

Communications Africa Afrique

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THIRTY YEARS THAT CHANGED A CONTINENT

Africa's communications revolution



Subsea cable deployment

Innovation under the
ocean

VSATs

Intelligent approaches
to remote education

Morocco
Why e-commerce is
here to stay

Fixed wireless access

Is 5G FWA a way
forward for Africa?

FEATURES: ● Analogue TV on the way out ● SDN on the way in ● Data centres on the way to everywhere

REGULAR REPORTS: ● Agenda ● Solutions

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A note from the Editor

THIRTY YEARS AGO, when this magazine was first published, communications technology in Africa was unreliable and, often, unavailable. Then mobile networks arrived.

It has undoubtedly been the mobile phone that has done the most to transform African communications since 1991 - but today satellite communications and subsea fibre are helping to continue the transformation.

So what have we learned? First of all that better communications, inarguably, boosts earning power and GDP. Most importantly, however, people just want to communicate.

That's why the argument that mobile phones would be a luxury for the few in Africa has been proved wrong. New business models made communications more affordable. The market grew. Then new innovations followed, none more influential than mobile money, which Africa arguably pioneered.

It's a genuinely inspiring story - and it's not over yet. Subsea cable, affordable smartphones, fibre rollout and falling satellite bandwidth costs will bring new and diverse services to ever-greater numbers of African consumers and businesses. The next thirty years could be even more exciting.

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Avanti Communications and Clear Blue Technologies to deploy rural connectivity across sub-Saharan Africa

AVANTI COMMUNICATIONS, ONE of the leading providers of high throughput satellite capacity across EMEA, has announced a partnership with Clear Blue Technologies International Inc, the Smart Off-Grid company, to enable mobile network operators and telco tower companies to deliver rural network coverage to areas across sub-Saharan Africa.

Within the next three to five years, the partnership is expected to deliver mobile network coverage to the 400 million people that currently cannot access mobile broadband services.

Sub-Saharan Africa is expected to become one of the largest telecom markets in the world. Sub-Saharan Africa has a young population with a projected high population growth, at a rate of 2.7% per year, more than double the rate of growth in South Asia and Latin America. As a result, telecom operators are expected to invest US\$52bn in infrastructure from 2019-2025, much of which will be in rural deployment.

Miriam Tuerk, CEO and co-founder of Clear Blue Technologies, said, "With only 26% of sub-Saharan Africa already connected through mobile internet, we're looking forward to bringing connectivity to areas where costs and lack of infrastructure make internet services prohibitive."



Sub-Saharan Africa is expected to become one of the largest telecom markets in the world.

This partnership will accelerate the rural rollout of low-cost connectivity solutions in areas where network coverage and broadband services have been limited or non-existent. Avanti and Clear Blue have already successfully provided these connectivity solutions in significant deployments across Africa's largest economies.

Avanti's rural network coverage solution supports 2G, 3G, 4G and Wi-Fi connectivity across Africa. As part of this joint rural deployment effort, Avanti will provide critical, high throughput Ka-band satellite connectivity and VSAT equipment. At the same time, Clear Blue will deploy its smart off-grid solar-powered solutions with remote management and control.

Mauritius Commercial Bank to adopt MITECH's TRAC system in the cloud

THE MAURITIUS COMMERCIAL Bank Ltd (MCB) is adopting MITECH's system TRAC (trade risk active control) to support a continuous and significant growth in its Commodity Trade Finance (CTF) business.

TRAC is a trade risk and collateral management system supporting structured trade commodity finance. The TRAC solution handles not only Transactional Commodity Finance but Borrowing Base structures as well.

Rajeshwar Pertab, head of Middle-Office, MCB, stated, "MITECH's expertise and TRAC's extensive functionalities convinced us to adopt the solution and streamline information flow between our customers, front-office and middle-office teams."

Photo: Avanti Communications

Out There Media and MTN Ghana launch telco-driven mobile advertising

GLOBAL MOBILE ADVERTISING company Out There Media (OTM) has partnered with MTN Ghana to provide digital advertising services for its customers.

MTN Ghana will adopt OTM's award-winning mobile engagement technology platform, Mobucks, and leverage its network of brands and brand agencies, driving advertiser interaction and engagement with its 25 million subscribers in Ghana, three times the reach of Facebook in Ghana.

OTM's proprietary mobile technology Mobucks is expected to enable MTN Ghana to bring its customers targeted and interactive messaging campaigns from their chosen brands and agency partners. MTN's telco insights and wide reach combined with Mobucks's precise targeting and personalisation capabilities will enable "micro-targeting at scale" for its future brand clients.

Several brand partners have signed up to be among the launch partners and innovation leaders on the Mobucks platform including Cadbury Richoco, Glitz Natural Care, Mandela Mile, Marie Stopes, Mycare Mobile, Odibets and PharmaAccess. One project came from Cadbury Richoco which ran a mobile messaging campaign to raise awareness for its national educational support programme "My Ghana, My Pride", by inviting school children to enter an essay competition to win scholarship funding. The campaign achieved an average click through rate of 5.5% beating current industry benchmarks for campaign engagement levels.

"Ghana has the highest mobile penetration rate in West Africa, and mobile technology plays an increasingly important role here," said Dario Bianchi, digital transformation lead at MTN Ghana.

"As MTN works towards becoming a digital operator by 2023, it is extremely important that we partner with the best brands to bring our customers the right content, to enhance their digital experience and enable them to enjoy modern connected life. Out There Media is the perfect partner for this, combining its technology with our data and our reach to deliver impactful engaging, interactive and innovative mobile advertising campaigns for our subscribers."

Millicom signs agreements to conclude Africa divestiture programme

MILlicom INTERNATIONAL CELLULAR SA (Millicom) has signed agreements for the sale of its operations in Tanzania and for its stake in the AirtelTigo joint venture in Ghana.

Once closed, the transactions will complete Millicom's multi-year plan to divest its African operations and focus on its Latin America markets.

In Tanzania, Millicom has agreed to sell its entire operations to a consortium led by Axian, a pan-African group that was part of the consortium that acquired Millicom's operations in Senegal in 2018.

In Ghana, Millicom along with its joint venture partner, Bharti Airtel Limited, has signed a definitive agreement for the transfer of AirtelTigo to the Government of Ghana. Millicom will take a US\$25mn charge as a result of this agreement.

Millicom CEO, Mauricio Ramos, commented, "Today, Tigo is a leading provider of broadband services to consumers, businesses and governments in Latin America, where penetration and data speeds remain low by the standards of more mature markets. Through our investment-led strategy, we are bringing reliable high-speed mobile and fixed broadband to the communities we serve in the region."

Ramos further added, "With today's announcement that we are divesting our remaining African businesses, we close a chapter in our history and open another solely focused on the Latin American region."

Financial details were not disclosed, and completion of each transaction is subject to customary closing conditions, including regulatory approvals.

Millicom is one of the leading providers of cable and mobile services dedicated to emerging markets in Latin America and Africa. As of 31 December 2020, Millicom operating subsidiaries and joint ventures employed more than 21,000 people and provided mobile services to approximately 55 million customers.

Sparkle collaborates with Google to build Blue and Raman submarine cable systems

SPARKLE, THE FIRST international service provider in Italy and among the top ten global operators, has announced a collaboration with Google and others to build the Blue and Raman Submarine Cable Systems

Blue will connect Italy, France, Greece and Israel, while Raman will connect Jordan, Saudi Arabia, Djibouti, Oman and India.

Each equipped with 16 fibre pairs and embracing the innovative concepts of open cable, supporting multiple fibre tenants and open landing station, enabling competitive access to the cable termination points, the two systems set a new reference in terms of diversification, scalability and latency throughout these geographies.

In particular, Blue will be deployed along a new northbound route in the Mediterranean, crossing the Strait of Messina, rather than following the traditional route through the Sicily Channel. As a result, internet service providers, carriers, telecom operators, content providers, enterprises and institutions will benefit from high-speed Internet and state-of-the-art capacity services with unparalleled diversity and performances.

Within the Blue System, BlueMed submarine cable is now Sparkle's own private domain, sharing its wet components with four additional fibre pairs and an initial design capacity of more than 25 Tbps per fibre pair, and is extended up to Jordan (Aqaba) with additional private branches into France (Corsica), Greece (Chania - Crete), Italy (Golfo Aranci - Sardinia and Rome), Algeria, Tunisia, Libya, Turkey, Cyprus and more in the future.

BlueMed flexible design allows seamless express connections throughout the Mediterranean Basin, with unprecedented latency and spectral efficiency, and sophisticated regional subsystems, based on specific customer requirements.

In addition, Sparkle's Genoa Open Landing Platform is set to become the



Photo: Adobe Stock

BlueMed flexible design allows seamless express connections throughout the Mediterranean Basin.

alternative priority access for other upcoming submarine cables looking for a diversified entry to Europe, backhauled to Milan's rich digital marketplace, and thus a new reference gateway between Africa, the Middle East, Asia and Europe.

Blue and Raman are expected to be ready for service in 2024, with the Tyrrhenian part of BlueMed planned to be operational already in 2022.

Elisabetta Romano, CEO of Sparkle, said, "With Blue and Raman Submarine Cable Systems, Sparkle boosts its capabilities in the strategic routes between Asia, Middle East and Europe and the enhanced BlueMed strengthens our presence in the greater Mediterranean area."

iSAT Africa and SES Networks to provide 4G Services in East Africa

FIXED SATELLITE SOLUTION and professional service provider iSAT Africa and global content connectivity solutions provider SES have signed a three-year partnership agreement to enable communities living across the easternmost peninsula of Africa to enjoy 4G services on their mobile phones.



Photo: Adobe Stock

The fibre-like connectivity will equip iSAT Africa to enable local mobile operators to deploy 4G services to close the digital divide.

This new service will be available first via SES's O3b medium earth orbit (MEO) constellation to subsequently migrate and expand to SES's next-generation MEO system, O3b mPOWER, in 2022.

Through SES's O3b mPOWER system that can deliver low-latency high-speed connectivity services from tens of megabits to multiple gigabits per second to a single site, iSAT Africa will be able to quickly scale its network to meet anticipated extensive connectivity demands. The fibre-like connectivity will equip iSAT Africa to enable local mobile operators to deploy 4G services to close the digital divide. iSAT Africa is among the first companies in Africa to sign up for O3b mPOWER.

According to the GSMA 2020 report, mobile coverage has been expanding in sub-Saharan Africa quickly; 3G coverage expanded to 75% compared to 63% in 2017, while 4G doubled to nearly 50% compared to 2017. However, the coverage gap in Sub-Saharan Africa remains the highest globally as it is home to 67% of the world's population not covered by mobile broadband.

This is because attempts to deploy 4G networks in sparsely-populated rural and remote areas continue to be an economic challenge. With telcos and internet service providers increasingly seeking innovative, cost-effective yet reliable connectivity solutions, SES's MEO satellite-based MEF-certified service that can ensure seamless interconnectivity with any network is an ideal solution.

NuRAN signs MoU with MTN and Telinno

NURAN WIRELESS INC, a supplier of mobile and broadband wireless infrastructure solutions, has signed an MoU with MTN to develop rural sites under the network-as-a-service model (NAAS) in South Sudan.

This is for the deployment of sites through the build, own, operate, and transfer (BOOT) revenue share model.

Pursuant to the terms of the MTN MoU, the parties intend to install a minimum of 250 rural networking sites in South Sudan within the next 24 months, subject to the conclusion of a definitive agreement with a ten-year term within four months of the signature of the MoU. The agreement is intended to provide mobile connectivity solutions through the NuRAN NAAS model.

The NuRAN NAAS model facilitates network expansion for mobile operators by managing and controlling the build, operation, and maintenance of cellular sites along with associated capital expenditures.

The sites are then monetised by providing connectivity on a paid for service basis. Leveraging its carrier-grade mobile network infrastructure solutions as well as its extensive expertise in the building of cost-effective cellular infrastructure, NuRAN to setup network operations from the ground up with an exceptional return on investment.

Apart from this agreement, NuRAN has signed another MoU with Telinno-Consulting Limited for the deployment of rural sites under the NAAS in Mali, West Africa and with Sierra Leone Telecommunication Company Limited in Sierra Leone, West Africa, for the deployment of sites through the BOOT revenue share model.

Under the terms of the MTN MoU, the parties intend to install a minimum of 250 rural networking sites in South Sudan within the next 24 months, subject to the conclusion of a definitive agreement with a ten-year term within four months of the signature of the MOU.

"Arrangements like these, where we partner up with companies such as Telinno and Sierra Tel, will help us to fast-track our mission of bridging the digital divide within the targeted timelines," stated Denis Lambert, vice-president sales and business development.

“The 90-day free data campaign seeks to ensure that no customer is left behind by ensuring that all our customers can now access the internet, even at no cost.”

- Peter Ndegwa

CEO

Safaricom

“With our Tier 3 certification we believe this facility will be a bedrock for increased economic development in Uganda as it will attract several opportunities for colocation, not only regionally but also internationally.”

- James Byaruhanga

general manager

Raxio Data Centre

“The Council of Ministers has unanimously made a historic decision today allowing Ethiopian Communications Authority to grant a new nationwide telecom license to the Global Partnership for Ethiopia, which offered the highest licensing fee and a very solid investment case.”

- Ethiopian prime minister Abiy Ahmed in a Twitter post

“We believe our proven satellite internet solution will bring cost-effective internet services to Nigerian towns where large gaps exist between demand and the affordability and availability of internet services.”

- Rick Baldridge

President and CEO

Viasat

“The growth and development of 10,000 MoMo agent businesses across the country not only benefits local communities and economies but has the ripple effect of many more unbanked and underbanked South Africans having an opportunity to manage their money digitally, wherever they are.”

- Felix Kamenga

chief officer for mobile financial services

MTN South Africa

“We are very glad to announce the establishment of Mobile Money Rwanda as a wholly owned subsidiary of MTN Rwanda. One of the key pillars in our strategy is to establish platforms that our customers find valuable.”

- Mitwa Ng'ambi

CEO

MTN Rwanda

“Axian is starting a new chapter in Tanzania and Zanzibar in the long term. We are convinced that Axian's model will accelerate digital inclusion and open up access to innovative services for populations while supporting economic growth.”

- Hassanein Hiridjee

CEO

Axian, which recently bought operators Tigo Tanzania and Zantel

“We are proud to be the first company by number of solar panels in five countries in Africa and the Middle East. As a stakeholder in the energy transition, Orange has included in its Engage 2025 strategic plan the objective of meeting 50% of the group's electricity needs from renewable sources by 2025.”

- Alioune Ndiaye

CEO

Orange Middle East and Africa

“The internet offers unprecedented opportunities for economic growth in developing countries. By providing access to information, connecting people to businesses everywhere, and opening up new markets, the

internet can act as an enabler of economic activity and an engine for information sharing.”

- Nic Rudnick

*group CEO
Liquid Intelligent Technologies*

“Through the GSMA fund, we are now able to embark on our quest to connect millions of unconnected people in Africa to the internet and help them get trained in valuable skills for the new digital economy.”

- Bola Lawal

*co-founder and CEO
ScholarX*

“We’re proud to partner with Eutelsat to combine the power of the Express Wi-Fi platform and Eutelsat Konnect, with the goal of increasing satellite broadband coverage across rural and underserved areas of sub-Saharan Africa.”

- Fargani Tambeayuk

*head of connectivity policy for
sub-Saharan Africa
Facebook*

“While the rollout of fibre has been fast in big metropolitan areas, it has been much slower in peri-urban and rural areas.

With AirFibre, we have found a cost-effective solution to help close the digital divide.”

- Calvin Collett

*managing director
MTN SA’s internet service
provider, Supersonic*

“When we started, we had about 15 sites where we have had the signal as we speak. This is expected to go up to about 100-250 sites by the end of the year.”

- Dilip Pal

*chief finance officer
Safaricom*

“A vital part of ATC’s sustainability programme is to rely more on renewable energy solutions to power our communications sites. Having a partner like Polarium enables us to harness renewable energy sources more effectively. By switching to Polarium’s high-end lithium-powered backup solutions, we have reduced our Scope 1 emissions and reliance on fossil fuels by over 50% since 2018.”

- Tuoyo Ebigbeyi

*chief technical officer
American Tower Corporation’s
African subsidiary ATC Africa*

“Fintechs are able to present a customer-centric channel to accepting and making payments in an extremely agile way. Ease of use, various payment methods, and great user experiences continue to drive payment adoption. If institutions perceive fintechs as key collaborators, the opportunity for a mutually beneficial partnership increases significantly.”

