 1 Million Terabytes

In January 2025, Nigeria's internet data consumption surpassed an impressive 1 million terabytes, emphasizing the nation's rapidly evolving digital landscape, as well as the significant strides in broadband penetration. The latest statistics from the Nigerian Communications Commission (NCC) reveal that data usage hit a remarkable 1,000,930.6 terabytes, marking a substantial increase from December 2024, when it stood at 973,455.35 terabytes, and reflecting a continued upward trajectory from November 2024, when consumption was recorded at 878,953.14 terabytes.

This consistent growth in data consumption highlights a broader trend of increasing digital adoption across Nigeria. Contributing factors of this increase include heightened activity in streaming services, social media engagement, and improved internet accessibility across various regions. Notably, data usage figures from October 2024, which indicated 870,398.28 terabytes, demonstrate a clear upward trend, signaling a growing reliance on internet services for entertainment, communication, education, and commerce. As more Nigerians gain access to reliable internet, the potential for innovation and economic development within the digital sector continues to grow, positioning Nigeria as an emerging player in the global digital economy.

Ghana Forms Interministerial Committee to Reduce Data Costs

Ghana's Minister of Communications, Samuel Nartey George, has announced plans to form an interministerial committee within the next two weeks to address the high costs of internet data.

The committee will include representatives from the Ministries of Energy and Finance, the Public Utilities Regulatory Commission (PURC), and telecom industry stakeholders. Including the energy sector is particularly important since power costs account for nearly 80% of tower companies' expenses.

Analysts also attribute high data prices to the fluctuating cedi-dollar exchange rate and limited market competition.

The minister proposed two approaches: either lowering prices or increasing data allowances at the same cost, aiming for tangible improvements by year-end. As of early 2024, Ghana had 24 million internet subscribers, with a penetration rate of 70%. However, the ITU data reveals that mobile internet spending accounts for 3.7% of gross national income per capita, while fixed internet stands at 12.8%—both exceeding the affordability benchmark of 2%. A report also highlights that many Ghanaians spend more on data than food, underscoring the urgency of cost reductions.

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Broadband Investment Driving Economic Growth and Prosperity

In today's digital age, broadband connectivity has emerged as a powerful engine of economic growth, sparking innovation, boosting productivity and expanding access to global markets. Governments and private sector players increasingly recognize the vital role of broadband investment in encouraging socio-economic development, particularly in regions where digital inclusion remains a pressing challenge. As digital transformation accelerates, the demand for high-speed, reliable internet infrastructure continues to grow, making broadband expansion a top priority for policymakers and industry leaders alike.

The impact of broadband investment extends beyond economic gains; it also plays a crucial role in social development by connecting underserved communities to essential services, improving educational opportunities, and promoting greater participation in the digital economy. By bridging the digital divide, broadband connectivity empowers individuals, businesses, and institutions to leverage technology for progress, driving long-term prosperity and sustainable development on a global scale.

As emerging technologies such as artificial intelligence, cloud computing, and the Internet of Things (IoT) reshape industries, broadband infrastructure serves as the backbone for digital transformation. Countries that prioritize broadband expansion position themselves at the forefront of the global digital economy, attracting investment, driving innovation, and enhancing overall competitiveness in an increasingly interconnected world.

The Economic Benefits of Broadband Expansion

Investing in broadband infrastructure delivers substantial economic benefits. High-speed connectivity streamlines business operations, facilitates real-time data exchange, and supports seamless digital transactions. Small and medium-sized enterprises (SMEs)—the backbone of many economies—leverage broadband access to scale their businesses, participate in e-commerce, and compete effectively in global markets.

Broadband investment also attracts foreign direct investment (FDI), as international businesses seek digitally advanced markets with strong connectivity frameworks. A strong broadband network also improves productivity across various sectors, including agriculture, healthcare, education, and manufacturing. Studies indicate that a 10% increase in broadband penetration can result in a GDP boost of approximately 1.38% in developing countries, improving its critical role in economic advancement.

Driving Job Creation and Digital Entrepreneurship

Broadband deployment generates employment opportunities across various segments, from network installation and maintenance to service provision and tech support. Furthermore, the digital economy thrives on broadband connectivity, enabling online job platforms, remote work, and digital entrepreneurship.

The gig economy, fueled by high-speed internet, has created millions of job opportunities worldwide, ranging from software development to creative industries like content creation and graphic design. Broadband also facilitates digital skills training programs, equipping workers with essential competencies for the evolving job market and ensuring a future-ready workforce.

Advancing Financial Inclusion and E-Governance

Broadband connectivity plays a transformative role in advancing financial inclusion, particularly in underserved regions where traditional banking infrastructure is limited. Mobile money services, fintech innovations, and digital payment solutions rely on stable broadband networks to bring financial services to unbanked populations, promoting economic participation and independence.

Governments are also using broadband infrastructure to enhance public service delivery through e-governance initiatives. Digital platforms for tax filing, e-health services, and online education improve efficiency, reduce bureaucratic inefficiencies, and promote greater citizen engagement. Digitizing these services promotes transparency, reduces corruption, and enhances public trust in governance systems.

Bridging the Urban-Rural Digital Divide

One of broadband's most transformative potentials lies in its ability to bridge the digital divide between urban and rural areas. In many developing regions, rural communities lack access to essential services due to limited connectivity.

Expanding broadband coverage allows rural populations to benefit from telemedicine, remote learning, and e-commerce opportunities, significantly improving their quality of life and economic prospects.

To achieve this, governments and telecom operators are implementing innovative solutions such as satellite broadband, fiber-optic networks, and mobile connectivity to extend internet access to underserved areas. Public-private partnerships (PPPs) are instrumental in financing and executing these initiatives, helping to make digital inclusion a reality for all.

Broadband investment, while immensely beneficial, faces several challenges, including high deployment costs, regulatory barriers, and cybersecurity risks. Expanding infrastructure in remote regions requires substantial financial resources, and the slow return on investment (ROI) often discourages private sector participation. However, well-structured policy frameworks, incentives for telecom operators, and government-backed funding programs can help mitigate these obstacles.

Cybersecurity also remains a significant concern. As broadband penetration increases, so does the risk of cyber threats. Strengthening cybersecurity measures, encouraging digital literacy, and establishing strong regulatory frameworks are crucial for protecting users and maintaining trust in digital systems.

Broadband investment is a fundamental pillar of modern economic growth and prosperity. By enhancing productivity, generating employment, promoting financial inclusion, and bridging digital divides, broadband connectivity drives sustainable development. To fully harness its potential, governments, businesses, and international organizations must continue prioritizing broadband expansion, making sure that its benefits reach every community. A more connected world is a more prosperous one, and investing in broadband infrastructure is a strategic step toward a thriving global digital economy. **TR**

Will Satellites Replace Cell Towers in Mobile Networks?

The mobile communications landscape is undergoing a profound transformation, driven by rapid advancements in satellite technology. Traditionally, terrestrial cell towers have been the backbone of mobile networks, providing coverage in urban, suburban, and even some rural areas. However, with the rise of satellite-based connectivity, a pressing question emerges: Will satellites replace cell towers in mobile networks?

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The Promise of Satellite Connectivity

Satellite networks, particularly those using low Earth orbit (LEO) constellations, offer significant advantages for extending mobile coverage. Companies like SpaceX's Starlink, Amazon's Project Kuiper, and OneWeb are deploying thousands of LEO satellites to deliver high-speed internet and mobile connectivity globally. In contrast to geostationary satellites, which operate at altitudes of around 36,000 km, LEO satellites function at much lower altitudes (500−2,000 km), reducing latency and improving connection speeds.

The primary benefit of satellite connectivity lies in its ability to bridge the digital divide. Traditional cell towers are expensive to build and maintain, especially in remote and underserved regions. Satellites, on the other hand, can provide near-global coverage, ensuring that even the most isolated communities have access to reliable mobile services. This capability is particularly critical for developing regions, maritime industries, and emergency response scenarios.

Challenges Facing Satellite-Based Mobile Networks

Despite their promised abilities, satellites face several challenges that prevent them from becoming a complete replacement for cell towers. A major limitation is bandwidth capacity. While LEO satellites can provide widespread coverage, their capacity is still limited compared to fiber-optic or terrestrial wireless networks. Densely populated urban areas, where millions of users require high-speed data simultaneously, may strain satellite networks beyond their capabilities.

Another key challenge is cost. While satellite technology has become more affordable in recent years, launching and maintaining a constellation of satellites remains an expensive endeavor. In contrast, terrestrial networks, despite their infrastructure costs, still offer a more cost-effective solution in many scenarios.

Power consumption is also a concern. Satellite communication devices require more energy to transmit signals to space, compared to conventional mobile phones that connect to nearby cell towers. This could pose challenges in developing energy-efficient mobile devices suitable for widespread satellite connectivity.

