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Atos: Leading Smart, Sustainable Cities

Marc Veelenturf, CEO of Middle East & Turkey, Atos

The Power of Partnership in the ICT Ecosystem Responsible Revolution: Can AI Chart Its Path Sustainably? Strategic Evolution: MENA's Robust IT Investments Gain Momentum



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Amazon Tests Humanoid Robots to Assist Workforce

Amazon is testing humanoid robots, starting with Digit, a twolegged mode designed for repetitive tasks. These robots are meant to work alongside humans in warehouses. This tech integration has led to the creation of 700 new job types. The company is focused on providing employees with new skills and technology for career growth.

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The messaging app Telegram is still leaking users' IP addresses to their contacts during voice calls. This privacy issue has been known for some time but may not be well known by less technical users. While Telegram claims to be secure, experts have warned that it is not as secure as other apps like Signal. To address this issue, users can disable peer-to-peer connections in their settings.

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News Provided in cooperation with AFP, the global news agency

Published by

tracemedia

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> Printing Al Nisr Publishing LLC

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Year 18 | Issue 205





Atos: Leading Smart, Sustainable Cities

For its year-end edition, Telecom Review sat with key industry players to discuss the impact of telecom initiatives on smart city development. Marc Veelenturf, CEO of Middle East & Turkey at Atos; Bernard Najm, Vice President telco MEA at AWS; and Eng. Saad A. Al-Sadhan, Chief of Business and Wholesale Officer at Zain KSA, shared their insights on how the ICT sector can help shape smarter and more sustainable communities. Stay tuned as the three experts shed light on the evolving landscape of technology and connectivity.

mart Destination Platform: Global and Local Partnership Reshaping Saudi's Smart City Projects As the world becomes increasingly urbanized, cities are facing a multitude of challenges. From traffic congestion to pollution, these issues can have a significant impact on the quality of

significant impact on the quality of life for residents. To address these challenges, many cities are turning to smart city initiatives that leverage technology to improve efficiency and sustainability.

In the dynamic landscape of mega projects, Atos works in partnership

with AWS, a leading cloud provider, and Zain KSA, a leading digital services and solutions provider in Saudi Arabia, steering the course toward a future where smart solutions are not just a possibility but a reality that transforms the very fabric of Saudi Arabia's giga projects. "By combining our awardwinning 5G network with the global expertise of Atos and AWS, we seek to bring smart solutions to power a wide range of smart city functionalities," Al-Sadhan said.

Navigating Digital Challenges

To build smart cities and enable hyper-connected communities, one of the key challenges is managing large amounts of data from various sources and integrating multiple technologies and systems into a cohesive and interoperable ecosystem. Through this partnership, Zain KSA will utilize Atos' Smart Destination platform to enable smart city initiatives and improve the quality of life for residents across the Kingdom.

The Smart Destination platform provides a centralized data management system that allows for easy integration and analysis of data from multiple sources. Moreover, this platform relies on openness and interoperability. By using open standards and APIs, it can easily integrate with different systems and data sources - from traffic sensors to weather forecasts - to provide a comprehensive view of what is happening in the city. This allows citizens and visitors to access up-todate information about everything from public transportation schedules to local events.

With the platform's ability around context brokerage and MACH architecture, the platform can offer many benefits for both citizens and businesses along with creating more liveable, sustainable, and resilient cities. Additionally, the Smart Destination platform helps cities reduce their environmental footprint through energy management systems and waste reduction programs.

Smart city solutions must also address concerns regarding data privacy and



security, in compliance with the local regulations of each market. Zain KSA, AWS and Atos all acknowledge the paramount importance of security in the implementation of smart city initiatives. As a leading digital enabler in the Kingdom aligned with international best practices and local cybersecurity requirements, Zain KSA supports its global partners in navigating the local cybersecurity landscape.

As a global leader in digital transformation services, Atos has developed innovative approaches and thought leadership to address these challenges. The Smart Destination platform includes advanced security features such as encryption and authentication protocols that ensure sensitive data remains secure at all times. "By collaborating with marketleading partners in Saudi Arabia, like Zain KSA, Atos is committed to delivering a holistic solution that extends far beyond initial deployment. The company's comprehensive Managed and Support Services stand as a testament to our dedication to ensuring the longevity and success of our partners' endeavors," stated Veelenturf.



As a global leader in digital services, Atos' commitment to sustainable IT services is not just a trend; it's a revolution that is reshaping the landscape of corporate responsibility and environmental conservation



TELECOM Review

Creating Smart Solutions for Smart Cities

AWS cloud is a scalable, robust and secure platform for agile and fast paced innovation. Their approach is to put the tools for this innovation right into the hands of developers of telecom operators and ISVs to help the public and business sectors create smart solutions, including smart cities.