- Anton Coertzen

*president of strategic
partnerships
Ukheshe Technologies*

“West Africa is becoming a major focus for Kaspersky. The agreement with DataGroupIT will see Kaspersky gain access to new verticals in this region while helping new and existing customers build their cybersecurity strategy. It also puts Kaspersky in a position to work with major regulators to elevate the digital protection threshold across the region.”

- Lehan van den Heever

*enterprise cyber security
advisor in Africa
Kaspersky*

Events/Événements 2021

SEPTEMBER/ SEPTEMBRE

6-7	World leading IoT conference series	London, UK	www.iottechexpo.com/global
14-15	West Africa Com	Virtual event	https://tmt.knect365.com/west-africa-com/
14-16	SECURA North Africa	Algiers, Algeria	www.securanorthafrica.com/en

OCTOBER/ OCTOBRE

6-7	Digital Transformation Expo	Virtual	https://dtxevents.io/europe/en/page/dtx-europe
12-14	Broadband World Forum	Virtual	https://tmt.knect365.com/bbwf/
17-21	GITEX	Dubai World Trade Centre, UAE	www.gitex.com
20-22	ISACA events/conferences	Helsinki, Finland and VIRTUAL	https://www.isaca.org/training-and-

NOVEMBER/NOVEMBRE

8-12	AfricaCom	CTICC, Cape Town	https://tmt.knect365.com/africacom/
15-18	Cairo ICT	Cairo, Egypt	https://cairoict.com/

DECEMBER/DECEMBRE

3-6	IBC2021	Amsterdam, the Netherlands	https://show.ibc.org/ibc2021-show-dates-announcement
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CABSAT 2021: the future of content?

Deblina Roy previews CABSAT, the only event for content, broadcast, satellite, media and entertainment industry professionals in the MEA region, which this year includes a whole day's forum dedicated entirely to Africa.

CABSAT – THE MEA region's leading media, entertainment and satellite event – is back! It takes place from 26-28 October 2021 at the Dubai World Trade Centre.

After a year of missed opportunities that has forced international media pioneers and decision-makers to connect virtually, CABSAT is back. Its aim, say the organisers of the 2021 event, is to put attendees' businesses at the forefront of the region's satellite, entertainment and media sectors, giving them a platform to connect with more than 10,000 key buyers and decision-makers.

As always, CABSAT 2021 is gearing up to bring together some of the industry's best creative minds on a single, international stage through a series of programmes relevant to a wide number of markets and technologies including OTT players, linear broadcasting, Gen Z audiences, AI and home viewing. Additionally, the event's Satexpo Summit gives visitors the opportunity to meet important members of the global space and satellite industry.

Of course the entertainment industry has remained strong during the pandemic, especially at a time when many people are relying more than ever on streaming and TV.



CABSAT 2021 will be held under stringent safety and hygiene protocols.

With this in mind, for Communications Africa readers, the day-long CABSAT Africa Forum is particularly significant for its focus on media and entertainment insights, applied AI in broadcasting and satellite, 5G in media, production technologies and industry stakeholder perspectives.

For example, a 40-minute panel discussion will focus on the fast-growing market for African pay TV subscribers. Several pay TV players have opted to create their own OTT video apps or partner with already-established OTT players to deal with the threat to profits of OTT, a transition impacting a number of operators who are experiencing shrinking margins. The discussion will look at how to monetize in a digital vs traditional age.

Finally, keeping visitor well-being as the number one priority at Dubai World Trade Centre, CABSAT 2021 will be held under stringent safety and hygiene protocols. The venue is certified with the prestigious Bureau Veritas SafeGuard Label, which attests to its compliance with the highest hygiene standards. Also, the team at DWTC are working around the clock to ensure that events run safely and have implemented a range of measures including an enhanced cleaning regime, improved air circulation, multiple hand sanitiser stations and directional signage where required.

For more information, see www.cabsat.com

Infobip to Power Expresso Senegal Customer Communication with Whatsapp

GLOBAL BUSINESS COMMUNICATIONS service provider Infobip will provide WhatsApp customer communication services and its conversations CPaaS-based contact centre solution to leading Senegal mobile operator Expresso.

Combining WhatsApp with Infobip's in-house developed Conversations cloud contact centre solution is set to give Expresso Senegal a powerful tool to manage customer communications and multiple use cases.

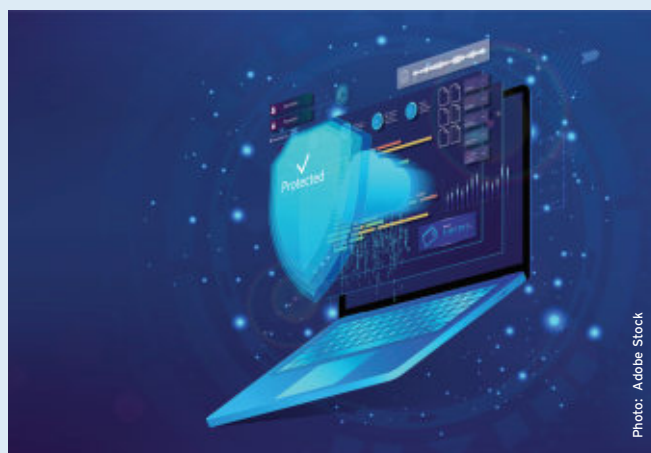
"This is well beyond just a trend, this is a momentous change in the way businesses engage with their customers, and we are certain Expresso will see an immediate improvement and increased customer satisfaction," said Mirza Bukva, regional director of Telecom Partnerships, Infobip Francophone Africa.

Sophos announces acquisition of Braintrac

SOPHOS, A GLOBAL NEXT-GENERATION cybersecurity solution provider, has acquired Braintrac, a move that is set to further enhance Sophos' Adaptive Cybersecurity Ecosystem with Braintrac's proprietary Network Detection and Response (NDR) technology.

Braintrac's NDR aims to provide deep visibility into network traffic patterns, including encrypted traffic, without the need for man-in-the-middle (MitM) decryption. Located in Salt Lake City, Utah, Braintrac launched in 2016 and is privately held.

As part of the acquisition, Braintrac's developers, data scientists and security analysts have joined Sophos' global Managed Threat Response (MTR) and Rapid Response teams. Sophos' MTR and Rapid Response services business has expanded rapidly, establishing Sophos as one of the largest and fastest-



According to Sophos' research, adversaries aggressively and constantly change tactics evade detection and execute their attacks.

growing MDR providers in the world, with more than 5,000 active customers.

Braintrac's NDR technology is expected to support Sophos' MTR and rapid response analysts and extended detection and response (XDR) customers through integration into the Adaptive

Cybersecurity Ecosystem, which underpins all Sophos products and services. The Braintrac technology will also serve as the launchpad to collect and forward third-party event data from firewalls, proxies, virtual private networks (VPNs) and other sources.

ICPS and Zwipe to bring biometric payment cards in Africa and Asia

BIOMETRIC FINTECH COMPANY Zwipe and international card payment processor and card personalisation bureau ICPS are partnering to bring Zwipe Pay ONE-enabled biometric payment cards to banks across Africa and Asia.

The Covid-19 pandemic

has boosted the use of contactless technology and ultimately the need for consumers and businesses to make higher-value payments using contactless cards. However, the contactless limit increase for payments also poses a higher risk for users without an additional layer of security.

ICPS and Zwipe have partnered to bring biometric payment cards enabled with fingerprint sensors. With a fingerprint sensor embedded in the card, consumers will now benefit from an extra layer of security with no need to enter a PIN code on the POS terminal.

Zwipe is expected to provide the complete Zwipe Pay ONE package comprising Biometric ISO contact plate module, passive inlay, fingerprint sensor, OS license and enrollment sleeves. As part of this collaboration, both companies will work closely to promote the disruptive Zwipe Pay ONE-enabled biometric payment cards for ICPS issuers in Africa and Asia.

"As a provider of innovative payment services in the African continent, we pride ourselves in delivering future-proof innovations. Together with Zwipe we will bring a new payment solution that will help financial institutions to differentiate their services, provide safer and much more secure payment solutions and uplift customer loyalty," said Khevin Seebah, CEO at ICPS.



Photo: ICPS

The initiative aims to create a strategic foundation for a mutually rewarding partnership.

Will the office make a comeback post-Covid-19?

AROUND 79% OF the workforce aspire to be back in the office at least once a week, up from 74% last October, highlighting the declining appetite to work solely from home as homeworking fatigue sets in, according to International research conducted by JLL and released by Tétris Design & Build (owned by JLL, a Fortune 500 company) titled Worker Preferences Barometer.

Around 37% feel more productive at home, down from 48% last April. However, 63% of workers do not want to be office-bound, showing preference for a hybrid style of working from both home and the office or third-party locations such as coworking lounges and coffee shops.

The Covid-19 pandemic and resulting lockdowns worldwide have challenged conventional ideas on how we work and what a workplace should look like.

According to the survey, while the disruption in workflow due to Covid-19 has had a negative impact on business over the past year, it has also paved the way for innovative working solutions and new ways of achieving a good work-life balance – a top priority for millennials and Gen Z. Emma Luyt, co-CEO of JLL sub-Saharan Africa and MD of Tétris Design & Build, is excited by the opportunity for strategic workplace design and bespoke office fit-outs as a means to refresh and re-engage with returning staff and believes the innovation it demands will bring enormous future value to the office sector.

Luyt said that business leaders need to get back into the office to protect and grow their business culture and nurture younger teams who require office infrastructure and connection to perform, but a rethink of corporate workspaces is necessary if business owners want to get employees back and working productively. "Company owners are looking for workspace solutions that can foster inclusivity and co-working while providing quiet spaces for thinking and doing," she added.

How telecoms changed Africa – and Africa changed telecoms

Communications Africa is 30 this year. We asked a number of players – both long-established and relatively recent entrants – what they thought had been the most significant developments in telecommunications or broadcasting in the African market since 1991 – or since their own entry into the market. Here's what they had to say.

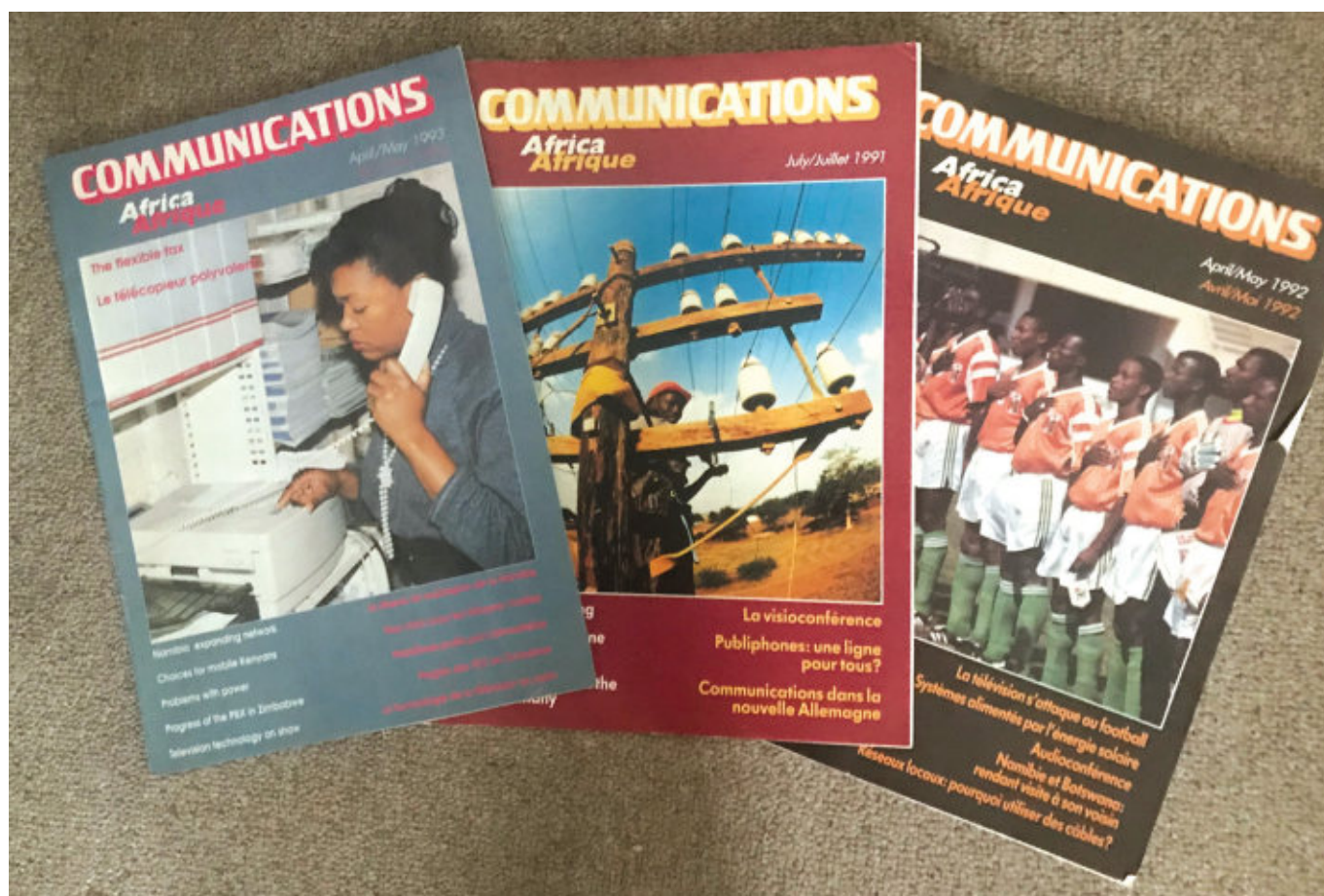


Photo: Where it all began. Three issues of Communications Africa from its first decade.

A LOT HAS CHANGED in 30 years in Africa telecommunications. In the early 1990s a business visitor to, say, Ghana, would arrange an appointment by fax or even telex or try to get through on an unreliable fixed line service. If they were running late, there was no easy way to alert the people they were meeting – and certainly not from the back of a taxi.

A thirty-year-old resident of Accra would barely recognise this description. He or she would probably be familiar with basic text and voice on mobile phones and, today might own one of a growing number of low-cost smartphones, on which they can now not only arrange meetings, but read the news, listen to music, watch streaming TV and access one of thousands of applications designed to make life easier or more fun.

This wasn't supposed to happen. As recently as 2003 the general view was that, with rural

populations of around 70%, a minority of Africa's urban population able to afford telecoms and the need for carriers to continue to make money, a likely mobile penetration ceiling in Africa would be on or around 10%. The actual percentage of individuals who own a phone in the continent's most populous country, Nigeria, is now over 50%. In many countries it's higher – over 100% in South Africa and Morocco, for example.

And Africa may have been late to the mobile communications party, but it can claim to have been a major innovator through mobile-phone-based money transfer services, payments and micro-financing. M-Pesa, launched in Kenya in 2007, was the first and is still the best-known brand in what is now a global trend.

Fibre connectivity was largely left behind by mobile – but that may not be the case for much longer. The staggering growth of subsea cable networks with a landing point in Africa is now,

slowly, translating to fibre connectivity further inland, and of course satellite communications is doing even more, at ever lower cost, to connect the unconnected.

In broadcasting, there's been a revolution too. Countries like South Africa and Nigeria are now big players in the broadcast content market, supporting viewers who, more than ever, are using streaming services – and even watching TV on their phones.

Clearly a lot has changed in the thirty years since Communications Africa first launched – and these observations are by no means comprehensive.

As our thirtieth anniversary approached we wondered how best we could review developments in the African telecommunications market since 1991. The obvious answer was to ask the companies that have been part of those developments.

Ericsson of course entered Africa in 1894 and,

said Todd Ashton, vice president and head of Ericsson South and East Africa, “we’ve seen mobile communications come a long way across the continent over the past 30 years, owing to the incredible potential offered by the continent. Today, a new era of socio-economic prosperity is underway by leveraging new technologies that make it easier to conduct business, increase productivity, and drive economic inclusion.”

He continued, “There’s a widespread acceptance that digital transformation is essential to propel Africa towards the future. 4G and 5G adoption will exponentially accelerate the regional digital agenda, and this is something that requires focus from all stakeholders. Looking at the example of artificial intelligence (AI) and automation, the continent will see value across the life cycle of network operations. Africa is home to over a billion people, and it is also the continent with the most growing economies globally. ICT is essential for the continent’s development, and adequate ICT service deployment and digital connectivity will play a crucial role in achieving economic sustainability in Africa.”