Hybrid Models: A More Likely Future

Rather than completely replacing cell towers, the future of mobile networks will likely be a hybrid model, combining terrestrial and satellite connectivity. Leading telecom providers are already exploring partnerships with satellite operators to enhance coverage in remote regions without overhauling their existing infrastructure.

For instance, T-Mobile has partnered with SpaceX to bring satellite-based messaging services to customers using standard mobile phones. Similarly, Apple's iPhone 14 introduced an emergency SOS feature powered by Globalstar's satellites, allowing users to send distress signals from locations without cellular coverage.

Regulators and industry stakeholders are also advocating for better integration between satellites and traditional mobile networks. The 3rd Generation Partnership Project (3GPP) has been developing standards for Non-Terrestrial Networks (NTN), enabling satellite and terrestrial networks to coexist seamlessly within the same mobile ecosystem.

The Role of 5G and Beyond

The rollout of 5G and future 6G networks could further influence the balance between satellite and terrestrial mobile services. 5G promises ultra-low latency and high-speed connectivity, which terrestrial networks are well-equipped to deliver in dense urban environments. Meanwhile, satellites can complement 5G by providing backhaul support and ensuring uninterrupted coverage in areas beyond the reach of traditional towers.

Looking ahead, 6G is expected to integrate more deeply with satellite technology, creating a truly interconnected global network. Research into technologies like reconfigurable intelligent surfaces and AI-driven network optimization could further improve the efficiency of hybrid satellite-terrestrial mobile systems.

Collaboration, Not Replacement

While satellites offer a compelling solution for expanding mobile coverage, they are unlikely to replace cell towers entirely. Instead, the future of mobile networks will be defined by a symbiotic relationship between terrestrial and satellite technologies. This hybrid approach will ensure reliable connectivity for both densely populated urban centers and remote locations, paving the way for a truly global mobile network.

As technology evolves, telecom operators, satellite providers, and regulatory bodies will need to collaborate to create seamless, cost-effective, and energy-efficient mobile ecosystems. The key to success lies not in competition between satellites and cell towers but in their integration to create a more connected world. **TR**

Telecom Egypt & Orange Egypt Partner for Transmission and Infrastructure Services
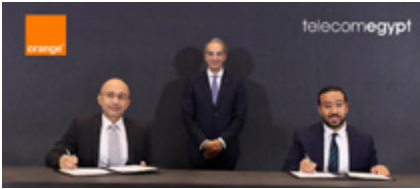
Telecom Egypt has announced the signing of several landmark service agreements with Orange Egypt at enhance strategic cooperation between the two companies. These agreements will enable Orange Egypt to improve its technological services and better meet the needs of its customers. This collaboration highlights the rise in technological investments in the Egyptian market, prioritizing strong digital infrastructure, and expanding advanced service offerings.

The agreements were signed by Mohamed Nasr, Managing Director and CEO of Telecom Egypt, and Yasser Shaker, Managing Director and CEO of Orange Egypt, in the presence of H.E. Dr. Amr Talaat, Minister of Communications and Information Technology, and Mohamed Shamroukh, CEO of the National Telecom Regulatory Authority (NTRA).

These agreements have a total combined value of approximately EGP 15 billion, which will be disbursed over their duration. They also include an extension of transmission services for an additional three years, lasting until 2032. Additionally, they include a new contract to provide fiber-to-the-site (FTTS) services to Orange's mobile sites over a three-year period.

The two companies also signed a Service Level Agreement (SLA) aimed at strengthening Orange's position as a leading provider of high-speed mobile internet and telecommunications services. These agreements will further support Orange Egypt's preparations for the rollout of its 5G services. Additionally, the agreements include amendments to the existing fixed internet services agreement, which focuses on improving the cost-efficiency of services in the telecommunications market. This will enable Orange Egypt to offer customers better deals and pricing through more efficient commercial models, allowing the delivery of higher-tier packages to end-users at more competitive rates.

The longstanding partnership between the two companies has created a strong foundation for exceptional business relations within the Egyptian market, driving its growth and delivering optimal benefits for all parties involved.

Ethio Telecom Launches Cloud-Based Enterprise Solutions to Drive Digital Transformation

Ethio Telecom is continuing to drive Ethiopia's digital transformation with the launch of seven cutting-edge, cloud-based enterprise solutions. These services empower businesses and institutions by enhancing operational efficiency, fostering financial inclusion, and modernizing key industries.

The newly introduced solutions aim to enhance various sectors through livestock tracking, enterprise communication, core banking for microfinance, digital education management, collaborative office tools, advanced contact centers, and cloud-based enterprise resource planning (ERP) for business transformation. Powered by Ethio Telecom's telecloud, these scalable, secure, and cost-effective solutions eliminate the need for costly infrastructure, allowing businesses to focus on growth and innovation.

Digital Livestock Tracking Solution: Revolutionizing Livestock Management
Ethiopia has the largest livestock population in Africa, yet the sector faces significant challenges, including limited tracking, financial barriers, and inefficiencies. Ethio Telecom's Digital Livestock Tracking solution addresses these issues through Internet of Things (IoT)-powered radio-frequency identification (RFID) and GPS tracking, enabling the real-time monitoring of livestock's location and health.

The solution include aims to enhance financial inclusion by enabling banks and insurers to verify livestock as collateral, thereby expanding access to credit. The solution's real-time visibility capability improves herd management by reducing theft, loss, and inefficiencies. Additionally, insurance integration streamlines claim processing and minimizes fraud, ensuring a more reliable system for farmers and insurers. Lastly, telebirr compatibility facilitates seamless digital transactions, enhancing convenience and financial accessibility in the agricultural sector.

Push-to-Talk/Video (PTT/V) Solution: Redefining Enterprise Communication
Traditional two-way radios are costly, have limited range, and lack multimedia support. Ethio Telecom's PTT/V solution modernizes enterprise communication with a cloud-based, smartphone-compatible alternative, ensuring secure, real-time team coordination.

The solution offers instant voice and video communication, enabling seamless collaboration among teams. It also features geofencing and live tracking, which enhance field team management by providing real-time location insights. Additionally, its scalability and security are ensured through telecloud hosting bolstered with encrypted communication, guaranteeing reliable and protected operations.

Ooredoo, Orange & Tunisie Télécom Launch 5G in Tunisia

Tunisia's leading telecom operators—Tunisie Télécom, Ooredoo Tunisie, and Orange Tunisie—have officially launched 5G, delivering ultra-fast connectivity to fuel business growth, gaming, education, and digital innovation.

This milestone follows the operators' acquisition of 5G licenses in December, granting them the authority to deploy next-generation mobile networks nationwide.

With expansive coverage and cutting-edge technology, the 5G rollout is set to revolutionize connectivity, empowering businesses, entrepreneurs, content creators, gamers, and students with faster, more reliable digital experiences.

Telkom Reports Strong Q3 Performance Driven by Data-Led Growth

Telkom announced strong financial and operational results for the third quarter ended 31 December 2024 ("Q3 FY2025"), demonstrating continued momentum across the Group through its data-led strategy.

The results highlight a solid data revenue performance, significant EBITDA expansion, and impressive gains in subscriber and network growth, reinforcing Telkom's position as the backbone of South Africa's digital future.

Telkom's group revenue rose 0.9% year-on-year to R10,995 million, driven by strong demand for data-led services. Mobile service revenue grew 9.6% to R5,401 million, outperforming the broader South African market, while fixed data and IT service revenues increased by 4.7% and 3.2%, respectively. Year-to-date revenue reached R32,377 million, up 1.6%. Group EBITDA surged 28.0% to R2,986 million, with margins expanding by 5.8 percentage points to 27.2%, while adjusted year-to-date EBITDA stood at R8,592 million (26.5% margin).

Mobile subscribers hit a record 24 million, up 21.6%, including a 17.3% rise in mobile data users, who now account for 62.3% of the total base. Fiber connectivity expanded rapidly, with homes passed increasing by 13.1% to 1.3 million and connected homes rising 17.6%. Mobile and fixed data traffic grew by 22.2% and 23.7%, respectively, reflecting Telkom's data-led strategy. Strong operational performance, coupled with R417 million in property disposal proceeds, helped maintain balance sheet resilience, with interest-bearing debt reduced by 2.7% since September 2024.

"These results provide further proof that the execution of Telkom's strategy is on track, delivering profitable growth. We are excited by the growing momentum across our business units, and we remain confident in our ability to meet our medium-term growth objectives as we continue to invest in our infrastructure, network and digital services," said Serame Taukobong, CEO of Telkom.

Telkom Consumer's performance was bolstered by innovative value-added offerings and strong mobile data performance. The pre-paid segment impressively grew by 25.0% to 21.0 million subscribers, while the post-paid base remained stable with improved ARPU performance.