As smart city environments comprise a broad range of complex and fragmented use cases, each with different and sometimes very specific objectives, financials and ROI metrics, the economics of AWS cloud remove barriers by providing the freedom to scale up and down. "AWS' focus is to marry those benefits with the secure and advanced connectivity services from telecom operators to enable smart city environments that deliver new experiences and can evolve quickly as new technologies and new innovations are brought to market," said Najm. ISVs and integrators, such as Atos, play a critical role in accelerating the implementation of smart cities as they facilitate the use of AWS services by Zain KSA and their B2B2x end customers, while also developing their own services on AWS.

Cloud economics drive innovation in telecom services enabling providers to run their solutions in adjacent markets and deliver them to consumers over AWS cloud. For example, the networkas-a-service feature enables scalable smart city solutions that are based on successful business cases and that create tangible outcomes.

Zain KSA: An Enabler of Smart Urban Hubs

"Smart cities are not just about efficient systems but about improving the quality of life for all residents. Zain KSA's commitment to creating a robust backbone for these technologies is critical in ensuring that smart cities can function efficiently and effectively," Al-Sadhan said.

With its advanced 5G network, Zain KSA is supporting the Kingdom's transition into a digital economy, with a particular focus on smart city Gigaprojects. Encompassing everything



from connectivity to cloud platform development to an expanding suite of scalable services delivered to end users, and enterprise and government customers, Zain KSA has grown into a digital partner of choice offering reliable and advanced telecom and cloud services to millions of subscribers in Saudi Arabia.

One of their key areas of focus has been the development and deployment of smart city infrastructure, including through partnerships with MODON, NEOM and The Red Sea. With their resilient IaaS, PaaS, SaaS, and IoT platforms, Zain KSA is playing a pivotal role in spearheading this technological evolution. Zain KSA's platforms are designed to seamlessly manage data from multiple sources, ensuring that it can be analyzed and used effectively by city planners and other stakeholders.

Smart cities need to collect real-time data in all media types from various sources. Zain KSA's telecom networks are instrumental in facilitating the integration of these devices into the laaS-IoT framework, guaranteeing smooth communication and efficient data Together, with our partners, such as Atos, we are bringing this innovation to telecom operators and to their customers using fast-paced innovation that we are really excited about



exchange. This means that everything from traffic lights to parking meters can be connected to a central system that can monitor and manage them in realtime.

Security and privacy stand as pillars in their journey. Zain KSA ensures roundthe-clock monitoring to prioritize the security and privacy of data generated and processed within smart city systems. Zain KSA SOCaaS providers offer a range of services designed to monitor and protect smart city systems 24/7. These services include SOC (Security Operations Center), EDR (Endpoint Detection and Response), MDR (Managed Detection and Response), and MXDR (Extended Detection and Response). Each of these services plays a critical role in ensuring that smart city systems remain secure.

As smart cities continue to grow around the world, so does the need for reliable connectivity solutions. Zain KSA has taken steps towards implementing robust SLA maintenance and oversight procedures, ensuring smooth operations while building trust among its customers through effective communication channels.

Sustainable Smart City Development

Veelenturf continued, mentioning that the world has become more aware of the impact of climate change and environmental degradation. Hence, smart city development has become increasingly important.

The first way that smart city functions can contribute to sustainability is through energy efficiency. By using sensors and other technologies to monitor energy usage in buildings and public spaces, cities can identify areas where energy is being wasted and take steps to reduce consumption.

Another way is waste reduction. By using sensors to monitor waste levels in bins and dumpsters, cities can optimize collection routes so that trucks are only sent out when necessary. This reduces fuel consumption and emissions while also reducing the amount of waste going into landfills.

Smart transportation systems are another key component of sustainable



Eng. Saad A. Al-Sadhan, Chief of Business and Wholesale Officer, Zain KSA

smart city development. By providing citizens with access to public transportation options such as buses or trains that run on clean energy sources like electricity or hydrogen fuel cells, cities can reduce traffic congestion and air pollution while also promoting healthier lifestyles by encouraging walking or cycling.

In addition to these practical applications of technology for sustainability purposes in a smart city context, there are many other ways in which technology could be used for good causes, such as improving healthcare services or education opportunities within urban areas.

Al-Sadhan commented: "Zain KSA has been championing green technologies for responsible business practices, complementing our role in advancing 5G connectivity across the Kingdom. Our collaboration with the Red Sea Project to build the world's first zero-emission 5G network actively contributes to Saudi Vision 2030's netzero emissions target by 2060."