His company’s well-known Ericsson Mobility Report backs this up, showing us that more than 340 million people will soon be connected to mobile broadband across sub-Saharan Africa, and, by 2025, mobile data traffic in Africa will rise by more than 50% year-on-year – by far the highest growth rate worldwide.

“Financial inclusion will continue to be enabled by mobile connectivity,” Ashton added. “Mobile money services have become an essential, life-changing tool across the continent for both women and men, providing access to safe and secure financial services. And when the access to safe and secure financial services is within reach, enhancements in energy, health, education, and employment opportunities will follow and thus, economic growth.”

And, after more than 100 years, Ericsson still has a lot to do. He added, “We look forward to an exciting journey with our partners in the African market.”

Nokia is another long-term player in the African market. As Soenke Peters, head of strategy and technology MEA at Nokia, pointed out, “Nokia has actively been collaborating with clients to build reliable critical networks in Africa. Our rich history in Africa starts in 1860 when Siemens, with whom Nokia joined hands to become Nokia Siemens Networks (NSN) in 2007, started its business activities with telegraph equipment for the Cape Town to Simonstown line. Since then, Nokia has led the charge with several firsts, such as Siemens equipping Libya with its first regional nationwide automatic switching network in the 1960s, Alcatel delivering the first digital exchange in Morocco in 1976, and Siemens and Alcatel jointly installing the first electronic exchange in



Todd Ashton,
vice-president
and head of
Ericsson South
and East Africa.

Photo: Ericsson

Pretoria, South Africa.”

He continued, “While the network technologies we bring to the market have evolved dramatically, our commitment to the African continent remains the same. Nokia has a strong presence, supporting all leading communications service providers (CSPs) and serving millions of end users across the continent. Most of Nokia’s customers entrust us providing technology and services across various network domains. From optical transport (33 customers), IP routing (48 customers) and core, cloud-based and traditional (12 customers), to access, both fixed via fibre (35 customers) and mobile (39 LTE, 29 microwave customers), we provide key building blocks to implement and operate critical networks in Africa. Fixed wireless access (FWA) is another key technology to connect the unconnected and delivered to five operators already. For 20 CSPs Nokia provides managed services to ensure smooth and optimal performance of their networks. On top of this, we have enabled various business applications for 26 customers based on our wide and leading CSP software portfolio.”

Sam Nkusi, CEO One Africa Broadband Connectivity (1-ABC) and group chief managing executive, government relations for technology group Liquid Intelligent Technologies, has worked in the ICT/telecoms industry for more than 35 years. He said, “The most significant development in Africa was the rapid evolution from fixed line telephony to mobile network

services in the 1990s and the liberalisation of the telecom sector, which opened up private sector participation and brought competition. This enabled the data revolution and a move to ever-increasing broadband internet capacity which is now at terabyte connectivity speeds.”

For Riana Strydom, territory sales manager South Africa of Brady Corporation, an international manufacturer and marketer of complete solutions that identify and protect people, products and places, the focus is fibre. She said, “Nine years ago fibre did exist in South Africa, but it was a well-hidden, underutilised technology, not available to our mobile network operators. We were using low-quality services like EDGE, 2G and limited GPRS mobile services powered by ageing copper infrastructure, and legislation protected the monopoly of the holding telecommunications operator at the time.”

Fibre development started in 2005 with the decision by the country’s High Court to allow mobile operators to build their own networks. She explained, “Using one world-class fibre network to service all communication needs, was highly successful. Since then, the fibre infrastructure in South Africa has grown rapidly. The global situation we have all found ourselves in since early 2020 with Covid has also contributed to the increase in development of the fibre infrastructure.”

Continued on page 17

Will new approaches transform the use of ICT in Zimbabwe? Photo of Harare: Adobe Stock

Photo: Adobe Stock

Building an e-government strategy

Zimbabwe's Ministry of Information Communication Technology, Postal and Courier Services has launched a National Data Centre. It is expected to change the way data and information is managed in the country. Wallace Mawire reports.

THE LAUNCH AND operationalisation of Zimbabwe's National Data Centre is described as one of the grand strategies in successfully implementing the country's national ICT (information and communications technology) Policy and its e-government Programme.

"It is also a clear demonstration of ensuring that the attainment of the country's Vision 2030 is heavily anchored on the modernisation of our economy through the use of ICTs," ICT minister, Dr Jenfan Muswere said earlier this year, adding that the SMART Zimbabwe 2030 initiative is the framework which provides for a smart government and consequently for effective e-government.

He also said that the ICT ministry would continue to provide the enabling environment that is necessary for the intensified adoption and utilisation of ICTs within government and across the economy at large to ensure that the country moves in tandem with the new dictates of global economics and governance.

He added, "This is in addition to ensuring that ICTs are diffused to penetrate to all corners of the country, hence bridging the digital divide and promoting rural development. Deployment of ICT infrastructure and equipment also resonates very well with the National

Development Strategy 1 (NDS1), as well as the attainment of Vision 2030." Vision 2030 is described as 'a vision for inclusive long-term economic recovery'.

According to the ICT ministry, the National Data Centre is one of the success stories in the implementation of various projects under the e-government programme that the Ministry in collaboration with the Office of the President and Cabinet is deploying across the public sector to re-invigorate the performance of government institutions, systems and processes.

The National Data Centre will allow for quick access, exchange and sharing of information by the various users within government

The National Data Centre is to be used as a central repository for all government information, allowing for quick access, exchange and sharing of information by the various users within government. It could also offer an opportunity for the government to save money as ICT operations will be based on cloud computing.

"This also resonates well with the Whole of Government Approach," Muswere said. This refers to the joint activities performed by diverse ministries, public administrations and public agencies in order to provide a common solution to particular problems or issues.

The ministry's goal under the e-government programme is to attain 100% e-enablement in the provision of basic services by the government.

The strengthening of the government portal and the ministries' websites is also expected to provide a platform for citizens and business to access the government information and services that will be housed in the National Data Centre.

Progress has also been made with the SMART Zimbabwe ICT strategy and requirements of Vision 2030. They include: development of backbone infrastructure to connect the country to the outside world; the modernization of the ICT backbone infrastructure; last-mile connectivity to all businesses and households through fixed and mobile telephony; and data links to allow citizens and business to access government services through the portal.

The mobile penetration rate is reported to have risen to 87.7% from the 10.4% recorded in 2008. The internet penetration rate is also reported to have been consistently growing over

the years and currently stands at 59.9% up from the 1.3% recorded in 2008.

Also community information centres, a key piece of infrastructure to provide access to online services to the local communities, particularly the less well-off, have been deployed throughout the country.

“They will enable citizens to also access government online digital services amongst other things,” Muswere said.

Other initiatives include: deployment of pre-fabricated modules (PFMS) kiosks across the country, e-learning initiatives to ensure that students throughout the country have equitable access to educational content; implementation of the telemedicine project to ensure the use of ICTs to facilitate the provision of clinical healthcare using two-way communications between physicians and the patients at remote and rural healthcare centres; the Safe Cities initiative – which uses camera technology to manage and monitor traffic in the cities; and the deployment of base stations across the country to ensure ubiquitous connectivity.

Dr Muswere said that government has identified ICTs as one of the pillars and cornerstones for economic development, adding that access to ICTs and effective participation in the digital economy are critical in improving the quality of life for all the citizens of Zimbabwe.

“The Community Information Centres initiative therefore resonates very well with the government’s vision that is anchored on leveraging ICTs for sustainable development,” he said. At a continental level, it is reported that data centres are entering a number of African markets (see round-up, below).

There is an urgent need for complementary legislation, policies and guidelines that will guide the acquisition, transfer and storage of data in Zimbabwe

Another relevant trend is facilities being created as pre-fabricated modules – smaller self-contained data centres to be used for network, cloud, wholesale and co-location, and suitable for local environments.

MISA Zimbabwe, one of 11 chapters of the Media Institute of Southern Africa, which promotes and defends media freedom and freedom of expression across the Southern Africa Development Community (SADC) region, said that the launch of the National Data Centre was a critical step towards the fulfilment of

some of the objectives under the National Development Strategy.

The organisation said that the launch of the National Data Centre is a step in the right direction as it pertains to access and usage of ICTs at the government level, which also need to be facilitated for ordinary citizens, including those in rural and marginalized communities.

“Such developments, however, do not operate in a vacuum, with the critical factor being that of reshaping and refining the country’s approach to human rights. This also includes the role that such facilities can play in either facilitating or restricting the right to privacy and freedom of expression, among other fundamental rights,” MISA-Zimbabwe said.

It added that one critical gap in that regard is the absence of an effective data protection and data privacy framework.

“In that regard, there is an urgent need for complementary legislation, policies and guidelines that will guide the acquisition, transfer and storage of data in Zimbabwe. This is particularly crucial in promoting public trust and confidence, and that the centre will not be used for unlawful surveillance,” it said.

MISA Zimbabwe also urged government to promote transparency and accountability on the nature of data and information that will be in its custody through the National Data Centre. ©

Capacity is growing – but not fast enough

AFRICA IS SEEING a considerable growth in its broadband user base, which is set to double over the next decade. Deblina Roy asks whether data centre growth can meet this demand.

More than two-thirds of Africa’s data centre capacity is within South Africa, according to a report from the African Data Centres Association (ADCA) and Xalam Analytics. The report further states that 15 countries have a deficit between five megawatts and 10MW of data centre capacity, with 20 facing a capacity deficit higher than 10MW. Meanwhile demand is likely to grow.

That said, there has been a lot of activity recently. For example, IXAfrica has broken ground on an 18MW data centre in Nairobi, which is expected to be East Africa’s largest ‘hyperscale-ready’ campus. In Ethiopia meanwhile, WinguAfrica has broken ground on a hyperscale data centre in Ethio ICT Park, Addis Ababa. The company also plans a facility in Adama City. Additionally, Raxio Group has begun construction of a data centre at the ICT Park in Addis Ababa.

In the west, N+One plans to build three data centres in Dakar, in partnership with the Ministry of Digital Economy and Telecommunications, along with the General Delegation for Rapid Entrepreneurship of Women and Youth (DER/F) and the Digital

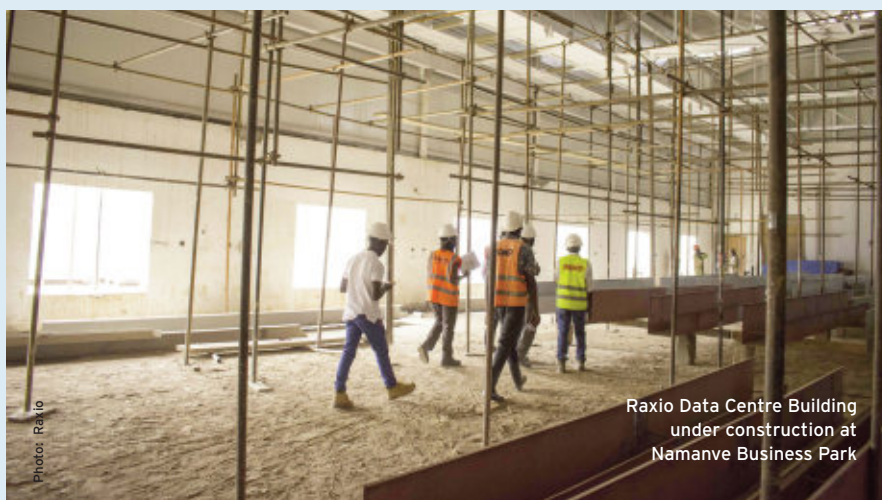


Photo: Raxio

Raxio Data Centre Building under construction at Namanve Business Park

Technologies Park of Senegal (PTN), as part of the country’s Digital Senegal plan. In Ghana, African Infrastructure Investment Managers (AIIM) has acquired a majority stake in Ghana’s only Tier IV data centre with plans for expansion.

Even the Democratic Republic of Congo is getting involved: Raxio Group is set to construct a 1.5MW data centre in Kinshasa, which is due to be commissioned in June 2022.

Paratus Zambia will soon open a one megawatt data centre in Lusaka and Zimbabwe

(see above) has launched a data centre, but South Africa remains the busiest country in terms of data centre rollout. One of many recent announcements concerns Teraco Data Environments, which has raised \$170 million to finance the construction of its 38MW hyperscale facility in Johannesburg.

There’s activity in number of other African countries too. However, positive data centre development at any meaningful scale may be difficult to achieve without more government involvement to enable it.

Quality data centre design can lower costs.

Photo: Siemon

Better design equals better performance

There has been a lot of news recently about the advantages of using renewable power for data centres - but optimising data centre design can also have a positive impact - and not just on power usage, as Dinesh OP of IT infrastructure solutions company Siemon told Ron Murphy.

THERE IS A lot of debate currently about power usage in the data centre and how data centres can reduce their carbon footprint.

In fact there are many innovative technologies available that can address the power issue. However, Dinesh OP, technical manager Africa at IT infrastructure solutions company Siemon, believes it is equally important to consider core data centre design principles.

As he said, "This is because optimised data centre design can have a positive impact on power consumption, while good design also addresses the most pressing challenges that data centre owners and operators are facing today: the need for faster transmission speeds, the need for fast data centre deployment and scalability, the need for infrastructure flexibility and manageability and the need for operational efficiency." He added, "When we talk about design principles, we refer to the implementation of high-performance physical layer components including the cabling and cabling architecture, racks and cabinets and power distribution throughout the facility."

In fact optimised data centre design can result in reduced capital expenditure (capex) and increased return on investment (ROI). For example, specifying high-performance cabling solutions on day one will support not only current but also future data speeds and could future-proof a data centre facility for many years to come. When considering operational expenditure (opex) on the other hand, quality data centre design can lower costs (for power, say) and improve operational efficiency through better power usage effectiveness (PUE).

OP explained, "Simple design considerations like installing blanking panels in racks and cabinets for example can prevent the mixing of hot and cold air, while patch cords with a reduced outer diameter help maximise airflow to improve cooling effectiveness and thermal efficiency. Also, specifying intelligent power distribution units (PDUs) which monitor power usage of individual connected devices can determine if devices operate within the intended range for energy use."

Of course it's important to remember that the ever-increasing number of connected devices is driving the demand for more bandwidth, which in turn can push the capabilities of existing data centre infrastructure to the limits. With data speeds now moving to 200 and 400 Gb/s in the data centre backbone and to 25 and 40 Gb/s at the data centre edge, selecting the right network cabling solutions on day one will determine if a data centre can support higher performance needs in the future.

OP suggested, "Solutions such as Siemon's Base-8 system with 8-fibre MTP parallel optics connectivity provide the most efficient, cost-

effective and highest performing option for current 8-fibre 40 and 100 Gigabit applications, and also provide an easy migration path to next generation 200 Gb/s and 400 Gb/s applications."

Moreover, the overall rise in demand for computing power means that data centres must be able to expand quickly and/or add additional capacity as required. A modular POD-based data centre design approach can facilitate a speedy expansion process.

OP explained, "PODs consist of groups of cabinets and are typically designed based on capacity, function or application. Once defined, they can serve as a template for incremental build-outs of additional units. As demand increases, this design can be easily repeated as the data centre grows. Faster infrastructure deployment can also be achieved by selecting pre-terminated trunking cables. These solutions are factory-assembled and therefore up to 75 per cent faster to install than traditional field-terminated solutions."

As for Africa, according to telecommunications market research and consulting firm TeleGeography, this continent saw the fastest internet bandwidth growth in the world between 2015 and 2019, at a compound annual growth rate (CAGR) of 45 per cent. At the same time the mobile penetration rate continues its upward trend, the internet of things (IoT) is increasingly utilised, and the cloud has become the place for data storage.

OP summed up, "All this is impacting data centres across the region and makes more efficient design - one that enables faster speeds and a faster deployment process, as well as scalability and flexibility - much more urgent." ☎



Photo: Siemon

It's important to get cabling right from the very start

Photo: Adobe Stock

The Namibian coastline, one of many areas that are soon to be landing points for subsea cables.

Innovation under the water: the cables are coming

Technology advances are driving resilience, speed and data volume as the Africa undersea cable market continues to expand. Phil Desmond looks at some of the big names driving this expansion and interviews two of the companies involved in the Pakistan & East Africa Connecting Europe (PEACE) system.