EBITDA for the unit surged by 51.4% to R1,488 million, with a notable 6.5 percentage point increase in EBITDA margin.

Openserve maintained a steady performance with revenue of R3,107 million, reflecting ongoing fiber service expansion and efficiency gains. Homes passed increased by 154,942 (13.1%) and connected homes by 100,115 (17.6%), with data consumption growing by 23.7%.

Efficiency initiatives, including network modernization and renewable energy programs, contributed to a 5.4% increase in EBITDA to R1,069 million and an improved margin of 34.4%.
BCX achieved a higher margin for IT services with revenue growing by 6.8% to R1,208 million. EBITDA expanded 36.0% to R438 million, with margins improving by 5.0 percentage points to 15.0%, reflecting the successful transition to scalable, higher-margin service offerings. While showing steady performance, BCX revenue declined by 9.7% to R2,913 million due to a strategic shift away from lower-margin hardware/software revenue.

The Swiftnet disposal remains on track, with regulatory approvals in place and the transaction expected to close by the end of the 2025 financial year.

Telkom is well positioned to continue its transformation into a leading digital enabler. With a strong operational foundation, ongoing network investments, and a clear focus on data connectivity, the Group expects continued momentum in the remaining quarter of FY2025 and beyond.

The strategic disposal of Swiftnet, combined with ongoing cost optimization and smart capital expenditure, further solidifies Telkom's powerful financial position and long-term growth prospects.

TELECOM Review AFRICA

6G Revolutionizing Connectivity for a Sustainable Future

As the world becomes increasingly digital, the emergence of 6G technology is set to revolutionize global connectivity. While 5G continues its rollout, research and development of 6G networks are already in progress, with a vision not only to enhance communication speeds but also to create a sustainable, efficient, and inclusive digital ecosystem. Beyond delivering ultra-fast internet and mobile experiences, 6G promises to redefine industries, societies, and global solutions to challenges like climate change.

TELECOM Review AFRICA

The Vision Behind 6G

6G is an evolution of the connectivity landscape, taking the capabilities of 5G to new heights. While 5G offers ultra-low latency and high-speed internet, 6G is expected to provide speeds up to 100 times faster than 5G, reaching up to 1 terabit per second. This leap in speed will facilitate advancements like real-time holographic communications, immersive augmented and virtual reality, and seamless global collaboration.

However, speed is just one aspect of 6G. The true transformative power of 6G lies in its ability to offer reliable, low-latency communication that is accessible to all. This will enable innovations such as fully automated smart cities, hyper-precise remote medical surgeries, and global collaboration on an unprecedented scale, making the digital world more integrated than ever before.

Sustainability at the Core

One of the most revolutionary features of 6G is its commitment to sustainability. As digital networks expand, the environmental impact of telecom infrastructure becomes a growing concern. Traditional mobile networks consume large amounts of energy, contributing to carbon emissions. In contrast, 6G networks are designed with energy efficiency as a central priority.

6G networks will prioritize using renewable energy sources—such as solar and wind—to power infrastructure. Advanced AI and machine learning tools will optimize energy consumption in real-time, reducing power use during periods of low demand. AI systems will adjust network operations based on traffic patterns and energy availability, reducing unnecessary energy consumption while maintaining reliable service.

Sustainability in 6G extends beyond energy consumption. 6G will use eco-friendly materials in the manufacturing of its infrastructure, ensuring that the entire lifecycle of the technology is environmentally responsible, from production to disposal. Additionally, with the integration of Internet of Things (IoT) devices, 6G will help monitor and manage energy usage more effectively across industries, from agriculture to supply chains, leading to significant reductions in waste and energy consumption.

Connectivity for All: Bridging the Digital Divide

A critical promise of 6G is to bridge the digital divide, ensuring connectivity reaches even the most remote and underserved areas. While urban regions are increasingly connected via 5G, rural and remote areas often struggle with poor or no broadband access. This lack of connectivity limits access to essential services like education, healthcare, and economic opportunities.

6G can address these disparities by providing global connectivity through the integration of satellite communication systems, including Low-Earth Orbit (LEO) satellites and unmanned aerial vehicles (UAVs). These technologies will provide high-speed internet access to areas where traditional infrastructure is difficult or costly to deploy.

By connecting rural and underserved regions, 6G will empower individuals in these areas with access to essential services. Farmers will be able to access real-time weather data, improving crop yields and supporting food security, while healthcare and telemedicine services will allow patients in remote regions to consult specialists without traveling long distances.

In addition to improving lives in underserved areas, 6G will create new economic opportunities by giving individuals and businesses in developing nations access to the global digital economy. This can help reduce inequalities and promote more inclusive growth.

A Connected Future: 6G's Impact on Society

The societal impact of 6G will be profound. Its unparalleled speed, capacity, and connectivity will support the creation of smart cities, where everything from traffic management to waste disposal operates autonomously and efficiently. AI-powered systems will process data from IoT devices to optimize urban infrastructure, reduce energy consumption, and improve the overall quality of life for residents.

In healthcare, 6G's ultra-fast and reliable connectivity will facilitate real-time remote surgeries, telemedicine, and AI-assisted diagnostics. This will improve access to healthcare, particularly in underserved regions, and elevate the quality of care worldwide. In education, 6G will support immersive learning environments, where students can participate in virtual classrooms and collaborate with peers and educators from around the world.

However, the deployment of 6G must be done carefully to avoid reinforcing social inequalities. Policymakers, technology providers, and stakeholders must ensure that the benefits of 6G are shared equitably across societies. Digital inclusion should be a priority to avoid leaving vulnerable populations behind.

The Future is 6G

6G is set to usher in a new era of connectivity that is faster, smarter, and more sustainable. With its focus on energy efficiency, global inclusivity, and innovative technologies, 6G will reshape industries and drive societal progress. From transforming urban living and healthcare to creating a more sustainable and inclusive digital ecosystem, 6G holds the potential to address some of the world's most pressing challenges.

As the world prepares for the 6G era, its promise to revolutionize connectivity and sustainability provide a glimpse into a future where technology empowers individuals, communities, and nations to thrive. The journey toward 6G is one of innovation, collaboration, and opportunity, and the possibilities are boundless for those ready to embrace the change. **TR**

Achieving Transparency in Telecom AI

The telecommunications industry is undergoing a profound transformation driven by artificial intelligence (AI). From optimizing network performance to enhancing customer service, AI is playing a crucial role in modern telecom operations. However, as AI systems become more embedded in telecom infrastructure, ensuring transparency in their deployment and decision-making processes is critical to building trust, regulatory compliance, and long-term sustainability.

TELECOM Review AFRICA

The Importance of Transparency in AI Transparency in AI refers to the ability of stakeholders—telecom operators, regulators, and consumers alike—to understand how AI-driven systems function, make decisions, and impact services. In telecom, AI is used for network optimization, predictive maintenance, fraud detection, customer experience management, and personalized service recommendations. Without transparency, concerns over bias, accountability, and ethical AI deployment can weaken consumer trust and lead to regulatory scrutiny.

Challenges to Achieving AI Transparency

Despite its importance, achieving transparency in AI remains a significant challenge for telecom operators. The key obstacles include:

1.Complexity of AI Models – Many AI algorithms, particularly deep learning models, operate as 'black boxes,' making it difficult to interpret how they arrive at specific decisions. This lack of explainability raises concerns about accountability and fairness.

2.Data Privacy Concerns – Telecom AI relies on vast amounts of user data to function effectively. Ensuring transparency while protecting customer privacy and complying with data protection regulations such as GDPR remains a delicate balance.

3.Algorithmic Bias – AI models can unintentionally introduce or reinforce biases, particularly when trained on unrepresentative or skewed datasets. Without transparency, detecting and mitigating these biases becomes challenging.

4.Regulatory Compliance – As governments and regulatory bodies increasingly scrutinize AI applications in telecom, operators must navigate a complex regulatory landscape while ensuring compliance with transparency and ethical AI guidelines.

5.Stakeholder Communication – Telecom companies must clearly communicate AI-driven decisions to customers, regulators, and other stakeholders. A lack of clear communication can lead to skepticism and resistance toward AI adoption.

Strategies for Enhancing AI Transparency in Telecom

To address these challenges, telecom operators can adopt several strategies to improve AI transparency and encourage trust:

1.Explainable AI (XAI) Models– Implementing explainable AI techniques can enhance the interpretability of AI systems. Techniques such as decision trees, SHAP (Shapley Additive Explanations), and LIME (Local Interpretable Model-Agnostic Explanations) help make AI decisions more understandable to non-technical stakeholders.

2.Ethical AI Frameworks – Developing and adhering to ethical AI guidelines ensures that AI systems operate fairly and responsibly. This includes bias detection, fairness audits, and ethical decision-making processes.

3.Regulatory Collaboration – Engaging proactively with regulators and policymakers can help shape fair and effective AI governance. Telecom companies should participate in industry discussions and work with regulators to establish AI transparency standards.

4.Consumer Awareness and Education – Telecom operators should educate customers on how AI is used in their services and what measures are in place to protect their rights. Providing clear and accessible information about AI-driven decision-making can increase consumer trust.

5.Strict Data Governance Policies– Ensuring strict data governance, including transparent data collection, usage policies, and compliance with privacy laws, can enhance AI

transparency. Adopting privacy-preserving techniques such as federated learning can further mitigate risks.

6.Third-Party Audits and AI Oversight Committees – Conducting independent AI audits and establishing oversight committees can ensure accountability and identify potential risks in AI implementations.

Case Study: AI Transparency in Network Optimization

Network optimization is one domain where AI transparency is especially crucial. Telecom operators leverage AI to predict traffic patterns, allocate network resources, and enhance service quality. However, if AI-driven optimizations result in service disparities between different user groups or geographical areas, concerns over fairness and bias can arise.

For example, an AI model trained primarily on urban network data may not perform as effectively in rural settings, leading to suboptimal service for certain demographics. To maintain transparency, telecom operators must regularly audit AI performance across diverse user segments and provide explanations for network management decisions.

The Future of AI Transparency in Telecom

As AI continues to shape the future of telecom, transparency will be a cornerstone of responsible AI adoption. Industry leaders must prioritize ethical AI deployment, proactive regulation, and stakeholder engagement to ensure AI systems operate in a fair, accountable, and understandable manner.

By prioritizing transparency, telecom operators not only comply with regulations but also build strong customer trust, drive innovation, and create a more equitable digital ecosystem. Achieving transparency in AI is not just a regulatory requirement—it is a strategic imperative for the telecom industry's sustainable growth. **TR**

ATU Presents Groundbreaking Report on Africa's 5G Preparedness

The African Telecommunications Union (ATU) has released a crucial new report that evaluates the readiness of African countries to roll out and utilize 5G networks across the continent. The report, titled "Report on 5G Preparedness and Relevant Use Cases in Africa," marks another key step in ATU's commitment to supporting digital transformation in Africa.

We are in the midst of the 4th industrial revolution, defined by digital innovation. For context, the 1st, 2nd and 3rd industrial revolutions were driven by steam engine, oil, and electronics, respectively. According to the ITU, "to maximize its impact on society and the economy, digital connectivity must be both universal and meaningful," with the

latter referring to a form of connectivity that is empowering enough for users to fully participate in the digital economy, along with the social well-being of society at an affordable cost.

The 2024 edition of Facts and Figures, i.e. ITU's annual overview of the state of global digital connectivity, estimates Africa's internet use at 38% of the population against a global average of 68%. To bridge the gaps in both universal and more so meaningful connectivity, Africa, led by the African Union and supported by various institution notably the ATU, is implementing the Digital Transformation Strategy (DTS) for Africa (2020 – 2030).

As the specialized institution of the AU in the field of digital development, ATU is actively undertaking various initiatives that support the full and innovative implementation of this strategy. Besides supporting the DTS, it is the statutory objective

of the ATU to "promote programs for the development of the African Information Society," by promoting "the development and adoption of appropriate African telecommunications policy and regulatory frameworks." The most recent initiative from ATU's Task Group on Emerging Technologies is this newly released 5G preparedness report.

The report focusses on assessing the readiness of African countries to deploy, operate and use 5G networks. The research further explores challenges impacting the deployment of 5G in Africa and the status of deployment in countries that have already embarked on the process. Even more significantly, prominent locally relevant use cases for 5G are well elaborated. In the concluding sections, the report provides recommendations to support decision-making for the deployment of 5G networks and use cases in Africa with the ultimate objective of promoting its maximized benefit.

West African Nations Sign Roaming Agreement to Cut Telecom Costs
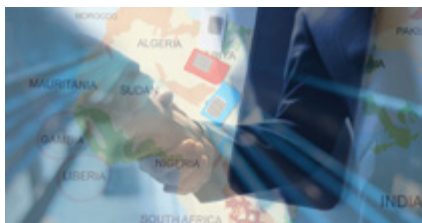
Liberia, The Gambia, and Sierra Leone have signed a groundbreaking Memorandum of Understanding (MoU) aimed at reducing telecommunications costs and enhancing roaming services across the three countries.

Set to be implemented in phases, the agreement will take effect on May 2,

2025, enabling Liberian travelers in Sierra Leone to receive calls free of charge while making calls, sending SMSs, and using mobile data at local rates—without needing a new SIM card. By July 1, 2025, similar benefits will extend to travelers between Liberia and The Gambia, eliminating additional international roaming charges.

This initiative, spearheaded by the Liberia Telecommunication Authority (LTA) in partnership with Sierra Leone's National Communications Authority and The Gambia's Public Utilities Regulatory Authority, aims to foster economic growth and seamless communication for the region's 16 million residents.

While full regional roaming integration is still a work in progress, LTA Chairman Abdullah Kamara emphasized that these agreements mark a significant step toward implementing ECOWAS regulations on roaming, ultimately working to eliminate high roaming fees across West Africa.

The move follows similar agreements in Africa, including Ghana's free roaming deal with Benin and Togo in 2023, as well as a Senegal-Mauritania agreement, highlighting the continent's growing momentum toward affordable cross-border communication.

Algeria Bets on Artificial Intelligence to Boost Its Economy

Algeria is turning to artificial intelligence (AI) to drive economic growth. The Minister of Post and Telecommunications, Sid Ali Zerrouki, announced his sector's ambition to achieve a 7% GDP contribution through AI by 2027. To support this goal, Algérie Télécom plans to launch an investment fund dedicated to startups specializing in AI, cybersecurity, and robotics.

This announcement was made during the opening of the 3rd edition of the CTO Forum Algeria, attended by the Minister of Knowledge Economy, Startups, and Micro-Enterprises, Noureddine Ouadah, and the High Commissioner for Digitalization, Meriem Benmouloud. On this occasion, Zerrouki emphasized the urgency for Algeria to accelerate innovation to remain aligned with the global digital transitions.

The country has already laid a strong foundation in this field, notably through the establishment of three major universities specializing in AI, robotics, and mathematics—an initiative stemming from the strategic vision of the President of the Republic. Additionally, the National Commission for Artificial Intelligence recently unveiled a dedicated national AI strategy, supported by a growing network of business incubators across the country.

As part of this commitment, new training facilities called "Scale Centers" will be inaugurated next week. Their goal is to democratize AI, cybersecurity, and cloud computing by offering free and continuous training to young people who have not pursued university studies in these fields.

Through these ambitious initiatives, Algeria aims not only to strengthen its position in the digital economy but also to create new opportunities for young talents and innovative entrepreneurs.

Eutelsat Hits Partner2Connect Milestone with 1M Connected in Africa

Eutelsat is proud to announce that it has achieved its Partner2Connect Digital Coalition pledge, backed by the International Telecommunication Union (ITU), two years ahead of schedule. This milestone marks the connection of 1 million underserved people in Sub-Saharan Africa to reliable, high-speed internet via satellite, reinforcing Eutelsat's commitment to bridging the digital divide—a key pillar of its Corporate Social Responsibility (CSR) strategy—and advancing progress toward the United Nations' 2030 Agenda for Sustainable Development.

Eutelsat's Konnect hotspot Wi-Fi services, powered by the EUTELSAT KONNECT satellite, have been instrumental in delivering affordable, high-speed internet to rural areas in Sub-Saharan Africa, where terrestrial networks remain inaccessible. With speeds ranging from 5 Mbps to 100 Mbps at competitive rates, these hotspots have empowered individuals, schools, businesses, and healthcare centers to access essential digital resources, unlocking opportunities for education, e-commerce, and critical services.

Eva Berneke, Chief Executive Officer of Eutelsat Group, commented: "Reaching this milestone means that 1 million people now have access to vital information, education, and communication resources through our Konnect solution. This achievement highlights our commitment to digital inclusion and underscores how we use cutting-edge satellite network solutions to meet the challenging demands for low-cost, high-availability, and trusted services in Africa. With both Eutelsat's GEO satellite fleet and OneWeb's LEO constellation, we are expanding our reach and ensuring that connectivity drives meaningful economic and social progress, empowering communities to thrive in the digital era."

Doreen Bogdan-Martin, Secretary-General of the ITU stated: "Eutelsat's achievements in satellite connectivity have been instrumental in providing reliable and affordable high-speed broadband to individuals, businesses, schools and healthcare centers in underserved regions. This work reflects Eutelsat's commitment to bridging the digital divide while contributing to ITU's goal of delivering meaningful connectivity to everyone, everywhere."