A REPORT LAST year from independent non-profit research institute RTI International called the Economic Impact of Subsea Internet Cables in Sub-Saharan Africa suggested a range of positive impacts – from an over 8% increase in employment in areas that are connected to fibre to a 19% increase in GDP per capita for countries like the Democratic Republic of Congo.

RTI completed a series of studies, in partnership with Facebook (itself an investor in a number of undersea cable systems), that analysed the economic impact of subsea cables and the improvement in connectivity they delivered to six countries in Sub-Saharan Africa.

In collaboration with African telecommunications experts, the RTI team documented how improvements in connectivity catalysed economic opportunity and growth in Nigeria, the Democratic Republic of Congo, Kenya, South Africa, Mozambique and Tanzania.

However, recent announcements underline not just the economic benefits but how the technology used is improving. Take for example the Africa Coast to Europe (ACE) subsea cable.

ACE covers about 17,000 km along the west coast of Africa, stopping off in 19 countries. Then it's backhauled by landing partner and South African operator MTN into Teraco's data centre facilities.

This is a major combination of two game-changing modern technologies. Users of ACE now have direct access to Teraco's ecosystem

of over 350 networks, 130 IT service providers, 50 global content providers, and a number of key global cloud providers.

This interconnectedness with data centres is also to be seen in the UAE whose new SmartHub Kalba facility is to be a landing for the new Africa-1 subsea cable. The new facility is due to open by the first quarter of 2022.

The 10,000 km Africa-1 cable will provide eight fibre pairs to connect Africa and the Middle East eastward to Pakistan and westward to Europe, increasing the available transmission capacity between Asia and Europe.

The technology in the cable itself is amazing too. The system will be equipped from day one with ASN 1620 Softnode transmission equipment, featuring high-performance 200/300/400 Gb/s advanced coherent XWAV line cards.

Of course, submarine cables have been landing in or near Africa for some years. The WACS (West Africa Cable System) submarine cable, for example, was delivered in 2012. WACS is an ultra-high-capacity fibre optic submarine

cable system which links the south of Africa and Europe, spanning the west coast of Africa and terminating in the UK. This four fibre pair system with total length of approximately 16,000km is, we are told, complemented with 15 terminal stations and involves a consortium of 18 leading international telecom carriers.

Then there's EASSy. EASSy is a 10,000km submarine fibre-optic cable system deployed along the east and south coast of Africa to service the voice, data, video and internet needs of the region. It links South Africa with Sudan via landing points in Mozambique, Madagascar, the Comoros, Tanzania, Kenya, Somalia and Djibouti.

The cable is said to incorporate the latest developments in submarine fibre optic technology, making it economical to connect the eastern and southern coast of Africa into the high-speed global telecommunications network. The system is owned and operated by a group of 16 African telecommunications operators and service providers and a smaller group – just under 10% of the total – of international operators and service providers.

In its time (it entered service in 2010) EASSy was, its providers suggest, the highest-capacity system serving sub-Saharan Africa, with more than 10Tbps, two fibre-pair configuration and the first to deliver direct connectivity between east Africa and Europe / North America. It was also the only system with built-in resilience end to end. EASSy interconnects with multiple international submarine cable networks for

“The 2Africa subsea fibre optic cable project will deliver more than the total combined capacity of all subsea data cables serving Africa today”



Photo: Adobe Stock

Djibouti's position in the Horn of Africa makes it a popular cable landing point.

diverse, seamless onward connectivity to Europe, the Americas, the Middle East and Asia.

In a related project, investors in the EASSy system are building terrestrial fibre backhauls to link the land-locked countries of the region to the cable.

More recently, in 2019, Google first announced its subsea cable project, Equiano, which, it says, will connect Africa with Europe, running along the west coast of Africa between Portugal and South Africa. Earlier this year Paratus and Telecom Namibia signed an agreement to land Equiano in Namibia.

Again there's evidence here of the changing and improving technology such systems use. The cable incorporates new technology that the companies say enables approximately 20 times more network capacity than the last cable built to serve this region and provides flexibility to add and reallocate capacity in different locations as needed.

Coming right up to date, it's impossible to overlook the 2Africa subsea fibre optic cable project. This project, once completed, will connect 23 countries in Africa, the Middle East, and Europe and deliver more than the total combined capacity of all subsea data cables serving Africa today.

The 2Africa cable will implement a new technology – SDM1 from ASN – allowing deployment of up to 16 fibre pairs instead of the eight fibre pairs supported by older

technologies, bringing much greater and more cost-effective capacity. The cable will incorporate optical switching technology to enable flexible management of bandwidth. Cable burial depth has also been increased by 50% compared to older systems, and cable routing will avoid locations of known subsea disturbance, all helping to ensure the highest levels of availability.

It's worth mentioning that many of these projects will be continuing to update their technology as new approaches become viable. However, the issues of cable breaks and ease of repair will probably remain tricky; once a cable is buried in the depths of the sea, what happens when it is damaged?

For example, Vietnam's internet connection via the Asia America Gateway (AAG) undersea cable has gained an unwelcome reputation for problems. AAG handles more than 60% of the country's international internet traffic, but it has experienced frequent ruptures and repairs, affecting services in Vietnam, where more than 64% of the population is online.

Closer to home, earlier this year WIOCC reported interruption to a significant number of client services between Djibouti and Marseille on the SeaMeWe5 submarine cable, affecting voice, data and internet services in multiple countries across eastern and southern Africa.

Such issues won't become irrelevant overnight, but potential cable damage (as 2Africa indicates) is now being taken into account at design stage and prepared for. Meanwhile, look out for faster, more powerful and more reliable international connectivity as undersea cables bring Africa and the rest of the world even closer together. ☺

PEACE is coming...

THE PAKISTAN & EAST AFRICA Connecting Europe (PEACE) system submarine cable system, provides an open, flexible and carrier-neutral services for its customers. Two of the companies making PEACE happen, PCCW Global, a leading international telecommunications service provider, and Infinera, a global supplier of innovative open optical networking solutions told us about some of the technological advances involved.

Communications Africa: How much has subsea cable technology advanced since PCCW Global entered this space?

PCCW Global: PCCW Global designed and optimized PEACE System specifically for maximum capacity per fibre pair and our advanced transmission line design will enable us to continue to embrace new technologies from different vendors. The initial design capacity per fibre pair was 16Tbps and now increased to 25Tbps by deploying the Infinera ICE6 optical engine solution. It is expected to increase during the life time of PEACE System.

Communications Africa: How is technology driving greater resilience, speed and volume, along with lower latency in the subsea cable space?

PCCW Global: Optical submarine cable systems employ optical fibres as the transmission paths. Optical fibres have excellent features such as low loss and wide bandwidths. However, from the viewpoint of increasing both transmission speed and wavelength-division multiplexing (WDM) density, it is important to design an optical fibre transmission line so that the optical signal waveform distortion is suppressed. Digital signal processing (DSP)-enabled coherent transponders offer unprecedented flexibility in submarine line terminal equipment operations, offering electronic chromatic dispersion (CD) and polarization mode dispersion (PMD) compensation, and putting many different modulation formats, symbol rates, forward error correction (FEC) and thus line rates within a single box.

Communications Africa: I assume future advances will bring continued evolution and improvement to subsea cable systems. How will future technology upgrades be integrated into existing subsea cable networks?

Geoff Bennett, Director, Solutions & Technology, Infinera: Coherent transponders have evolved through five distinct generations over the past 12 years (100G, 200G, 400G, 600G and today's 800G). Each generation delivers increasing fibre capacity and individual wavelength data rate – and both factors bring a direct improvements in CapEx and OpEx for the cable operator.

Each of these generations can be implemented onto existing cables with no disruption to services that are already running on those cables. Infinera is committed to the continued development of high-performance coherent optical engines for long-haul terrestrial and submarine networks.

“The issues of cable breaks and ease of repair will probably remain tricky”

Continued from page 11

Again looking at fibre, Chris Wood CEO of WIOCC, a leading supplier of end-to-end managed, wholesale connectivity solutions, commented: "Over the past 10 years, Africa has experienced a huge increase in demand for bandwidth. This is largely driven by the inexorable growth in business and consumer use of online services and applications, underpinned by greatly improved accessibility to – and affordability of – connectivity services and connected devices."

He continued, "The ability of the market to address this demand depends on the ongoing availability of cost-effective, truly scalable connectivity, which is why WIOCC – and others – continue to invest heavily in Africa's subsea and terrestrial infrastructure to improve capacity, reach, accessibility and affordability."

Communications enabler BICS has had partners and a presence in Africa since the mid-1990s. Clémentine Fournier, regional vice president sales, Africa, said "Over the past two decades, we've seen a mobile revolution! This has impacted not only the telecommunications market, but the economy as a whole, which has benefitted from mobile-driven digitisation. Thanks to continued investment in our network and local presence, it's a revolution that we've helped – and are very proud – to support."

As for how that revolution has happened, "Firstly, access to mobile phones. Prices for handsets have been falling, and now you can buy a device for as little as \$20, helping many more citizens and businesses access mobile services."

With this extended access comes the second major force behind the revolution she mentioned: an explosion in data. "Operators and governments, with the support of bodies such as the World Bank and IMF, have invested in telecom infrastructure to ensure better network coverage and bandwidth, to support the demand for data. More recently, we've also seen investment from OTT players like Facebook and Amazon, who are investing in submarine cables and data centres. As more people have been able to consume more data, more services have gone digital."

And that's not all. "I have to mention mobile money here. M-Pesa launched back in 2007 in Kenya, and the then-pioneer's model has since been replicated on a global scale. Africa arguably continues to lead in this area."

For Miriam Tuerk, CEO and co-founder, Clear Blue Technologies, whose company we described in issue one of 2020 as one that delivers clean, managed, wireless power, recent years have seen a commitment and push by governments, NGOs and regulators to ensure that internet connectivity for all becomes a reality.

She explained, "Investments and developments by the industry are making



Pieter-Paul Mooijman, regional sales director Africa, ST Engineering iDirect: "We are on the cusp of another revolution, one that is possibly the biggest in the history of satellite communications."

Photo: ST Engineering iDirect.

internet connectivity for all economically possible," citing a number of instances, such as "the OpenRan movement along with the entry of new wireless vendors including companies such as Parallel Wireless, Vanu and Nuran".

Then there's the satellite revolution. "Companies such as Avanti, Intelsat, Eutelsat and others who are solving the backhaul capacity bottleneck." She also highlighted the so-called FANG companies "including Facebook (with participation in TIP and internet delivery services), Google, Amazon and others".

In her own area of business, "Solar off-grid smart technologies are making 100% lights out, solar-only power a viable option, thereby reducing the cost of power by 50-80%."

For mobile solutions company Comviva, and its head of Africa region Anil Krishnan, some of the most significant telecommunications developments in Africa over the past 30 years include the mobile subscriber penetration rate, which "has grown significantly larger than landlines". He also mentioned the consolidation of telecom operators, leading to "large and medium-size groups running multi-country operations, with very few countries having standalone operators".

He added, "The continent has set the tone for mobile money adoption and growth primarily because it addresses the 'bottom of the

pyramid' and provides financial inclusion."

Speaking of money, a brief impression of African telecoms over the past 30 years by SVP & head of EMEA business James Kirby of CSG, a leading provider of revenue management, payments solutions and more, looked at how even rural work has been transformed. "Historically, a farmer or shepherd would trek for hours, or even days, to get to a market to know the selling price of his produce and then decide whether it was worth selling – a mission with hardly any success rate indication before getting to the market," he said. "Today with GSM and 2G, the same farmer can get price estimates much closer to home from a nearby hilltop before setting off, which dramatically improves his or her opportunity to sell their produce at a desired price point."

For him then, "The impact of mobile and internet connectivity on the African economy is without a doubt significant. Global internet access has played a critical role in enabling access to education services across Africa and actively contributed to reducing the urban/rural divide. By enabling the development of mainstream digital skills, African citizens in more rural areas of the continent have become active and successful participants in the digital society. With many communications service providers being among the largest companies

across the continent, not only have they created skilled jobs in network and IT domains, as well as business and managerial roles, but they have also enabled and encouraged investment and development in their local economies.”

FonYou aims to transform MNOs into completely digitised organisations that achieve actionable, unprecedented levels of understanding for every single customer. Its chief commercial officer, Albrecht von der Recke, suggested, “While it is obvious the difference wireless and mobile communications has made across Africa – putting global communications and internet access into the hands of many previously beyond the reach of typical landline connectivity – it is perhaps also the change in business model that made the biggest impact.”

He explained, “The arrival of pre-pay mobile contracts made smartphone usage more affordable and more accessible. According to the GSMA, measured against monthly GDP per capita, smartphone affordability in both usage and purchase price has almost halved since 2015.”

He added, “So while the mobile technology itself has deservedly captured attention, it is the changing economic model that has underscored the technology and enabled it to make a significant difference. And mobile has done much more than just deliver voice and data access – it is bringing hundreds of millions of people in Africa into a world of digital payments – with some 500 million mobile money accounts in sub-Saharan Africa alone. Mobile, and its assorted features, is doing more than any other technology or initiative to close the digital divide.”

Arik Zenouda, VP sales for Francophone Africa, Gilat Telecom, which offers satellite and fibre-based connectivity solutions, highlighted undersea connectivity. As he said, “Africa has literally become more closely connected to the rest of the world with the construction of a series of submarine cables. In the process, Africans have become world leaders in ‘mobile web’ technology – accessing the internet through mobile devices.”

He added, “Mobile usage exceeds landline usage, but perhaps a more interesting trend is that, even among mobile users, data usage exceeds voice traffic. While much of Africa is still developing 3G infrastructure, 4G traffic is growing at a faster rate. And 5G infrastructure is on the way. Mobile devices are increasingly using Wi-Fi to offload mobile traffic—51% of it—onto the fixed network.”

And there’s more to come. “The coming 5G technology will offer 100 gigabits connectivity, roughly 1,000 times as fast as 4G connectivity.”

Brian Jakins, RVP, Africa sales, of satellite technology company Intelsat, pointed out that Intelsat was the first operator to introduce satellite services to Africa and has been an



Photo: Gilat Telecom

Arik Zenouda, VP sales Francophone Africa, Gilat Telecom: “Africa has literally become more closely connected to the rest of the world.”

integral part of Africa’s communications fabric since 1965, enabling critical communications infrastructure throughout the continent.

Intelsat was also the first to enable pan-regional broadband networks, to provide critical connectivity to educational networks, to deliver a direct-to-home (DTH) platform and to bring cellular backhaul services to the continent.

He said, “Since the inception of Intelsat service on the continent, we have watched the region change and grow. Over the past decade in particular, African connectivity has improved dramatically.

So with connectivity on the rise, Africa has come a long way on its journey to closing the connectivity gap and providing broadband everywhere it’s needed. “However,” he added, “there’s still a significant amount of work to do. The coverage gap in sub-Saharan Africa remains the highest globally, despite the fact that the region is home to 67% of the world’s population.”

Continuing with the satcoms theme, Pieter Paul Mooijman, regional vice president, Africa, ST Engineering iDirect, discussed what he calls ‘seismic change’ in the satellite communications market in 30 years. “Looking back, we were using very large ground systems featuring large antennas with low throughput capabilities and inefficient space and ground equipment that resulted in very high cost per Mb. Today, prices have dropped considerably thanks to smaller,

more efficient ground systems known as VSATs that provide much higher throughput, dramatically lowering prices.”

Of course satellite technology has developed over the years to suit a plethora of applications – from enterprise, media and broadcast all the way through to delivery of connectivity to mobile platforms on land, sea and air.

Today, he said, “we are on the cusp of another revolution, one that is possibly the biggest in the history of satellite communications. New, multi-orbit constellations with satellites numbering in their thousands will require new innovations and technologies on the ground but will change the game and enable satellite to become interwoven into the connectivity landscape along with 5G and other access technologies. There are exciting times ahead and the ground segment will be the key to realising the potential of this new era.”

A similar feeling was expressed by Kyle Whitehill, CEO at Avanti, a company that provides high-throughput Ka-band satellite connectivity with extensive coverage across Europe, Middle East and Africa. As he said, “Over the past 30 years significant progress has been made in connecting some of the hardest-to-reach communities in sub-Saharan Africa, and we are proud to have played a part in that.”

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Teaching techniques that go above and beyond

Falling prices, more efficient technology and an undoubted need are driving the use of satellites and VSATs to support education and learning in some of Africa's remote areas. The sector is still developing but, as Vaughan O'Grady found out, it already involves some very big names.

Satellites are now helping to bring education to students in Africa's remote areas.



Photo: Adobe Stock

GIVEN ITS REACH, satellite technology would seem an ideal way of supporting the delivery of education to remote areas. But is it?

In fact, it already does. As an example, back in 2015, Avanti Communications, a provider of satellite technology across Europe, the Middle East and Africa, began leading a consortium that delivers improved numeracy and literacy educational outcomes to marginalised schoolchildren in Kenya through a UK Foreign, Commonwealth & Development Office (FCDO)-funded project called iMlango.

After five years the project had been implemented in 205 primary and 40 secondary schools across four regions in Kenya, reaching over 180,000 marginalised students. It showed exceptional learning outcomes for these children, doubling their numeracy

learning rates.

The programme incorporates satellite broadband internet-based individualised learning which is supported by in-field technical support and by real-time monitoring based on sophisticated machine-to-machine learning and artificial intelligence technologies.

Nor is this the only example of such inventive approaches to combining satellite communications and education. We asked three major players in satellite communications to tell us about their work in this field. First of all, we

Satellite can provide internet and broadcasting solutions to deliver e-lectures and virtual classrooms

asked, how can satellite communications can be an effective delivery system for remote learning in Africa?

As Amir Cohen, VP of business development and engineering, Gilat Telecom, put it, such approaches are more cost-effective than they once were. He said, "Gilat satellite technology has changed a lot in the past five years. These changes mean we can now deliver communication to the most remote rural places at a reasonable cost. Many schools in rural Africa are not connected to any telecoms infrastructure, so satellite is the only solution to equip those regions and support e-learning and more."

Caroline De Vos, co-founder and COO / public relations at satellite service provide SatADSL pointed out that satellite communications can be very effective for delivering e-learning solutions and platforms in

remote and hard-to-reach areas where terrestrial connectivity infrastructure may be lacking. She said, "Satellite connectivity offers ubiquity thanks to its capability to provide global coverage, cost-effectiveness, quick set-up times and immediate access with simple terminals, and reliability against terrestrial infrastructure damage."

Scott Mumford, is chief executive officer with Liquid Telecom Satellite Services, part of technology group Liquid Intelligent Technologies, and a board member at the trade group the World Teleport Association. He said, "The vast majority of schools in Africa are outside of the main metropolitan areas; as such there are few to no connectivity options available to them. Both fibre and mobile network operators cannot justify the high cost of infrastructure build into these locations."

He continued, "This is where satellite comes in to its own! With ubiquitous coverage of the African continent, satellite can reach, in one guise or another, every school – no matter how remote."

But that's not all. As he said, "With the advent of HTS [high throughput satellite; an approach that offers a significant increase in capacity] and the addition of fleets at altitudes lower than the traditional GEO, the cost of both the terminal equipment and the relative cost of the connectivity have fallen significantly."

This is encouraging news – but what can be delivered, to where and via what technology?

Cohen said, "Gilat Telecom has invested in high-edge satellite systems technologies which enlarge its coverage to the entire sub-Saharan region. We can provide capacity from a VSAT of a few Mbps to VSAT of 100Mbps."

However, as well as a lack of telecom infrastructure, many schools don't have electricity. "So," he said, "they need to be provided with a full package of satellite hardware,



Amir Cohen of Gilat: We can provide capacity from a VSAT of a few Mbps to VSAT of 100Mbps.

solar panels and Wi-Fi – which can not only serve the e-learning needs, but also telemedicine, governmental applications and so on."

De Vos added, "Satellite can provide internet and broadcasting solutions to deliver e-lectures and virtual classrooms that can be viewed both online and recorded. It can enable virtual

With ubiquitous coverage of the African continent, satellite can reach, in one guise or another, every school – no matter how remote

chatrooms, allowing students to ask questions and receive support from teachers, and can also be used to make electronic textbooks and online training applications and computer simulations available."

As for the role of VSATs, she said, "For these applications to be delivered successfully via satellite, the VSAT terminal needs to be installed at a school or location where pupils are. This would allow a company like SatADSL to multicast a live stream or a video of a teacher in a studio to several schools simultaneously."

And of course SatADSL can make that happen. "Through an innovative cloud platform like neXat, which offers the VNOFlex feature, one customer organisation can manage several sites dynamically, allocating more or less bandwidth as needed among the several schools without needing to contract new capacity."

LT's Mumford described this as "an ever-changing landscape from a satellite perspective, with unprecedented levels of investment into space-based communications. This, combined with the technological advancements in the ground segment capabilities, has really moved the offerings forward." He continued, "If we are looking at VSAT and GEO satellites, we're now offering 30Mbps - 50Mbps on traditional one-metre diameter terminal equipment with price points of under US\$1,000 and monthly service costs of under US\$500."

He concluded, "When looking at MEO (medium earth orbit) the terminal pricing is still relatively high, but the bandwidth capabilities are into the Gbps. Now, with the advent of LEO (low earth orbit) we're seeing another new dimension. Terminal pricing for LEO access is still relatively high at this point, at over US\$1,000 a unit. That will drop significantly with volume, but we are seeing services of 100Mbps - 200Mbps – which is great news for the continent!" ©

Helping remote students to access education

What's on offer in the remote learning space? There's a wide variety of satellite communication-based offerings meeting the needs of educators and learners in remote areas.

For example, according to Amir Cohen of Gilat Telecom, his company has full coverage over sub-Saharan Africa with different technologies to support many needs. "As a service-oriented company, we are delivering not only the satellite communication, but an entire solution – from design level and shipping to deployment and civil work including solar panels, networking and software, and on-site training."

SatADSL, meanwhile, has developed a high-value solution targeting e-learning applications in rural areas. After serving many other sectors in very remote locations in Africa, SatADSL has delivered an effective solution to serve e-learning applications in rural areas thanks to

in-the-field experience and expertise.

Caroline De Vos explained, "In Western Africa, with affordable and easy-to-install micro-VSAT equipment, SatADSL established an e-learning solution between a studio, where lessons are filmed by a teacher, and local classrooms, which the lessons were streamed to. High-quality video, with real-time uplink, and real-time interactivity with a chat room for remote students to interact with a teacher was delivered. The availability of the service is running at more than 99.5%."

SatADSL set-up a VNO, allowing the operation of an e-learning videoconferencing application as well as providing internet access in both the studio and classrooms in the entire territory. She explained, "Each school is equipped with an affordable satellite telecommunication equipment – a modem

inside and VSAT antenna outside – for direct educational purpose, and a PC and multimedia equipment – projector and screen – to screen the lessons."

She added "An installation such as this can also serve as a hotspot for the community, providing internet access when the connection is not used for e-learning purposes – for example after school or during the weekend."

Liquid Intelligent Technologies also has a lot to offer. Scott Mumford explained, "We have recently added a number of new high-throughput beams to our capabilities, providing our services into countries we previously haven't been able to, and the reaction and take up has been really exciting to see. We are looking at all of the technical options to continue to increase our capabilities and product portfolio across the board."

Cellulant rolls out digital payments solution in Ghana

PAN AFRICAN PAYMENTS company Cellulant has acquired PSP License in Ghana as it rolls out a digital payments solution for businesses.

Also, Cellulant is launching Tingg in Ghana to provide the best customer experience for all persons and businesses looking to digitize their payments, collect and disburse to customers today.

This announcement comes after the Central Bank of Ghana issued Cellulant a payment services provider (PSP) License. The PSP License allows Cellulant to aggregate merchant services, process financial services, acquire merchants; deploy POS systems, and aggregate payments for banks, institutions, and the general public. The license is a requirement under the Payment Services Act 2019 which mandates that all Financial Technology or digital payments companies be licensed by the Bank of Ghana.

YahClick partners with GCES to provide satellite connectivity for 9mobile

YAHCLICK, ONE OF the leading satellite broadband services from global operator Yahsat, and its partner Hughes Network Systems, have signed a strategic partnership with Global Communications Extension Services Limited (GCES) to provide satellite connectivity for 9mobile, one of Nigeria's leading mobile network operators.

The collaboration is set to bring satellite connectivity to hundreds of cellular backhauling sites, delivering 9mobile with a reliable and robust means of rural connectivity across its entire Nigerian operation.

The introduction of satellite services within rural and unserved areas will also positively impact the economy of the country as it strengthens Nigeria's policy of financial inclusion championed by the Central Bank of Nigeria. Money vendors operating Point of Sale (POS) services and other merchants in these areas will benefit from the availability of broadband connectivity and increased financial transactions resulting in greater profitability, therefore raising their standard of living.

YahClick and GCES will work to support 9mobile in providing its high-quality telecommunication services to individuals across Nigeria. With the addition of YahClick's reliable satellite connectivity solutions, this partnership will ensure that citizens throughout the country have access to secure, affordable connectivity options nationwide.

Farhan Khan, CEO, YahClick, commented, "Our agreement unites three companies in working shoulder to shoulder to



Photo: Adobe Stock

This partnership is expected to allow GCES to introduce 9mobile to the latest telecommunication applications, equipment and IT infrastructure.

bridge the digital divide while enabling residents and businesses to realise their potential."

Adamu Babadisa, chief technical officer of GCES, added, "This latest partnership will allow us at GCES to introduce 9mobile to the latest telecommunication applications, equipment and IT infrastructure we provide to help sustain their mobile network operations. This partnership will not only eliminate the barriers to mobile internet adoption within remote regions in Nigeria but also improves the citizens' access to affordable devices, data plans and opportunities which arise from staying connected."

Tizeti launches NeXTGEN connectivity solutions

WEST AFRICA'S SOLAR-BASED internet and voice service provider Tizeti has launched new connectivity offerings that aim to widen the broadband envelope in Nigeria with more robust internet plans, expanding coverage, especially in Nigeria.

The products also reiterate the company's focus on delivering a simpler and more convenient technology offering with a smart customer care operation and integrated customer relationship management systems.

Speaking at the company's annual conference, Tizeti's CEO Kendall Ananyi said, "The global pandemic expedited the need for technology to be more agile, faster, more intuitive, and easier to understand, irrespective of the peculiarities of its users. Many people were unable to quickly adapt to the new normal of working, connecting to family and colleagues remotely, and accessing various educational, occupational, entertainment, and other services virtually. Many firms took an unnecessarily long time to adjust to the constraints the pandemic brought, and this resulted in declined productivity, ineffective transformation, and lost revenue."

"Technology is only useful when it is creating solutions to problems and we believe that as a leader in the digital space in West Africa, we have a role to build the technology platforms that will allow our user base to be agile and relevant in the coming years. We saw the transition from physical everything to the work-from-home model overnight and knew that we had to help people and businesses change the way they work and play."



Kendall Ananyi at Tizeti NeXTGEN.

Photo: Tizeti

VYIZO and CAMPOST sign agreement to deploy digital payment in Cameroon

VYIZO, A MOBILE financial services technology company, and CAMPOST, the national provider of postal and financial services in Cameroon, have signed a commercial partnership agreement to deploy and operate digital payment and mobile financial services throughout Cameroon.

VYIZO will initially deploy its VYIZOPay solution for CAMPOST. VYIZOPay is a state-of-the-art mobile financial services technology platform that will enable CAMPOST to securely rollout and manage digital payments for government services, money transfers and international remittances as well as mobile financial services for micro-credit and micro-savings.

VYIZO will also provide CAMPOST with strategic consultancy to increase the awareness, education and, most importantly, the adoption of these services, especially among the large underbanked and unbanked segments of the population in Cameroon.

CAMPOST is also planning to enable digital payments and mobile financial services for higher education, welfare disbursement and micro-insurance.

"Our partnership with VYIZO and the new digital payment and mobile financial services we are launching together will strengthen our competitive positioning and create important new revenue streams for CAMPOST," stated Pierre Kaldadak, CEO of CAMPOST.

"More importantly and based on a strategic vision we share with VYIZO, our new digital services hold the potential to improve the lives of our customers in Cameroon and will deliver new access to essential services that were previously unavailable to many segments of our society."

CAMPOST's new services are intended to be financially and socially inclusive and will be available to the entire population of the country.

Does SDN mean a whole new world for operators – or just a more efficient and flexible one?

Photo: Adobe Stock

The quiet revolution

The concept of software-defined networks may once have seemed impossible in a hardware-defined and dominated world. Today SDNs are redefining network architectures in markets around the world.

Simon Fletcher, CTO of wireless advisory firm Real Wireless* explains why.

I FIRST BECAME seriously involved in software defined networks (SDNs) more than 10 years ago. At the time I was working with product and standards development teams influencing an ETSI** policy document looking at SDN and network function virtualisation (NFV) as separate, but highly interdependent trends. The plan was to turn what was then a trial concept into a commercial reality.

While often mentioned in the same breath, SDN and NFV play different roles in redefining network architectures.

On the one hand, the main driver behind SDN is to separate the network control plane (essentially the routing that determines how data is sent from one place to another) from the transport layer. And this encapsulates the conceptual underpinning for SDN – to move from a vertical to a horizontal separation of the control and transport layers in mobile networks.

NFV, on the other hand, is about abstracting network functions from the hardware on which it runs. Theoretically, you could have SDN without NFV – a software-defined network with static hardware.

The reason this work was – and remains – important is that service providers always want

to get away from operational and architectural inflexibility and vendor 'lock in'.

Before the concept of SDN, networks were hardware-defined and the hardware market was dominated by two or three very big players that sold vertically integrated appliances that, while operationally robust, provided limited choice and offered very little operational flexibility.

From the start, SDN benefitted from concepts and standards approaches in the IT networking sector

To address this, the mobile industry borrowed standards and interfaces like OpenFlow from the IT world to enable secure and efficient access to and manipulation of network routers and switches. These devices could be either physical or virtual.

The proof of concept was established through a small-scale Stanford trial that demonstrated mobile network functionality over Wi-Fi using an SDN. This encouraged the support of pioneering operators like BT and Telefonica and led to the ETSI initiative.

Today SDNs are becoming mainstream. It's true that there have been some bumps along the way, not least because switch vendors and some of the big equipment suppliers felt they could make more money in the short term by maintaining the status quo. There is also the issue of squeezing the most out of (costly) legacy hardware.

But the programmability of networks has become increasingly important to service providers. As data usage over mobile networks continues to surge, more granular resource management becomes a priority. The flexible, efficient end-to-end management of data flows has become business-critical to operators – and SDNs hold one of the keys to making it happen.

SDNs mean that the management plane can be separated from the data flow and that these aspects of network functionality can be sourced from different suppliers. This is partly about reducing capex by making it possible, for example, for operators to source hitherto expensive switches and routing gear from white box suppliers without compromising the integrity of network operations. But it is also about improving network efficiency by having more control

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A catalyst for change

There's been significant growth in e-commerce in Morocco in the past year according to a new report from market research company Euromonitor International. Vaughan O'Grady asked Jacob Adib, analyst at Euromonitor International, why this growth happened - and whether the trend will last.



A bazaar in Rabat, Morocco. The pandemic has changed buying habits.

WITH PHYSICAL STORES closed for an extended period during lockdown and consumers fearing shortages of essential products, in 2020 Moroccans began to shop online in growing numbers. The E-Commerce in Morocco report from Euromonitor International discusses these changes and looks at what the future may bring for this market.

However, was e-commerce already on the rise in Morocco before Covid-19? Jacob Adib, analyst at Euromonitor International, said, "Not as much – and growth was seen to be stable." It seems that the pandemic became the catalyst for accelerated growth in e-commerce retail, notably because purchasers of fast-moving consumer goods (FMCG) remained at home.

That said, only two thirds of households in electrified areas have access to the internet (24 million Moroccans are connected). There is still a large handful of consumers who do not; the remaining one third rely on traditional purchasing habits. However, as Adib explained, "Historically, pre-pandemic e-commerce in North Africa has been weak and the use of e-commerce platforms was low due to strong reliance on traditional stores, but a combination of the pandemic and growth of technology in the region has been a catalyst for change. The pandemic has significantly increased this growth."

And it's not a small rise. "Morocco saw dynamic growth in online sales in 2020. Growth in 2021 will be slower but is still strong and represents a major opportunity." He added, "Major e-commerce platforms such as Jumia have invested in regional infrastructure and developed partnerships."

There's been a windfall for government too. "The Moroccan tax authorities have benefited from the rise of e-commerce due to the tax benefit. This has benefitted the Moroccan government in terms of revenue."

Most if not all households use Facebook, Instagram and WhatsApp on a daily basis.