TELECOM Review AFRICA

Quantum Technology Transforming Telecom in Africa

Africa's telecom industry is on the verge of a technological revolution, with quantum technology emerging as a game-changer in network security, data processing, and communication efficiency. As the continent experiences rapid digital transformation, integrating quantum advancements can significantly enhance connectivity, cybersecurity, and overall network reliability. While quantum computing and quantum communications are still in their early stages globally, Africa's telecom sector is already exploring ways to harness these innovations to overcome persistent challenges and unlock new opportunities.

The Role of Quantum Technology in Telecom

Quantum technology is set to revolutionize telecommunications by using the principles of quantum mechanics to create faster, more secure, and highly efficient networks. Key applications include:

1. Quantum Cryptography and Security: One of the most primary benefits of quantum technology in telecom is Quantum Key Distribution (QKD). This method uses quantum mechanics to generate and exchange encryption keys that are virtually unbreakable. As Africa's telecom sector faces increasing cybersecurity threats, QKD could help protect sensitive communications, financial transactions, and critical infrastructure from cyberattacks.

2. Quantum Computing for Network Optimization: Quantum computers, once fully developed, will have the potential to solve complex network optimization problems in seconds, a task that classical computers would take years to complete. This could improve data traffic management, improve bandwidth allocation, and streamline telecom operations.

3. Quantum Communication Networks: Unlike traditional fiber-optic networks, quantum networks could facilitate ultra-secure and ultra-fast data transmission over long distances, reducing latency issues that often challenge African telecom infrastructure.

Challenges in African Telecom That Quantum Can Address

Africa's telecom industry faces several challenges that quantum technology can help resolve:

- **Cybersecurity Vulnerabilities:** As the number of mobile users and reliance on digital financial services continue to grow, telecom operators become easier targets for hackers.

Quantum encryption can provide a strong security framework to counteract these threats.

- **Limited Bandwidth and Network Congestion:** Many African nations struggle with inadequate broadband infrastructure, leading to slow internet speeds and connectivity issues. Quantum computing could help optimize network resource allocation, ensuring better service delivery.

- **Infrastructure Constraints:** Some rural and remote areas lack reliable telecom infrastructure. Quantum-based satellite communications could offer an alternative to traditional network towers, bridging connectivity gaps.

African Telecom Operators and Quantum Integration

Leading African telecom operators are beginning to explore the potential of quantum technology to strengthen security and increase network efficiency. For instance, MTN Group has been investing in advanced cybersecurity measures and may integrate quantum key distribution (QKD) to safeguard its extensive subscriber base. Similarly, Vodacom, which is focused on next-generation networking solutions, could adopt quantum-safe encryption to protect sensitive communications. As the continent's telecom landscape evolves, quantum integration could play a crucial role in securing financial transactions, fortifying digital infrastructure, and securing resilient connectivity.

Global and African Collaboration in Quantum Research

Africa is not alone in its pursuit of quantum-powered telecom advancements. Countries such as China, the U.S., and members of the European Union have invested heavily in quantum research, presenting African nations with partnership opportunities.

- **International Collaborations:** African telecom companies can

collaborate with global tech giants like IBM, and Google, which are already developing quantum technologies.

- **Government Initiatives:** Some African governments are beginning to recognize the importance of quantum technology and may invest in research and pilot projects.

- **Academic and Research Contributions**: Universities in South Africa, Egypt, and Kenya are beginning to introduce quantum physics and computing research, which could play a role in future telecom innovations.

Potential Roadblocks to Quantum Adoption in African Telecom

Despite its potential, quantum technology still faces significant challenges in Africa:

- **High Costs:** Developing and implementing quantum solutions requires substantial investment, which may pose a challenge for many African telecom companies.

- **Limited Expertise:** The continent has a shortage of professionals specializing in quantum computing and communications, highlighting the need for more educational initiatives.

- **Infrastructure Readiness:** Existing telecom infrastructure may not be fully compatible with quantum technology, requiring phased upgrades.

Case Studies: Quantum Technology in Action

To better understand the impact of quantum technology on telecom, it is worth examining real-world applications:

1. China's Quantum Satellite Communications: China has successfully tested QKD through its Micius satellite, setting the stage for global quantum-secure communication. African telecom
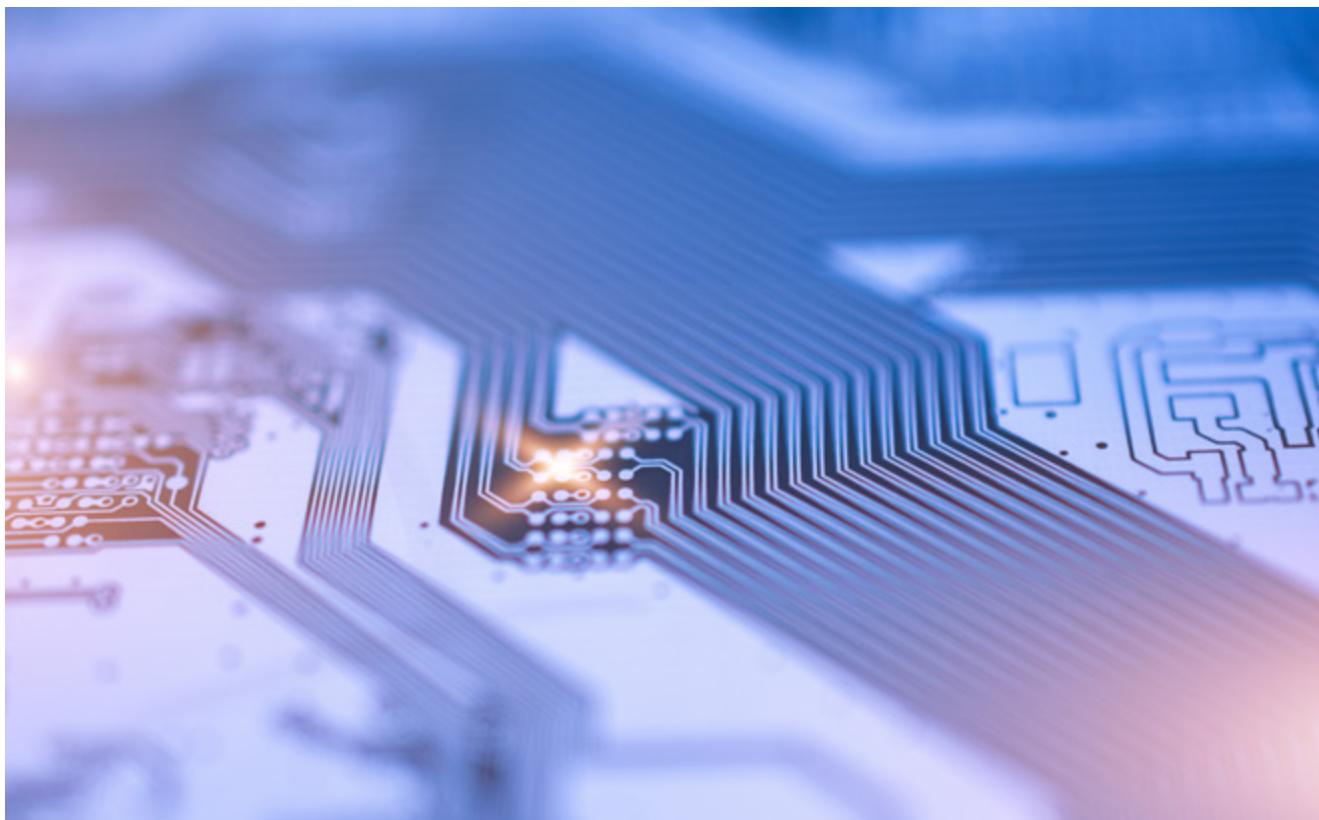
operators could partner with international researchers to deploy similar solutions.

2. European Quantum Internet Initiatives: The European Union is developing a quantum-secure communication network, demonstrating how governments can effectively drive quantum adoption. African policymakers can study these efforts to guide their own quantum strategies.

3. Quantum-Secure Data Centers: Tech companies like IBM and Google are investing in quantum-resistant security for data centers. African cloud service providers could integrate similar measures to ensure data integrity.

The Future of Quantum Technology in Africa's Telecom Industry

While quantum technology is still in its infancy, Africa's telecom sector can prepare for its inevitable integration by:

1. Investing in Research and Development: Governments and private companies should allocate resources to quantum research to stay ahead of technological advancements.

2. Building Strategic Partnerships: Collaborating with international quantum research institutions and tech firms can accelerate Africa's adoption of these innovations.

3. Developing Quantum Talent: Encouraging academic programs and training initiatives in quantum computing and cryptography will be essential for building a skilled workforce.

4. Implementing Pilot Projects: Testing quantum cryptography and communication solutions in controlled environments can help telecom operators understand their feasibility before full-scale adoption.

5. Government Policy and Regulation: African governments should work on establishing clear policies for quantum communications, ensuring that the regulatory framework supports innovation while maintaining strong cybersecurity.

6. Public-Private Partnerships: Combining efforts between telecom providers, governments, and academic institutions can drive quantum adoption more effectively.

A Quantum Leap for African Telecom

The integration of quantum technology into Africa's telecom sector has the potential to reshape the industry by enhancing security, improving efficiency, and overcoming long-standing infrastructure challenges. While there are still obstacles to overcome, the benefits of quantum-driven telecommunications far outweigh the risks. With tappropriate investment, strategic partnerships, and forward-thinking policies, Africa can position itself at the forefront of the global quantum revolution, ensuring a more secure and connected future for its people. By proactively embracing quantum technology, African telecom companies can lead the transition toward a smarter, safer, and more efficient digital ecosystem. **TR**

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Nokia Announces Justin Hotard as New President and CEO

Nokia today announced a leadership transition. Nokia's President and Chief Executive Officer, Pekka Lundmark, has informed the Board that he will step down. The Board has appointed Justin Hotard as the next President and Chief Executive Officer of Nokia. He will start in his new role on 1 April, 2025.

Hotard joins Nokia with more than 25 years' experience with global technology companies, driving innovation, technology leadership and delivering revenue growth. He currently leads the Data Center & AI Group at Intel. Prior to this role, he held several leadership roles at large technology companies, including Hewlett Packard Enterprise and NCR Corporation. He will be based at Nokia's headquarters in Espoo, Finland.

"I am delighted to welcome Justin to Nokia. He has a strong track record of accelerating growth in technology companies along with vast expertise in AI and data center markets, which are critical areas for Nokia's future growth. In his previous positions, and throughout the selection process, he has demonstrated the strategic insight, vision, leadership and value creation mindset required for a CEO of Nokia," said Sari Baldauf, Chair of Nokia's Board of Directors.

"I am honored by the opportunity to lead Nokia, a global leader in connectivity with a unique heritage in technology. Networks are the backbone that power society and businesses, and enable generational technology shifts like the one we are currently experiencing in AI. I am excited to get started and look forward to continuing Nokia's transformation journey to maximize its potential for growth and value creation," added Hotard.

After leading Nokia since 2020, Lundmark has decided to step down from executive roles and move on to the next phase of his career.

"I want to thank Pekka for his significant contributions to Nokia; he will leave with our highest respect. The planning for this leadership transition was initiated when Pekka indicated to the Board that he would like to consider moving on from executive roles when the repositioning of the business was in a more advanced stage, and when the right successor had been identified. Now, both of those conditions have been met, and he has decided to step down," noted Baldauf. "Pekka joined at a difficult time in Nokia's history. Under his tenure, Nokia has re-established its technology leadership in 5G radio networks and built a strong position in cloud-native core networks. Network infrastructure has delivered growth and significant profit improvement, and Nokia has secured the longevity of its patent licensing business. At the same time, Nokia has built strong foundations in new growth areas, refreshed the company's brand and culture, transformed its operating model and rebalanced its portfolio."

Cisco Unveils AI-Driven Innovations in Networking and Security

Cisco has unveiled a suite of new products, reinforcing its role in guiding businesses through AI-driven transformations. Company leaders emphasized innovations in networking, security, and data centers, addressing evolving workplace needs, AI infrastructure, and digital resilience.

The latest product lineup includes the N9300 Smart Switches with Hypershield for AI data centers, the Hybrid Mesh Firewall for enhanced security, and Agile Services Networking to support AI connectivity. Additionally, the UCS C845A M8 server, built on NVIDIA MGX, boosts AI workloads with greater performance and efficiency.

Alongside product enhancements, Cisco also introduced new partnerships and skills initiatives to nearly 18,000 IT professionals.

"Cisco is uniquely positioned to guide customers through the rapid transformations happening across industries," said Oliver Tuszik, President of Cisco EMEA. "From evolving workplaces to the AI-driven shift in data centers and network infrastructure, as well as the growing need for digital resilience, Cisco provides solutions to tackle these challenges."

Jeetu Patel, Cisco EVP and Chief Product Officer, stated "Businesses everywhere are working hard to navigate the opportunities and challenges of the AI era."

"Our mission is to shape the future and empower customers to succeed," Patel added. "The innovations we unveiled in networking, security, and data centers are designed to help businesses adapt. Our customers need trusted partners for this transition, and we are stepping up to meet that need."

Orange Egypt and Huawei Launch SD-WAN Services to Drive Digital Transformation
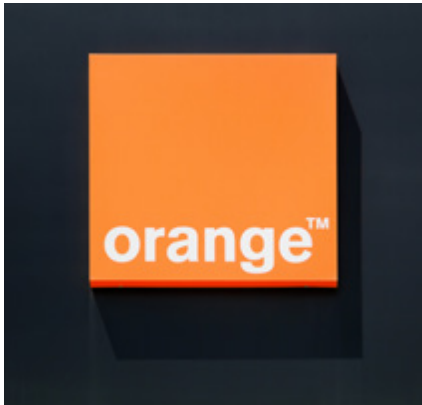
Orange Egypt and Huawei have partnered to introduce Huawei's Software-Defined Wide Area Network (SD-WAN) services via the Huawei Cloud Stack (HCS) platform, marking a first for Egypt. This collaboration enhances network efficiency, security, and performance while supporting remote work and business continuity.

Orange's Chief Business Officer, Hesham Mahran, emphasized the company's commitment to digital transformation, leveraging Huawei's expertise to optimize network and IT resources. Huawei Egypt's Key Account Executive, Mohamed Youssef, highlighted the 20-year partnership and the role of SD-WAN in advancing Egypt's WAN connectivity.

This initiative aligns with Egypt's Vision 2030, which has seen the ICT sector's contribution to GDP rise from 3.2% in 2017/18 to 5.8% in 2023/24.

Cisco Launches Cybersecurity PoP in South Africa

Cisco, in partnership with Amazon Web Services, has opened a cybersecurity point of presence (PoP) in South Africa to provide customers across sub-Saharan Africa with access to Cisco's cloud-delivered cybersecurity services. This PoP, designed to enhance service availability and security, offers high availability and low latency, serving both enterprises and organizations of all sizes.

The new PoP supports Cisco's Secure Service Edge (SSE) solution, built on zero-trust principles, offering seamless, secure access across devices and locations. It includes multiple redundant data centers, ensuring high availability, and is carrier-neutral, making Cisco's cloud-hosted security services accessible to a broad audience.

Key services include Cisco Secure Access, which automates connectivity decisions for SaaS, private applications, and the internet, simplifying IT operations. The Cisco AI Defense solution helps enterprises secure AI applications, providing comprehensive visibility and protection from evolving threats.

Cisco's PoP also enhances security by offering granular controls and simplifying IT operations, with a focus on reducing risks from increasingly sophisticated threats. The company emphasizes the need for modern cybersecurity measures, particularly as AI adoption grows. Cisco AI Defense provides visibility into AI-enabled apps, safeguarding against data leakage and unauthorized access, while continuously validating AI models to address potential vulnerabilities.

In addition to securing AI applications, Cisco also focuses on industrial network and operational technology (OT) cybersecurity, helping industries like manufacturing and healthcare secure their networks. Cisco's AI-driven solutions integrate networking, security, and application protection across multiple environments, managing complexity and improving overall security posture.

Through this strategic PoP investment, Cisco aims to drive digital security in sub-Saharan Africa while supporting the region's growing cybersecurity and AI adoption needs.

TELECOM Review AFRICA

Enhancing Antenna Characterization: New Techniques for Next-Gen Wireless Connectivity

As the demand for faster, more reliable wireless communication grows, the need for precise antenna characterization has never been greater. From 5G networks and satellite communications to Internet of Things (IoT) applications and defense systems, antennas play a critical role in ensuring seamless connectivity. To meet evolving performance requirements, engineers are continuously refining techniques for testing and characterizing antennas. This article explores the latest advancements in antenna characterization, highlighting innovations that enhance accuracy, efficiency, and adaptability.

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The Fundamentals of Antenna Characterization

Antenna characterization involves measuring various parameters such as gain, radiation pattern, efficiency, impedance, and polarization. These metrics determine an antenna's performance across various environments and applications. Traditional methods, including anechoic chamber measurements and outdoor far-field testing, have long been the industry standard. However, these methods are often expensive, time-consuming, and space-intensive, prompting researchers to develop more efficient techniques.