As for which retail categories dominate, e-commerce, as we have seen, is growing, but grocery retailing and pharmacies are the other main sectors that performed positively during the pandemic. All the others declined in growth in 2020.

Of course, Covid-19 restrictions (such as the closure of informal markets during the lockdown) have decreased competition coming from such informal markets as Kria'a in Casablanca.

Customers were no longer able to buy cheap products from such places; therefore, they have switched to e-commerce platforms. This has eventually, led to the growth of e-commerce start-ups (such as Animal Souk) in large cities such as Casablanca and Rabat.

Oddly enough, this activity extends to pets. As Adib discovered, "The pet industry has shown us that most pet stores have an online presence and started engaging with customers via social media."

The leading pet care stores – AlloCroquettes is one – have adapted the WhatsApp ordering service purposefully, to increase their customers' interaction and reach them anytime and anywhere.

Again lockdown encouraged this. "E-commerce has recorded high growth as most physical pet stores were closed or have restricted working hours." But modern retailing stores such as Marjane and Carrefour have also revised their e-strategies. "Customers are now able to order online most food products – including pet ones – and have their items delivered to their doorstep."

Phones and computers are used to do this sort of business. Banks too have played a vital role in changing consumer behaviour. Adib said, "They are constantly encouraging payments by card to give some reward credit

card points and/or gifts to cardholder.” Banque Populaire is an example.

And, as we have seen in the case of the pet care stores, social media has played a vital role in raising customer awareness in Morocco. “Most if not all households use Facebook, Instagram and WhatsApp on a daily basis. They are constantly informed about the products that are in the market through these platforms. Grocery retailing e-commerce start-ups such as Khaddar Pdar are one of the emerging business models during the pandemic. Different platforms are marketing fresh food and other grocery products through social media platforms – Facebook, Instagram and even WhatsApp.”

The events of 2020 have clearly meant a boost for Morocco’s online retail – but was it ready? Apparently, as Adib explained, online retail has responded by operating through certain companies. “Companies specializing in the service – such as Glovo, Telegaz, Ajidaba or Sewbilila – have experienced significant growth in their turnover. This is also the case for several start-ups that operate in different sectors of activity, and that have noted a significant increase in their turnover since the appearance of Covid in Morocco.” Textiles, small household appliances, shoes, decorations or telephones – low budget products, or products already known – tend to dominate.

The digital circuit is little developed in Morocco because of a wariness about transactions online, “but,” said Adib, “Morocco was ready for the growth in demand due to the number of start-ups and online retail services available which have seen a growth in users”.

While some households were either stockpiling or buying in bulk, others turned to e-commerce platforms

So Covid-19 fears have undoubtedly impacted consumer behaviour in Morocco. “While some households were either stockpiling or buying in bulk in attempt to reduce their monthly stores ‘visits (fearing contamination), others turned to e-commerce platforms to shop for grocery and non-grocery products.”

But will this trend continue? Adib noted, “A lot has gone into building and developing infrastructure for e-commerce platforms, so we’re expecting ecommerce to benefit from these investments and continue to grow – albeit with growth rates lower than in 2020. Apparel and consumer food services are expected to benefit particularly from these investments in digital infrastructure.

Many of the companies in these industries are revising their digital strategies. They are increasing their presence in social media, working on launching their websites and signing partnerships with third-party delivery services such as Glovo and Jumia.”

And it won’t stop there. “Over the next five years, on average, e-commerce in the Middle East and North Africa is expected to grow by almost 30 percent across the different industries, outpacing global averages.”©

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The Euromonitor International report E-Commerce in Morocco is priced at £650 and can be purchased at www.euromonitor.com/e-commerce-in-morocco/report

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through programmable orchestration software.

This transformation of network architecture initially proved its worth in the world of data centres and cloud providers. It then steadily became part of the mobile operators’ approach to network design.

It’s probably true to say that, as technology revolutions go, SDN has been reasonably successful. At some level, kit has become more generic and commoditised, but in practice significant levels of vendor lock-in remain. While the equipment will be standards-compliant, there is usually enough complexity and there are sufficient proprietary features to prevent high levels of mix-and-matching delivering optimal outcomes. And the plug-and-play dream promised by the early SDN vision remains more aspiration than reality.

This said, SDN has enabled network operators to accomplish the vertical separation of control, user and management planes which, from an architectural perspective, is becoming increasingly important for the design and operation of 5G networks.

It’s tempting to equate the SDN trajectory with the ongoing architectural revolution implied by the current open RAN initiatives. There are certainly legitimate parallels. Both have taken a similar amount of time to make the journey from the drawing board to



Simon Fletcher: “Today SDNs are becoming mainstream.”

commercial reality. And both are likely to prove very much more difficult to implement in practice than seemed apparent at the beginning of the journey. But there are also some important differences.

From the start, SDN benefitted from

concepts and standards approaches in the IT networking sector and was shaped by objectives that were, in general, universally agreed. Open RAN is much more fragmented – not just from the point of view of objectives and standards, but also in terms of the political and regional agendas informing, and in some cases inhibiting, progress and consensus.

From the Real Wireless perspective, we believe that the SDN revolution has been a progressive evolution of network architecture because it provides more resource control to network operators and more supply chain diversity, which is always something we champion.

The other side of the diversity coin is complexity – and this is the area in which we support clients – helping to guide technology choices not just to address current needs, but also to protect investments on the path to 5G and beyond. ©

**Real Wireless is the world’s leading independent wireless advisory firm. Its network of experts includes engineers, physicists, economists, security advisors, business strategists and deployment specialists. www.real-wireless.com*

***ETSI (European Telecommunications Standards Institute) is an independent, not-for-profit, standardization organization in the field of information and communications.*

Is 5G FWA a way forward for Africa?

Fixed wireless access (FWA) has been in the news a great deal of late. Phil Desmond asked three major names in the business of supplying FWA connectivity, along with the GSMA, which represents the interests of mobile operators worldwide, to give us their view of the relationship between licensed technologies (like 4G and 5G) and FWA - and what FWA could mean for Africa.



Rolling out a 5G (or even 4G) FWA network costs less than rolling out fibre.

FIXED WIRELESS ACCESS (FWA) enables network operators to deliver ultra-high-speed broadband to suburban and rural areas, a useful alternative to fibre, and one that can take advantage of the growth of 4G and 5G. But is it right for Africa? And can unlicensed spectrum technologies do a better job of delivering FWA?

For the GSMA, which represents the interests of mobile operators worldwide, licensed spectrum has a number of benefits in its own right. As the GSMA's acting head of sub-Saharan Africa, Angela Wamola, told us, "Licensed

spectrum is essential to guarantee the heavy long-term network investment that is necessary for 5G. Also, licensed spectrum enables wider coverage areas and better quality of service guarantees and has been central to the major global success of mobile services. This includes the progress that's already been made on shrinking the digital divide."

A representative of Inseego, a

leader in 5G and IoT device-to-cloud solutions, pointed out that 4G and 5G connections are a powerful gateway to local Wi-Fi connectivity and other shared-spectrum solutions that deliver high-speed wireless internet to local communities and businesses.

He added, "The need for carrier-anchored support and services, with enterprise security and other features, typically outweighs the

benefits of totally unlicensed technologies. Inseego can provide 4G and 5G solutions for all of these scenarios."

In fact, Inseego offers a full portfolio of 5G and 4G fixed wireless solutions, including devices for outdoor and indoor use cases. These devices can be deployed quickly and cost-effectively to provide fast, reliable, secure broadband connectivity.

Justin Colyn, chief sales and marketing officer of Comsol, a provider of enterprise-grade licensed wireless infrastructure, suggested that for most infrastructure providers, it will be a question of quality versus cost.

Since affordability is a key challenge, FWA is the best option for expanding fixed connectivity in the developing world and bridging the digital divide.

That said, he agreed that licensed FWA services are typically more expensive than unlicensed services due to the cost of spectrum and whether or not 'best of breed' hardware is used to build the network, adding, "In many cases the cost of spectrum differs depending on whether it is deemed to be 'high demand' spectrum in the low, medium or high bands (mmWave)."

However, he added, "The major benefit to consuming services through licensed providers is the fact that specific bands are exclusively assigned to operators for their independent use, so they mitigate interference between services, which is unlicensed services' biggest downfall. In addition, licensed services are more scalable over time as and when unlicensed operators start interfering with one another."

He added, "You cannot really equate unlicensed FWA services to 4G and 5G FWA services because of the difference in speeds achieved in production networks."

Comsol operates in South Africa and runs one of the largest pre-5G FWA licensed open access point-to-multipoint wireless networks on the continent. With Comsol owning the lion's share of the 28GHz band and a fair share of the 3.7GHz band in South Africa, Comsol says it is poised to become a very important player in the 5G FWA market in the next 12-18 months.

Nokia's focus is on 3GPP standard wireless technologies for fixed wireless access, which includes 4G and 5G in licensed and unlicensed bands, the availability of which is regionally dependent. Thus Mohamed Salama, head of fixed networks, MEA, Nokia, said, "In general, unlicensed bands have the advantage of avoiding high costs of licensing but can be spectrum-limited. There is also the risk of contention with other operators using the same bands. "For this reason," he suggested, echoing Comsol's point about interference, "unlicensed bands are best used in private wireless applications or in rural deployments where the chance of contention is limited."

Thus, the advantage of owning the spectrum is that it's completely



Photo: Nokia

Mohamed Salama: "Nokia has a growing list of public fixed wireless references."

reserved for the operator. "With broad 4G/5G spectrum in multiple bands, operators can manage their wireless capacity for distance and capacity across urban, suburban and rural areas to serve mobile and FWA use cases."

So why are 4G or 5G FWA important as future networks are rolled out?

Colyn of Comsol agreed that fibre is top of mind but pointed out that its reach is limited due to costs once the initial economies of scale are reached within a defined area. He explained, "This is where 4G and 5G FWA really come into their own. Rolling out a 4G or 5G FWA network is circa 30% less than fibre, which is material with ROIC (return on invested capital) cycles much shorter than fibre."

He added, "It is important to note though, that fibre and 4G / 5G FWA services are in fact complimentary. Most businesses need some form of resilience and redundancy with everything moving into the cloud – and using a bonded service with both mediums is first prize. With the

pandemic having disrupted the way we worked, the requirement over time to have an always-on service for those working from home is just as important."

He added "Fibre also won't get to the rural areas – and it is vital that licensed wireless services reach the unconnected so that people are able to digitise their worlds and have access to services required."

Nokia's Salama added that the demand for stable and high-speed broadband connections to the home has been very strong over the last years – and it has become even stronger since the start of the pandemic. The lockdowns have reminded everyone that broadband keeps economies and societies operating smoothly.

But fibre rollout takes time, while 4G LTE upgrades are surging, some emerging countries expecting to reach steep double-digit annual growth rates over the coming years. In other countries of the region – mainly South Africa – 5G NR (new radio) mass deployments are currently ongoing.

"Thus," Salama said, "CSPs are seizing this opportunity to grow their business now, by wirelessly connecting homes and small businesses with fixed-grade services." Fixed wireless allows mobile operators to compete head-to-head with fixed broadband services; it also gives mobile operators a new tool for connecting subscribers.

Thus, together with the fast-time-to-market and plug-and-play capabilities, fixed wireless has become a technology of choice for affordable broadband services in the region and beyond. "In the region," Salama said, "Nokia has a growing list of public fixed wireless references including Togocom, Safaricom Kenya, Tizeti in Nigeria, Vodacom South Africa, Zain Saudi Arabia, and Ooredoo Kuwait."

The GSMA's Wamola summed up the importance of 4G and 5G saying, "In the 4G and 5G era, FWA can provide fibre-like speeds with much lower infrastructure costs. Outside fibre footprints in urban areas, FWA is usually the only affordable solution to providing broadband services. Even within the fibre footprint, FWA can provide competition."

But could FWA be relevant to the developing world and bridging the digital divide? And if so, how?

Colyn of Comsol pointed out earlier that licensed wireless FWA is relevant to both the developed and developing worlds. He continued, "It is common knowledge that for every 10% of broadband penetration that the GDP increases by circa 0.16%. Having reliable access to the internet and digitisation creates employment and supports entrepreneurship which is sorely needed in Africa."

He added, "The 4IR (Fourth Industrial Revolution) is vital to Africa renewing itself and setting the stage to become relevant in the global economy. This can only happen if the continent is digitised."

"There are still more than 1.4 billion households in the world with no or with too slow broadband and we're determined to help operators reach them," said Salama of Nokia. "White spots' exist across the world both in

5G FWA in particular has the ability to deliver broader, easier access and higher speed and throughput than traditional wired broadband connectivity.

developed but certainly also developing nations in the MEA region, where even schools and businesses are deprived of reliable high-speed internet connection. This situation makes it very challenging to enable economic growth and provide access to good healthcare and education.

Fixed wireless is of course ideal for hard-to-reach locations or areas with low population densities where radio might be the only way to reach people. Salama also offered a powerful example of the socio-economic benefits of broadband and FWA, in the form of Nokia's work with UNICEF connecting schools in Kenya. "Here, Nokia teamed up with UNICEF and the government of Kenya in a multi-partner collaboration to bring internet connectivity and digital learning to disadvantaged Kenyan schools. Nokia's FWA solution delivers a reliable and stable broadband connection to students' laptops, smartphones, and other mobile devices for the best broadband experience and learning."

The Inseego representative argued that FWA solutions can benefit developing nations in almost every area. "5G FWA in particular has the ability to deliver broader, easier access and higher speed and throughput than traditional wired broadband connectivity, with lower deployment costs and better user experiences," he said.

He added, "Looking ahead, fixed wireless 4G and 5G connections will



Photo: Adobe Stock

Over a billion households have no – or too slow – broadband.

also open the door to greater internet access and economic opportunity in regions across Africa – from basic broadband to advanced enterprise applications."

It is precisely in places like the developing world that a better communications infrastructure can catapult industries forward, and, he pointed out, FWA is particularly cost-effective. "Providing access to a high-speed broadband experience allows internet service providers to leapfrog other broadband options with wireless solutions that can be deployed more economically to deliver reliable internet access almost

anywhere for life-changing experiences."

In fact the GSMA's Wamola suggested that the developing world will see the strongest use of mass-market affordable FWA services. "Fibre footprints in developing countries are typically lower, meaning that wireless services are the primary mechanism for delivering broadband, and dense fibre roll-out is often prohibitively expensive," she explained.

"Since affordability is a key challenge, FWA is the best option for expanding fixed connectivity in the developing world and bridging

the digital divide. It is already the fastest-growing method of bringing fixed broadband to the unconnected due to the limited availability of copper and fibre broadband."

Not surprisingly for an operator association, the GSMA feels that mobile operators have an unmatched ability to bridge the digital divide. "But," Wamola added, "all this potential is not going to happen without governments and regulators putting in place investment-friendly policies that help drive the needed investments and accelerate the rollout of networks." ②

The best possible performance

NOKIA CONSUMERS CAN, of course, currently connect to mobile broadband at home using smart phone tethering and data dongles (Mi-Fi). But these are designed for mobile convenience, not home broadband and they tend to waste radio resources, and hence have lower energy efficiency, while providing limited revenue opportunities for operators.

Nokia, said Salama, has worked very hard to get the best possible performance from FWA. "We use high-gain antennas, 5G massive MIMO and outdoor receivers to improve throughput and radio efficiency," he said. "High-gain antennas target signals as a much more effective beam directed towards the cell site, which also limits interference. Within the radio access network, the massive MIMO arrays of 5G help radio efficiency in a similar way. We

also use outdoor or window mount devices to avoid having to penetrate walls, which greatly improves radio efficiency and, hence, power efficiency. High-gain FWA outdoor receivers can have up to a 30 dB reduction in radio attenuation when compared to an indoor mobile phone, resulting in five times better energy efficiency."

But Nokia hasn't forgotten indoor coverage. "Nokia's fixed wireless CPEs implement WiFi EasyMesh-certified middleware, combining local and cloud-based Wi-Fi optimisation that creates the best Wi-Fi performance for subscribers inside the premise," said Salama. "For 5G fixed wireless, 5G speeds are extended throughout the home or enterprise with the latest Wi-Fi 6 technology."

To reduce deployment costs, guarantee fast time

to market and enable subscriber self-install, the fixed wireless solution includes cloud-based software solutions.

First, the Altiplano FastMile controller empowers the operator's point of sales locations with network data on what services can be offered to customers based on their location and rules can be set to limit the number of FWA subs on any given cell site.