Near-Field to Far-Field (NF-FF) Transformations

One of the most significant advancements in antenna characterization is the adoption of near-field to far-field (NF-FF) transformation techniques. Rather than requiring large far-field measurement ranges, NF-FF transformations allow antennas to be tested in compact environments. This method collects data in the near-field region and mathematically extrapolates far-field parameters. With modern computational methods such as spherical wave expansion and plane wave synthesis, NF-FF transformations have become more precise and accessible.

Machine Learning in Antenna Testing

Artificial intelligence (AI) and machine learning (ML) are are playing a growing part in enhancing antenna characterization. ML algorithms can process large datasets, from antenna measurements to identify patterns, predict performance, and optimize designs. AI-driven techniques enable real-time data processing, reducing the time and cost associated with extensive physical testing. These approaches are particularly useful in designing complex antennas, such as phased arrays and metasurface antennas, which require intricate optimizations.

Compact Antenna Test Ranges (CATR)

Compact Antenna Test Ranges (CATR) have revolutionized far-field testing by creating a controlled testing environment within a relatively small space. CATR utilizes a collimating reflector to simulate far-field conditions in a compact indoor setting. This technique is particularly beneficial for characterizing high-frequency antennas used in millimeter-wave (mmWave) and terahertz applications, where traditional far-field measurements would be impractical due to space constraints.

Over-the-Air (OTA) Testing

With the rapid proliferation of 5G and IoT devices, over-the-air (OTA) testing has gained prominence as an essential characterization method. OTA testing evaluates an antenna's performance in real-world conditions, including multipath interference and environmental variations. Unlike traditional conducted measurements, OTA testing provides a holistic assessment of an antenna's interaction with the device and surrounding environment, making it indispensable for modern wireless systems.

Reconfigurable and Adaptive Antennas

The rise of software-defined and reconfigurable antennas has introduced new challenges in characterization. These antennas can dynamically change their frequency response, beam direction, and polarization to adapt to different conditions. To accurately assess their performance, advanced measurement setups that account for real-time adaptability are required. Vector network analyzers (VNA) with time-domain capabilities and real-time signal processing tools have become essential for evaluating reconfigurable antenna behavior.

Computational Electromagnetics (CEM) and Digital Twins

Computational Electromagnetics (CEM) techniques, such as finite-difference time-domain (FDTD) and method of moments (MoM), have significantly improved antenna design and characterization. These simulations provide highly accurate predictive models, reducing the reliance on physical prototypes. Additionally, the concept of digital twins—virtual replicas of physical antennas—allows engineers to simulate and optimize antenna performance before fabrication, cutting down costly iterations.

Future Trends in Antenna Characterization

As wireless technology continues to evolve, future antenna characterization techniques are expected to incorporate:

- **Quantum-enhanced measurements:** Utilizing quantum sensors for ultra-precise electromagnetic field measurements.

- **Terahertz and sub-mmWave characterization:** Developing new techniques to address challenges in extremely high-frequency bands.

- **Autonomous testing systems:** Using robotics and AI-driven automation to accelerate antenna characterization workflows.

- **Environmental and material-aware testing:** Considering factors such as weather conditions, device enclosures, and human interaction in characterization studies.

The field of antenna characterization is rapidly evolving to meet the demands of next-generation wireless communication systems. From NF-FF transformations and AI-driven analysis to OTA testing and digital twins, advancements in measurement techniques are improving the accuracy and efficiency of antenna performance evaluations. As the industry moves towards higher frequencies and more complex antenna architectures, continued innovation in characterization methods will be crucial in shaping the future of wireless connectivity. **TR**

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Cloud Security Protecting Digital Infrastructure's Future

As digital transformation accelerates globally, businesses are increasingly relying on cloud infrastructure to enhance scalability, improve efficiency, and optimize costs. While the transition to the cloud offers numerous benefits, it also introduces new risks and challenges that need to be addressed to ensure the security of sensitive data and digital assets. With cyberattacks growing in sophistication and data breaches becoming more costly, cloud security has never been more critical. This article explores the evolving landscape of cloud security, the challenges it presents, and the strategies organizations can implement to protect their digital infrastructure's future.

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The Shift to Cloud Infrastructure
The adoption of cloud technologies has revolutionized the way organizations store, manage, and process data. According to a recent survey by Gartner, global spending on public cloud services is expected to surpass $500 billion in 2025, indicating the rapid expansion of the cloud computing market. With the ability to scale on demand, the flexibility of pay-as-you-go pricing models, and the opportunity to innovate faster, more businesses are choosing to migrate their operations to the cloud.

Cloud computing is typically classified into three primary service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Each model offers different levels of control and responsibility for security, with IaaS providing the most flexibility and PaaS and SaaS offering increasingly managed environments. Regardless of the chosen model, the shared responsibility framework remains central to cloud security, where the cloud provider is responsible for securing the infrastructure, while the customer is responsible for securing their data, applications, and identity.

Cloud Security Challenges
While cloud adoption offers immense benefits, it also creates new security risks. Traditional on-premises security models no longer suffice in the cloud, as sensitive data is spread across multiple environments, and users access systems from various locations and devices. The following are some of the most significant security challenges associated with cloud infrastructure:

1. Data Breaches and Loss: The most common and costly security risk is data breaches, where attackers gain unauthorized access to sensitive data stored in the cloud. Cybercriminals target weak points in cloud systems, exploiting misconfigurations or vulnerabilities to steal or compromise personal, financial, or proprietary data.

2.Insider Threats: Employees, contractors, or third-party vendors with privileged access may intentionally or unintentionally expose sensitive information, either due to negligence or malicious intent. Given that cloud systems often allow remote access, ensuring strict monitoring and control over access is crucial.

3.Data Privacy Compliance: With the rapid globalization of cloud services, organizations must ensure that they comply with various national and international regulations regarding data privacy. Laws such as the European Union's General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) mandate strict requirements for data handling and security, creating additional challenges for businesses operating across borders.

4. Misconfigurations and Inadequate Access Controls: Misconfigured cloud settings and overly permissive access controls are among the most frequent causes of data breaches. A 2020 report by McAfee found that 52% of organizations that had a cloud data breach did so because of misconfigured cloud services. These errors can expose sensitive data to the public or unauthorized users, leaving companies vulnerable to attacks.

5. Denial of Service (DoS) Attacks: Cloud services are susceptible to distributed denial of service (DDoS) attacks, where attackers flood a network with traffic, overwhelming cloud systems and causing outages. While cloud providers often offer protections against DDoS attacks, the sheer scale of modern DDoS attacks makes them difficult to defend against.

6. Third-Party Risks: Many cloud services depend on third-party vendors and service providers to manage and maintain cloud environments. If these third parties have weak security practices or experience their own security breaches, organizations that rely on their services may be exposed to risks beyond their control.

Key Strategies for Protecting Cloud Infrastructure
Given the growing sophistication of cyber threats, organizations must prioritize cloud security to make sure their data remains protected. The following strategies are essential for securing cloud infrastructure:

1. Implement Strong Authentication and Access Controls
One of the first lines of defense against cloud security threats is ensuring that only authorized users have access to critical resources. Multi-factor authentication (MFA) should be enforced for all users, adding an additional layer of security beyond traditional usernames and passwords. By requiring a second form of identification, such as a one-time passcode or biometric verification, MFA can significantly reduce the risk of unauthorized access.

Moreover, organizations should implement the principle of least privilege (PoLP), confirming that users only have the minimum necessary access to perform their duties. This reduces the potential attack surface and limits the impact of a compromised account.

2. Regular Security Audits and Monitoring
Continuous monitoring of cloud environments is vital for detecting potential security incidents early. Implementing a comprehensive security information and event management (SIEM) system allows businesses to collect and analyze security data in real time, helping to identify anomalies that could indicate a breach.

Regular security audits are also necessary to ensure compliance with industry standards and identify potential vulnerabilities. Cloud

providers often offer built-in tools for monitoring and auditing, but organizations should augment these with their own tools to gain deeper insights into their environments.

3. Data Encryption and Backups
Data encryption is one of the most effective ways to protect sensitive data in the cloud. Encryption guarantees that even if data is intercepted or stolen, it cannot be read without the proper decryption key. Organizations should encrypt data both in transit and at rest for protection across all stages.

Additionally, businesses should implement regular data backup strategies to safeguard against data loss. Backups should be stored securely in different geographic locations so that they remain accessible in the event of a disaster or data breach.

4. Adopt a Zero Trust Security Model
A Zero Trust security model assumes that threats could exist both inside and outside the organization and therefore requires strict verification for all users and devices attempting to access network resources. Under this model, no entity is trusted by default, even if they are within the corporate network. Zero Trust enforces continuous monitoring, identity verification, and access control across all devices and users.

Implementing Zero Trust principles in cloud environments helps mitigate risks associated with insider threats, third-party vendors, and compromised accounts by limiting access to only verified users and devices.

5. Comprehensive Incident Response Plan
Despite the best security measures, breaches and incidents can still occur. Organizations must have a well-defined incident response plan (IRP) in place to quickly detect, respond to, and mitigate any security incidents. The IRP should include clear communication protocols, roles and responsibilities, and step-by-

step procedures to follow in the event of a breach.

While cloud providers often offer incident response tools and support, organizations should develop their own response strategies to address cloud-specific challenges, including the complexities of multi-cloud or hybrid environments.

6. Vendor Risk Management
When using third-party cloud services, organizations must assess and manage the security posture of their cloud providers. This includes understanding the provider's security practices, compliance with industry standards, and their ability to respond to security incidents.

Organizations should also carefully review service level agreements (SLAs) to make sure cloud providers meet agreed-upon security and privacy requirements. Regular vendor assessments and audits can help mreduce third-party risks and maintain strong security controls throughout the supply chain.

The Future of Cloud Security
As cloud technology continues to

evolve, so too will the nature of security threats. The future of cloud security will be shaped by advances in artificial intelligence (AI) and machine learning (ML), which will help organizations detect and respond to threats more quickly and efficiently. AI and ML will play a pivotal role in idetecting abnormal patterns of behavior, automating security tasks, and providing predictive insights to prevent breaches before they occur.

In addition, as cloud adoption grows, so will the emphasis on regulatory compliance. Governments worldwide are increasingly focusing on data protection and privacy laws, and organizations must stay ahead of evolving regulations to avoid penalties and reputational damage.

The future of cloud security will also bring stronger partnerships between cloud providers and organizations, with an increased focus on shared responsibility. As organizations move more of their operations to the cloud, cloud providers will continue to enhance their security offerings, while customers must be diligent in securing their own data and applications. **TR**

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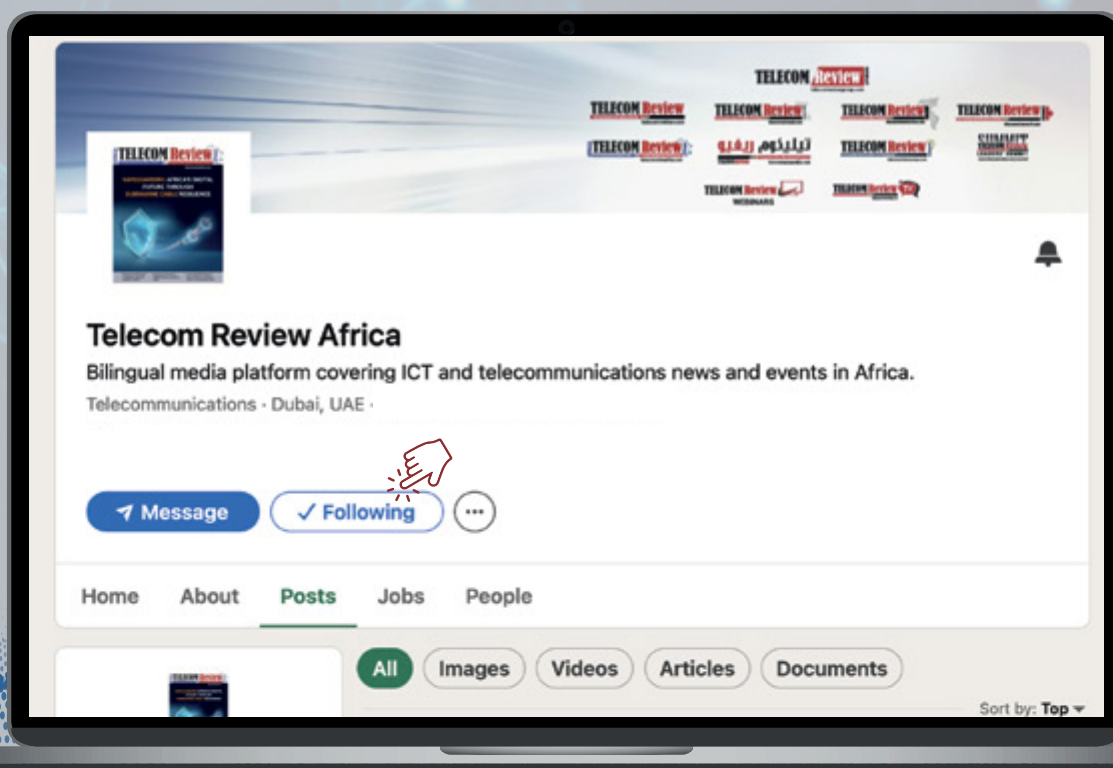
South Africa's Mobile Internet Revolution: Growth and Opportunities by 2029

South Africa's digital landscape is evolving at an unprecedented pace, with mobile internet playing a crucial role in connecting millions of users across urban and rural areas. By 2029, the number of mobile internet users in the country is expected to surge significantly, driven by factors such as affordable smartphones, expanded 4G and 5G coverage, and increased data consumption. This growth will not only transform the way South Africans access information and communicate but will also reshape industries, from e-commerce to financial services and beyond.

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The Current State of Mobile Internet in South Africa

As of 2024, South Africa boasts one of the most developed telecom infrastructures in sub-Saharan Africa. According to the Independent Communications Authority of South Africa (ICASA), mobile penetration exceeds 100%, with major operators like Vodacom, MTN, Telkom, and Cell C driving the industry. Mobile broadband subscriptions continue to rise, and the adoption of 4G networks is approaching saturation, while 5G rollout is steadily expanding.

However, despite this progress, digital inequality remains a challenge. Rural areas continue to face connectivity barriers due to infrastructure limitations and high data costs, leaving millions of potential users underserved. Bridging this gap will be critical in ensuring that the projected mobile internet user growth is inclusive and sustainable.

Projected Growth and Key Drivers

By 2029, South Africa is projected to have over 50 million mobile internet users, up from approximately 40 million in 2024. This growth will be driven by several key factors:

1. Expansion of 5G Networks

Continued investment in 5G infrastructure by major telecom operators is set to revolutionize mobile internet connectivity. With faster speeds, lower latency, and increased capacity, 5G will enhance user experiences and support new digital applications, including IoT, smart cities, and remote work solutions.

2. Declining Smartphone and Data Costs

Affordability of smartphones is improving, thanks to increased local manufacturing and global competition among brands. Additionally, regulatory interventions and market dynamics are expected to drive down mobile data costs, making internet access more accessible to lower-income users.

3. Government and Private Sector Initiatives

The South African government, in collaboration with private sector stakeholders, is actively pushing digital inclusion efforts. Projects such as SA Connect aim to expand broadband infrastructure to underserved communities. Similarly, partnerships between telecom providers and fintech companies are driving mobile payment solutions, increasing the demand for internet services.

4. Digital Services and Content Consumption

Growing popularity of video streaming, social media, and mobile gaming is driving a surge in mobile internet usage. Platforms offering entertainment, financial services, and e-commerce continue to attract millions of users, integrating digital connectivity into everyday life.

Potential Barriers

Despite the optimistic outlook, several challenges could slow the pace of mobile internet growth:

- **High Spectrum Costs and Regulatory Hurdles:** South Africa's telecom industry has faced delays in spectrum allocation, impacting network expansion efforts. Regulatory clarity and efficient spectrum distribution will be crucial for sustained growth.

- **Digital Divide:** While urban areas are experiencing rapid digital transformation, rural connectivity still lags due to cost constraints and lack of infrastructure.

- **Cybersecurity Concerns:** As internet penetration increases, so does the risk of cyber threats. Strengthening cybersecurity measures and raising awareness will be essential to ensure safe digital experiences for users.

The Future of Mobile Internet in South Africa

By 2029, South Africa's mobile internet ecosystem is expected to be faster, more inclusive, and deeply integrated into various aspects of life. The expansion of fintech services will drive financial inclusion, e-learning platforms will make education more accessible, and digital health services will improve medical access.

Additionally, businesses will increasingly adopt digital strategies, with small and medium-sized enterprises (SMEs) leveraging mobile internet to reach broader markets. The anticipated rise of AI-driven applications, virtual reality (VR), and the metaverse could further redefine online interactions and commerce.

South Africa's mobile internet landscape is on a transformational trajectory, with significant user growth projected by 2029. While challenges such as infrastructure gaps and digital affordability persist, continuous investments in 5G, regulatory improvements, and innovative digital solutions will play a pivotal role in shaping a connected future. As mobile internet adoption deepens, South Africa is set to witness a digital revolution that will drive socio-economic progress and empower millions of people in the years to come. **TR**

> Mobile broadband subscriptions continue to rise, and the adoption of 4G networks is approaching saturation, while 5G rollout is steadily expanding

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