Then, a mobile app ensures that subscribers self-install fixed wireless CPEs properly the first time or enables more efficient professional installs through guided installation from unboxing to verification of service activation.

Such design consideration helps CSPs and governments to accelerate broadband connectivity programmes.

The government is trying to enhance awareness of the switchover.

Making the switch

The switchover from analogue to digital television in South Africa is finally taking place. But, asks Phil Desmond, who will benefit?

AS MANY READERS will know, the ITU announced that the African deadline for the switchover from analogue to digital terrestrial television (DTT), was set for 17 June 2015. The ITU said that this change would herald the development of 'all-digital' terrestrial broadcast services for sound and television for 119 countries belonging to ITU Region-1 (Europe, Africa, the Middle East and Central Asia) and the Islamic Republic of Iran.

However, for much of Africa this didn't happen, or is still ongoing, often because of financial constraints or organisational issues. South Africa in particular has seen many delays and missed deadlines. As we write, however, the process is underway with a finishing date of 2022.

As for who will benefit, Thecla Mbongue, senior analyst with Omdia, a leading global research group, explained, "It's going to free up spectrum, so it's beneficial for both the broadcasting and the telecom segments. In the broadcasting environment the players are going to move to digital platforms whereby they will be able to provide content of better quality and also have access to platforms that will allow them to offer more in terms of number of channels."

She continued, "Telecom segments are going to inherit spectrum from the broadcasting players that will allow them to enhance their services in terms of broadband – spectrum that is more compatible to some wireless broadband technologies that they plan to use, or are already in use, for 4G – and maybe 5G."

Certainly the regulator – the Independent Communications Authority of South Africa

(ICASA) – appears keen to get the process moving so that the 'digital dividend' in the 700MHz and 800MHz bands can be reassigned to telecommunications operators to provide mobile and wireless broadband services. The regulator wants to license spectrum in these and other bands as soon as possible.

The government is trying to enhance awareness of the switchover through a campaign asking people to buy digital television and set top boxes.

Of course there could be further delays. However, Mbongue suggests that even if the auction takes place before it's all over "the spectrum might be used in places where the switchover has happened" and, in theory, the rest of the country could catch up not long afterwards.

Let's not forget there's a broadcasting benefit too. The government is trying to enhance awareness of the switchover through a campaign asking people to buy digital television and set top boxes – if they don't already have them. Poorer households will get a subsidy for a set top box. Sentech, a state-owned company, and the leading provider of electronic communications network services to the country's broadcasting and communications industry is helping to facilitate the set top box rollout.

Mbongue warns, however, that the extra

channels that digital permits might not be something to get too excited about. "Most of the televisions now sold are digital. Also, a lot of people, even in the poorer population, already use satellite services on some sort of digital platforms."

Obviously in some countries there is very little content on the national television channels and a very limited number of those channels in any case. By contrast the portfolio of services like direct broadcast satellite service DStv, and GOtv a paid TV terrestrial service, both owned by MultiChoice, are likely to be more appealing and, says Mbongue, "monthly fees start at prices like 10 dollars or even less a month".

And free-to-air digital channels already exist – like e.tv, South Africa's biggest independent and free-to-air television channel, established in 1998. "So," says Mbongue, "there is an audience already watching something digital in any case."

But there's still mobile communications to get excited about – not least because more spectrum could – possibly – address the vexed issue of high data prices.

Meanwhile, after vague ministerial comments about reviewing the implementation process and inefficiencies and bottlenecks the switchover process has finally begun.

The analogue signal was switched off in Boesmanskop and surrounding towns in the Xhariep district municipality in March. Gauteng will round off the process in January 2022.

Thus a much delayed digital switchover will actually finish next year. Will the government finally get this right? "I think it has to," said Mbongue. "But you never know." ©

Photo: Adobe Stock

'You win I win', a motto that fuels Innovation and Customer Delight: BlackNGreen

In the competitive world of telecom services, the biggest challenges telecom operators face today are revenue growth, usage, user retention and customer delight. Atul Madan, CEO of BlackNGreen Mobile Solutions, explains this, while highlighting the company's strategic vision.

When was BlackNGreen founded and what are its main industries?

BlackNGreen Mobile Solutions is a next-gen telecom value added and digital services company, founded by entrepreneurs Rahul Gupta and Karthik Shankar in 2011. Ever since BnG has been providing services in space like M-VAS, Digital Services, Enterprise Solutions, Real Money Gaming, and Cloud-enabled OBD solution to telecom Operators, Enterprises, and governments around the globe. We endeavor to provide affordable and customer-aligned solutions.

Tell us more about BlackNGreen. What region does it cater to?

BlackNGreen Mobile Solutions is one of the leading innovators in telecom VAS, Gaming, digital services, and Enterprise segments, with considerable focus on emerging technologies, domains and business practices across the world. As an innovation-focused VAS product and telecom solutions provider, the company aims to stimulate growth for telecom operators globally.

After establishing a global presence, the company is now making a breakthrough in the geography and technology spread by leveraging innovative and patented solutions and processes. From Voice to Rich Media to gaming to Enterprise solutions, the technology spread of BlackNGreen Mobile Solutions knows no bounds.

BlackNGreen is amongst the fastest-growing mobile technology companies in the world. Thanks to the highly passionate team that brings innovative, customer-focused ideas to life. At BlackNGreen we focus on Customer Delight and that has helped us build long-term relationships with our customers, where our customers see us more as partners in delivering true value to mobile subscribers. We are a truly multicultural organisation with people from 25+ different nationalities bringing their rich understanding of different parts of the world to help innovate and create solutions that are relevant and needed by mobile subscribers.

With an extended focus on the development and provision of path-breaking products and services for over a decade, BlackNGreen Mobile

Solutions has become a truly multinational company with business in 90+ countries and 110+ telecom operators spread across Africa, Caribbean, Europe, Middle East, South East Asia and South Asia.

What are the main challenges faced by telecom operators, and how are your products helping to address them?

In the competitive world of telecom services, the biggest challenges telecom operators face today are revenue growth, usage, user retention and customer delight. Increasing competition with OTT and internet platforms, cloud-enabled services, protecting investments in the ever-changing technology sector and shorter product lifespan are some challenges that telecom operators worldwide are trying to address. BlackNGreen Mobile Solutions is a customer-focused services provider that leverages years of global experience to bring real value to the telecom operators and their customers while keeping in mind the challenges being faced by the telecom operators.

BlackNGreen helps operators in staying ahead of the technology curve and business cycles, by working on solutions which are aligned to the technology and services of tomorrow like 5G, Cloud, Gaming and digital services. We further help in adding new revenues for operators by introducing new services in segments such as entertainment, spirituality, productivity, education, and health – services that generate true consumer delight.

Are there any current or recent projects/contracts/news updates you are working on, which you would like to highlight?

BlackNGreen Mobile Solutions believes in turning opportunities into a successful business model by redefining the product definitions and introducing customer-focused solutions. The company is currently working with top gaming companies and leading mobile gaming studios to develop and integrate multiplayer gaming platforms with integrated use of innovative payment instruments to enable a superior gaming



Photo: BlackNGreen

Atul Madan is the CEO of BlackNGreen Mobile Solutions.

BlackNGreen helps next-gen operators in staying ahead of the technology curve and business cycles

experience to mobile consumers.

To summarise, our focus is on gaming, digital services, next-generation voice VAS and enterprise communication with cloud enablement and artificial intelligence as technology drivers.

What strategies have helped to improve the brand identity?

Customer delight, innovation, and staying ahead on the technology curve have helped us grow rapidly over the last decade. Our multicultural team helps us innovate and create solutions relevant across geographies. We do not hesitate from walking the extra mile to deliver agile, user-centric, affordable, and innovative solutions to telecom operators. As a future-forward company, our motto explains it all - "You win I win."

What importance do you attach to service and support?

"You win, I win" is not just our motto – it's our culture, one that defines our ethos. We don't work towards providing customer support, we work towards providing customer delight. We believe that a happy customer is the only way to create a sustainable organisation. Our customer delight philosophy starts right from the time we engage with our customers to introduce a solution, to deliver them, and then working together with customers to grow revenue with a close eye on subscriber satisfaction. ☺

Continued from page 18

This, he pointed out, has traditionally been a challenge for even the largest mobile network operators (MNOs) due to limited terrestrial networks. “But,” he said, “by working in close partnership, we have been able to help operators expand their networks to reach rural locations.”

The company achieves this by providing VSAT connections that deliver high-speed and reliable 2G/3G and 4G connectivity in rural and remote sites, in doing so bringing telecommunications to those that have never before been connected to the rest of the world in this way.

Whitehill added, “Such progress is critical as technology has the ability to empower people and strengthen communities, from individuals to family and friends, and to help small businesses be more competitive.”

He continued, “It can also improve access to quality education, providing children with the knowledge, tools and opportunity to learn, grow and build a better future for their families and communities. This has a knock-on impact on the country’s employment rate which can help further boost economic growth.”

A much newer entrant is Gist Mobile, which offers a simple calling and messaging app. As Aramide Adebajo, co-founder, said, “Gist Mobile entered the sector in 2020, just at the start of the pandemic. Since then the global pandemic has rewritten many business models.”

As for what the company has observed in the telecommunications sector, he said it includes “an increase in remote ways of working which meant telcos and companies that have tools, apps and infrastructure components that enable remote working have seen a hundredfold increases in their customer base”. There’s also e-commerce, digital transformation and online marketing, which have increased significantly, “especially with the use of social media and platforms. A lot more social influencers and content creators are used to promote brand marketing.”

And, as we know, the rise in smartphones and mobile devices is providing more ubiquitous access to the internet.” But he also cited the rise in crypto trading and digital wallets “through the enablement of platforms that encourage and enable access for regular consumers”.

He added, “Mobile operators, fixed wireless providers, Wi-Fi companies and cloud and hosting providers have both been challenged and energised by these changes. There is more pressure to improve access to services, provide more capacity and improve quality of services and products.”

We’ve talked a lot about connectivity. How about phones? Michel Mboule, BD manager – Western Africa of KaiOS Technologies, the smart feature phone company, made an interesting

point, saying, “The most significant development in telecommunications in the African market has been the acceleration of African-based players. Since KaiOS started to work in Africa with MTN back in 2019, we’ve seen growing exposure and partnerships with regional players – both on devices and telecommunications.”

Backing this up, he said, “The mobile ecosystem is also expanding in speed and scale, with more and more local developers entering the market.” Among the company’s own partnerships are cooperation with talent marketplace Gebaya to support the education of talented African software engineers, and with Roducate, a mobile learning app, to provide comprehensive curriculum-based education to students in Nigeria.

Mboule suggested, “The pace of this transformation is accelerating and is shaping the new digital landscape in Africa. With our operating system that powers affordable phones at a fraction of smartphone cost, yet loaded with all the essential smartphone-like capabilities, we’re closer to the mission to get everyone connected. This is what we at KaiOS are striving for, alongside our partners.”

Returning to undersea cable, Steve Briggs, chief sales and marketing officer at SEACOM, said, “SEACOM entered the African market in 2009, with the first subsea internet cable connecting the east and southern coast of Africa to Europe. Since then, SEACOM’s five African markets (Kenya, Uganda, Tanzania, Mozambique and South Africa) have enjoyed tremendous digital innovation and growth, largely thanks to affordable and reliable internet connectivity.”

As for general developments relevant to Africa, Briggs’ colleague Tonny Tugee, managing director at SEACOM East and North East Africa, cited internet data democratisation – “easy access to all internet users driving penetration levels (Kenya to a high of over 80%)”. He also mentioned improved quality and experience of internet access and scalability. “A Gigabit economy is now a reality,” he said.

He also mentioned, economic growth “through growth of the knowledge

economy plus FDI [foreign direct investment] growth in the region focused on the ICT sector. All sectors in the economy are now embracing automation and adopting digital technology for growth and efficiency.”

And, looking at Kenya in particular, he cited its cutting-edge innovation in ICT. “M-Pesa, digifarm, e-health etc are among renowned and life-transforming ideas.”

Broadcasting and telecoms have, in some ways, converged over the past 30 years. SES is a provider of satellite and ground communications solutions and Clint Brown, vice president, sales and market development for SES Video in Africa, said, “When we entered the market in the early 2000s, we were focusing on delivering satellite TV. The focus has since shifted to also delivering high-quality HD content where demanded by the markets. With the popularity of smartphones and tablets in recent years, the way viewers consume content has changed, and broadcasters have had to adapt their business models to cater to their evolving needs.”

Carole Kamaitha, vice-president, sales, Africa, SES Networks, added, “Since 1991, the connectivity landscape in Africa has changed dramatically. The continent has seen multiple fibre-optic cables laid and many satellites launched, including the O3b constellation, resulting in a rich supply of connectivity. Governments and businesses have leveraged



Photo: KaiOS Technologies

Michel Mboule, BD manager – Western Africa of KaiOS Technologies: “The pace of this transformation is accelerating and is shaping the new digital landscape in Africa.”

this connectivity to connect people and communities and transform industries while propelling economic growth and business innovation that we are seeing in Africa today.”

Satya Mekala, MD of World Telecom Labs, a leading name in wireless access, summarised the most significant developments in a few words: connectivity and mobile money. He explained, “Africa showed the world how mobile money could work and bring more financial security to the unbanked. But, of course, the industry has a long way to go to bring broadband, and digital services, to everyone across this vast continent. However, in terms of rural connectivity, we have finally seen a change of heart and real plans from the MNOs to connect the unconnected population of rural Africa.”

For Shanks Kulam, co-founder of x-Mobility, which is providing new telco revenues for brands and MNOs, it's also simple: it's the mobile internet. “It has levelled the playing field for the whole of Africa and, thanks to services such as digital MVNOs, it has also made it easier for calling and messaging as well.”

William Ponela, CEO of solar energy company Zonful Energy, goes back to the smartphone. “It has enabled so much more to be done and has revolutionised industries such as agriculture, sanitation and energy. It is now possible for the energy sector to easily communicate with customers in rural areas,” he explained.

And don't forget security. Kaspersky is a cybersecurity and anti-virus provider and Bethwel Opil, enterprise sales manager at Kaspersky in Africa, said, “Looking back, the internet was initially designed to accommodate a relatively small number of users. And the proliferation of the internet – which it's fair to say began in the early 1990s with more widespread public access and use across more markets worldwide – was the linchpin for the digital age as we know it today.”

She added that the capability of the internet was briefly overshadowed in the late 1990s with the dot com bubble (or dot com boom) – and then Y2K/Millennium bug hype. Of course more than half of internet users today probably have no idea about dial-up, or even know of a time of the internet before 3G, at least. Today trends revolve around cloud, 5G, Internet of Things, AI, on-demand streaming and so on.

However, she said, “In fact, the technology has advanced so rapidly that the global pandemic that began this decade has also demonstrated just how much every facet of our 21st century society is dependent on digital interconnectedness to work, communicate, connect, shop, and basically function in our modern world.”

She agreed too that the digitisation of society, and the evolution of the internet over the past 30 years in Africa has been a saving grace for many businesses in the wake of the pandemic. “Internet connectivity enabled them



Photo: Zonful Energy

William Ponela, CEO, Zonful Energy: "It [the smartphone] has enabled so much more to be done and has revolutionised industries such as agriculture."

to rapidly adopt remote working and adapt to their change in circumstances in ways that would have been impossible even 10 years ago.”

But, she added, “No less notably, it has starkly revealed that cybersecurity, and establishing cyber-immunity, is a concern for every tier of society. From government to the private sector, large enterprises to small and medium businesses, individuals to communities, each and all are affected by today's cyberthreat landscape, which continues to shift and evolve.”

We round up this review, fittingly perhaps, given the role of mobile in Africa, with the GSMA, which represents the interests of mobile operators worldwide. Angela Wamola, acting head of sub-Saharan Africa, GSMA, said, “The digital landscape in sub-Saharan Africa and beyond is evolving rapidly, driven by tech innovation, changing consumer behaviour, digital transformation and operators' continued investments in enhanced connectivity solutions. There has been an increase in the number of people subscribing to mobile services.”

She continued, “At the end of 2019, 477 million people in sub-Saharan Africa subscribed to mobile services, accounting for 45% of the population. And smartphone adoption continues to rise rapidly in the region, reaching 50% of total connections in 2020, as cheaper devices have become available. Smartphone financing models are also gaining traction.”

She added “The 5G era has begun in sub-Saharan Africa but 3G will remain the dominant technology for the foreseeable future. Commercial mobile 5G services have been launched in South Africa and Kenya recently, and trials have been conducted in several other

markets across the region.”

And of course there's the massive growth of mobile money over the past decade “and now operators are venturing into other financial services products”.

The GSMA State of the Industry Report on Mobile Money revealed a dramatic acceleration in mobile transactions during the Covid-19 pandemic as lockdown restrictions limited access to cash and financial institutions. Wamola said, “The report found that the number of registered accounts grew by 13% globally in 2020 to more than 1.2 billion – double the forecast. The fastest growth was in markets where governments provided significant pandemic relief to their citizens.”

But that's not all “The media and entertainment (M&E) space in sub-Saharan Africa is also showing signs of digital disruption, prompted by rising mobile internet and smartphone adoption, a youthful population and the increasing availability of local entertainment content. Over the last two years, a number of mobile operators have launched M&E services or partnered with third-party content providers to deliver online streaming content.”

It's fair to say that a simple question about significant developments in the African telecommunications market since 1991 has elicited some fascinating – and very varied – responses. Our thanks to all who contributed. Here's to the next thirty years! ©

Our next issue will contain the second part of this anniversary feature, in which we will ask companies to assess their own achievements in the African market since 1991.

Comviva partners with Etisalat Misr to offer enhanced CRBT services

COMVIVA HAS ANNOUNCED a strategic partnership with Etisalat Misr to offer media-rich caller ring back tone (CRBT) services. With this new service, Etisalat subscribers can personalise the ring back tones for different callers.

The new CRBT services allow subscribers to replace the ring tone that callers normally hear with a personal choice of music or audio and video content, making the calling experience more enjoyable for callers.

Comviva's media-rich CRBT platform will allow Etisalat to drive the next phase of growth, with a deeper customer engagement. Since music consumption has evolved to include short videos and user-generated content, Comviva's CRBT solution brings in elements for integrating music streaming, with user's self-recorded status, and video ringback tones. It is a future-ready solution supporting VoLTE/ViLTE-ready software, innovative digital interfaces such

as mobile app, OTT store-fronts, YouTube and Chatbot, and integration with smart devices like Alexa.

The platform is an end-to-end offering, including product planning, partner management, storefront management, revenue management, and business analytics. CRBT software houses innovative features and interfaces aimed at enhancing revenue across the customer life cycle.

"We are looking forward to a fruitful partnership with Comviva on one of our leading VAS services. The Comviva platform will allow us to digitalise the CRBT experience and enrich and enhance the user journey. Given that our community is evolving constantly, the options available on our new platform will surely be able to satisfy all customer needs through the countless personalisation and customisation options," said Ahmed Yahia, chief commercial officer at Etisalat

Ramy Moselhy, senior vice-



Ramy Moselhy is the head of MENA region, Comviva.

president and head of MENA region at Comviva, said, "We are committed to bringing innovative digital services that enrich the lives of people across markets globally. We are excited to partner with Etisalat in their long-term vision and strategy focused on digitalisation. These new and exciting infotainment services will enable new experiences for their rapidly growing customer base. CRBT has enjoyed enormous success with operators across the globe and we are confident of replicating our

success with Etisalat Misr."

"Our new partnership with Comviva in this service will bring a livelier call experience to our customers' at Etisalat Misr. Adopting new and exciting technologies and offering them to our customers has always been a core focus at Etisalat Misr, and that is why we are introducing this new service where the callers can change their ring back tone based on user mood and context, or use the diverse features to gift or copy a ring back tone. CRBT is yet another service that would elevate our calling experience to a whole new level," explained Amr Fathy, IT vice president, Etisalat Misr.

With Comviva's CRBT footprint spanning across two dozen deployments across the globe, the company has seen the volume of caller tunes increase on its platform exponentially. Globally, the CRBT platform is powering 224 million mobile users, constituting a 45% share of the worldwide market.

Infinera to launch a suite of coherent optical pluggables

INFINERA IS PLANNING to launch a suite of coherent optical pluggables, designed to address point-to-point and point-to-multipoint transport applications seamlessly, from the network edge to the core.

Leveraging innovative XR optics technology, Infinera's new suite of vertically integrated ICE-XR pluggables will offer network operators the performance, scale, and efficiency essential for delivering differentiated 5G, enhanced broadband, and next-generation cloud and business services.

ICE-XR pluggables will support a range of transport rates, including 100G, 400G, and 800G, and utilise industry-standard form factors such as QSFP-28, QSFP-DD, and CFP2 to enable ease of deployment in a wide variety of router and transport devices.

"We have been engaged with 100-plus network operators globally and the feedback that we have received has surpassed anything I have seen in my 35-plus years of experience in successfully bringing game-changing technologies to market," said Dave Welch, founder and chief innovation officer at Infinera.

"Leveraging the innovative capabilities of XR optics, ICE-XR will enable Infinera to create a completely new market with functionality that is uniquely positioned to address the point-to-multipoint traffic demands at the rapidly growing network edge and provide TCO savings of as much as 70%. With Infinera deep vertical integration, ICE-XR will enable us to address the rapidly growing market for point-to-point pluggable coherent applications with a differentiated and cost-reduced solution," added Welch.

ICE-XR can be seamlessly software configured between point-to-point and point-to-multipoint operations. When used in point-to-point applications, ICE-XR can enable network operators to benefit from seamless generational upgrades, enhanced performance in capacity and reach, and the ability to utilise pay-as-you-grow service activation. In multipoint applications, ICE-XR can enable network operators to reduce the total number of transceivers in their networks by 50% or more and simplify their network architectures by eliminating electrical aggregation points and driving down capital expense and operational complexity.

Media Brokerage Africa to launch a host of new pan-African channels

MEDIA BROKERAGE AFRICA, a pan-African broadcast media brokerage, which specialises in channel distribution, and operates across all broadcasting platforms including, free-to-air (FTA), pay-TV, digital switchover (DSO), mobile and over-the-top (OTT), aims to bring quality international content to African audiences.

The company has announced numerous pan-African exclusive distribution partnership deals, including IMMEDIATE Platform's official entry into Africa's online marketing industry, helping marketers create the best content possible, with Swig Media. LLC is offering a bouquet of original, special-interest channels to Africa, such as the Global Fashion Channel, featuring fashion, beauty, art, luxury lifestyle and music and special events from around the world, and other exclusive partnership deals, such as The Dancehall Channel, that will introduce the Dancehall culture to the African continent, and ENLIVE tv, which will offer Christian entertainment for African viewers. There is also StoryZoo, a platform that combines animation, music and education to create a learning adventure for young children.

"In line with the evolving media landscape and a demand for a multi-channel solution as opposed to silo offerings, I am thrilled to set up, develop, and drive this new company. It is no longer just about selling media platforms, but more about addressing the marketing objective of our clients," said Colman Murray, founder and managing director of Media Brokerage Africa. "I am excited to further enhance Media Brokerage Africa's exceptional portfolio of brands and revenue streams across the continent. This is an exciting opportunity, and I am looking forward to taking this business to unprecedented heights," he added.

Some of the existing clients include South Africa's public broadcaster, SABC; TV production company, Brainwave Productions; and Ethiopian TV & Entertainment OTT platform, Habeshaview, which operates IPTV services offering rich content that includes live TV, documentaries, drama, children's programmes, lifestyle shows and others.

AUB and APO Group partner to deliver quality Africa-related content to African and global TV and radios

THE AFRICAN UNION of Broadcasting (AUB), the professional body representing national and private televisions and radios from 52 African states, and APO Group, the leading pan-African communications consultancy and press release distribution service, have announced a partnership that will provide free access to quality African content for major televisions and radios all over the world.

All B-roll footage and soundbites produced or distributed by APO Group and related to sports, politics and business news from the African continent will be made available to AUB members free of charge and with unrestricted news use through the AUB Platform 'AUB Vision'.

The African Union of Broadcasting is the largest professional body that brings together national and private radio and television organizations from African states. It is responsible for developing all aspects of the broadcasting industry in Africa.

APO Group content will not just be available to AUB members in Africa, but also members of their sister associations around the world, including the European Broadcasting Union (EBU), the Arab States Broadcasting Union (ASBU), and the Asia-Pacific Broadcasting Union (ABU).

By delivering content directly to major international

broadcasters, APO Group is continuing its commitment to changing the narrative about Africa, by telling positive stories that can reach new audiences and challenge global perceptions of the continent.

APO Group's multinational customers and partners operating in Africa regularly produce compelling content that shines a light on the dynamism of African economies, and the growth potential these emerging markets have to offer.

This agreement represents an unprecedented opportunity to deliver the best of African economic news and sport to new audiences and show the rest of the world what Africa has to offer.

Sport also has a major role to play in influencing the way Africa is perceived on the global stage, and APO Group is perfectly placed to bring the very best action to AUB's members and sister associations around the world.

APO Group is the exclusive Pan-African communications consultancy for the NBA, and the Basketball Africa League. APO Group is also the Main Official Sponsor of World Rugby's African association, Rugby Africa, and an official sponsor of Team Qhubeka Assos, the only professional African cycling team on the UCI World Tour, and the annual Lux Afrique Polo Day.

APO Group frequently carries video content from

the biggest sporting events around the continent - including all-African Rugby World Cup and Olympic Games Rugby Sevens qualifiers - and this agreement means national broadcasters all over Africa and beyond will have free access to several elite African sporting events for the first time.

APO Group video and audio content will be uploaded directly to the AUB platform within three hours of the end of each event. B-roll footage and soundbites will be accompanied by a dope sheet translated into English, French, Arabic and Portuguese, providing truly pan-African content that can be aired by national broadcasters quickly and easily.

"APO Group produces and distributes some of the best video and audio content in Africa," said Gregoire Ndjaka, CEO of African Union of Broadcasting. "Our members and affiliate partners will now be able to access prime video and audio highlighting the biggest economic and sporting stories on the continent. This type of content is extremely valuable, and the seamless way it is delivered will make it easy for broadcasters all over the world to incorporate it in their news output."

"The sheer scale of AUB's reach into the African broadcast community is incredible," said Nicolas Pompiagne-Mognard, founder and chairman of APO Group.

e4 launches computer centre at Diepdale Secondary School

PARTNERING WITH MELISIZWE Computer Lab Project, South Africa-based Fintech specialist e4 has provided resources for a full renovation including aesthetic upgrades, functional items and technology supplies including a smartboard, air conditioners and 33 computers for use by students and educators.

Adri Führi, group chief financial officer, e4, said, "People and technology are at the core of our business. We must look both inside and outside the organisation to support our strategic growth. Enabling both the development of school and community technology skills enables us and other organisations in our industry to remain relevant as part of the fourth industrial revolution."

The computer centre will allow Diepdale Secondary School pupils to learn computer applications technology (CAT) as part of their curriculum and master basic computer literacy skills. In addition to the assistance provided by e4, the computer centre is funded and will be maintained by other major sponsors, corporates and the country's Media, Information and Communications Technologies Sector Education and Training Authority (MICT SETA) which will provide training for students and teachers.

The project brought together e4 and the Melisizwe School Computer Project, a non-profit dedicated to developing computer labs for schools in need and providing IT skills training in various youth programmes.



The centre will work on improving young peoples' computing skills.

Orange Bissau launches programme to modernise mobile access network

ORANGE BISSAU RECENTLY inaugurated the first antenna in the village of Bijimita (Quinhamel sector) under the high patronage of the president of the Republic of Guinea Bissau Mr General Umaro Sissoco Embaló, and the presence of the chairman of the board of directors of Orange Bissau, ministers, ambassadors, notables, and dignitaries of Guinea Bissau.

This inauguration marked the complete modernisation of the existing 3G+/4G network of Orange Bissau, which will offer the entire population an incomparable experience of the telecommunications network: calls, internet browsing and Orange money along with the extension of Orange Bissau's 2G/3G rural coverage to more than 1,000 villages, with the deployment of 150 new antennas perfectly suited to the environment.

Around 150 new antennas will be deployed throughout Guinea Bissau, thus opening up more than 1,000 villages in all regions of the country.

Orange Bissau remains committed to continuing its efforts to give Bissau-Guineans national coverage and a modernised network, while contributing to the country's digital transformation.

Orange is present in 18 countries in Africa and the Middle East and has around 130 million customers as on 31 March 2021. With 5.8 billion in turnover in 2020, Orange MEA is the Group's main growth region.

Additionally, Orange is launching season 2 of "Y'Africa," a contraction of "Africa Ya lelo" or "Africa today" in Lingala, is a TV series which puts emerging artists in the spotlight.

Each episode presents a portrait of three artists who tell their story through their work, while acting as a guide to the cities where they live. The programme aims to offer African culture, in all its forms, an opportunity to shine and to strengthen the local presence of the Orange brand in Africa.

Vodafone and Cradlepoint's IoT business solution

IoT IS ALREADY proving itself as a multi-industry innovation, offering businesses and corporations the chance to collect and leverage data to streamline future operations, improve customer service and provide unprecedented visibility of their supply chains, assets and operations.

However, due to the wide reach of Internet of Things (IoT) solutions, there are a number of IT issues facing businesses, with the responsibility of hundreds or thousands of connected devices and applications naturally providing a set of hurdles IT departments must jump.

Cradlepoint has partnered with Vodafone, the worldwide telecommunications company, to craft a new premiere enterprise solution for organisations looking to implement IoT technologies without the problems that arise from such a wide-reaching technology.

The collaboration eliminates the need for several different vendors, offering businesses an all-in-one solution that can be deployed across 22 countries. This makes the developments between proof of concept to production quicker and easier.

The turnkey, cloud-managed solution will offer a fast and secure WWAN connectivity to businesses, giving those that use IoT solutions the ability to connect devices to their networks and prioritise network traffic while controlling sensitive data. A single contract can offer a contract, logistics and support model, streamlining the IoT management.

Cradlepoint and Vodafone's solution will fast-track the time to market for business-critical services and application across a number of verticals, including manufacturing operations, retail omnichannel operations, freight monitoring and transportation logistics, telemedicine, remote asset security, smart ATMs, AI and machine learning.

SWIFT launches SWIFT Go for low-value cross-border payments

SWIFT HAS ANNOUNCED the launch of SWIFT Go that is set to enable financial institutions to offer a seamless payments experience for low value transactions often initiated by small- and medium-sized enterprises (SMEs) to pay suppliers overseas and for consumers sending money to friends and family internationally.

Using tighter service level agreements between institutions and pre-validation of data, SWIFT Go enables banks to provide their end customers a fast and predictable payments experience with upfront visibility on processing times and costs.

The SWIFT Go service builds on the high-speed rails of SWIFT gpi, which have transformed the speed and predictability of high-value payments. The service marks another milestone in SWIFT's strategy to enable instant and frictionless transactions from one account to another, across SWIFT's network that connects more than 11,000 institutions, and four billion accounts across 200 countries worldwide.

Stephen Gilderdale, chief product officer at SWIFT, said, "The new service is a direct response to the needs of small businesses and consumers for fast, easy, predictable, secure and competitively priced cross-border payments. Our new service will allow banks to compete effectively in one of the fastest growing segments of the payments market, delivering a seamless experience for their customers."

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Ericsson private 5G to boost connectivity

ERICSSON'S NEWEST, NEXT-GENERATION private network, Ericsson Private 5G, is a cellular 4G and 5G network tailored to drive Industry 4.0 and the digital transformation of a variety of industrial sectors.

The network is designed to optimise and simplify operations, supplying users with a cloud-based network management, with zero-downtime upgrades, guaranteed high performance and quick installation periods. These features are guaranteed with a series of Service-Level Agreements (SLAs).

Chief beneficiaries of the new network are expected to include manufacturing, mining and process industries, offshore and power utilities, and port and airport facilities.

Flexibility is a key feature of the product, with the ability to support a selection of deployment sizes depending on user requirements. Businesses can manage their networks on-site and integrate with IT/OT systems via an open API.

Thomas Noren, head of dedicated networks and business area technologies at Ericsson, explained, "With Ericsson Private 5G, we take the best of Ericsson's current portfolio and top it up with the best of our new technology. With Ericsson Private 5G, we give operators a better way to serve business customers and leverage their assets - in short, to grow beyond mobile broadband."

Leo Gergs, senior analyst, ABI Research, added, "With this new offering, Ericsson will be able to address key trends in the enterprise cellular market. The value proposition will appeal to operators and service providers as the solution hides technology complexity and therefore reduces the barrier of entry to deployment for many different flavours of enterprise networks."

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