In line with Atos' views on smart city development, AWS is also driving



Zain KSA actively champions green technologies and support responsible business practices. Our collaboration with the Red Sea Project to establish the world's first zeroemission 5G network aligns with Saudi Vision 2030's goal of achieving net-zero emissions by 2060



renewable energy projects impacting local communities around the world, innovating in transport (with the first ever zero-emission capable cargo ship), and detailing progress on sustainability through their climate pledge and regular reporting.

"At Amazon, we combine data and science with passion and invention to drive everything we do. We set big goals and work backwards to achieve them. We apply that same tenacity to how we address some of the world's biggest environmental and societal challenges," noted Najm.

AWS enables customers to build sustainability solutions ranging from carbon tracking to energy conservation to waste reduction, using AWS services to ingest, analyze, and manage sustainability data. "And we provide knowledge and tools for organizations of all sizes and across all sectors to build and implement solutions that meet their sustainability goals."

AWS is also focused on efficiency and continuous innovation across its global infrastructure, as it progresses towards powering operations with 100% renewable energy by 2025 (and is committed to achieving Amazon's goal of net-zero carbon by 2040). As a result, AWS made the commitment to become water positive by 2030, with the intent to return more water to communities than what they use.

"Overall, there's no doubt about it: Smart city development offers an exciting opportunity for creating more sustainable urban environments around the world," expressed Veelenturf.

Generative AI: Data-Driven Sustainability

With the current hype globally, it is important to understand what generative AI is and how it can be used for sustainability. Generative AI refers to the use of machine learning algorithms that can create new content based on existing data. In the context of sustainability, this means using data from various sources such as sensors, satellites and social media platforms to generate insights that can inform decision-making. Energy management: By analyzing data from smart meters and other sources, generative AI algorithms can identify patterns and trends in energy consumption that may not be immediately apparent to humans. This information can then be used by utilities and other stakeholders to optimize energy usage and reduce waste.

Supply chain management: By analyzing data from suppliers, manufacturers and logistics providers, generative AI algorithms could help identify inefficiencies in the supply chain that contribute to waste or emissions. This information could then be used by companies to make more sustainable decisions about sourcing materials or transporting goods.

Naturally, there are also potential risks associated with the use of generative AI for sustainability. One concern is that these algorithms may perpetuate biases or reinforce existing inequalities if they are trained on biased datasets or if their outputs are not carefully monitored. Additionally, there may be privacy concerns related to collecting large amounts of data from individuals without their consent.

"Despite these challenges, I believe that the integration of generative AI for data-driven sustainability has enormous potential for positive impact. By leveraging technology in innovative ways, we can gain new insights into complex environmental problems and develop more effective solutions than ever before. As we move forward into an increasingly digital future, it will be critical for organizations across sectors to embrace these technologies while also being mindful of their potential risks and limitations," stated Veelenturf.

Building and Scaling Generative AI for Smart Cities

The use of AI in smart cities has become increasingly important as urban areas continue to grow and face new challenges. The first step in building a generative AI application for a smart city is understanding the needs of the community. Atos works closely with local governments and other stakeholders to identify areas where AI can make the biggest impact. In the same context, AWS underscored that telecom operators monetizing their network assets with 5G connectivity and IoT solutions and related edge computing can extend their innovative solutions to meet the diverse needs of smart cities across various locations. Infusing this with new capabilities, such as machine learning and generative AI, brings new opportunities to Atos and Zain KSA. It also presents new service opportunities for smart city environments that public and business customers will benefit from.

"When creating smart city solutions, building customized IoT solutions and manufacturing devices that address the unique challenges, demographics, and infrastructure needs of each city is essential." according to Al-Sadhan. Being armed with the capabilities to enable customized IoT solutions for smart city applications can drive innovation and stimulate economic growth by ensuring the optimal use of resources in each city. Scalable applications also enhance sustainability by meeting environmental targets, such as efficient water usage in droughtprone areas. With more effective and human-centric services, these cities will ultimately enhance engagement and improve the quality of life of their residents.

Once these needs have been identified, Atos helps organizations collect and analyze data from various sources such as sensors, cameras, and social media feeds. This data is then used to train machine learning models that can make predictions or recommendations based on real-time information.

Traffic flow management: One example of a generative AI application that Atos has helped develop is a system that optimizes traffic flow in busy urban areas. By analyzing real-time traffic data from sensors placed throughout the city, this system can adjust traffic signals in real-time to reduce congestion and improve travel times.

Predictive maintenance system: Another example is a predictive maintenance system for public failures

infrastructure, such as bridges or water treatment plants. By analyzing sensor data from these structures, machine learning models can predict when maintenance will be needed before any issues arise. This allows for more efficient usage of resources and reduces downtime due to unexpected

Atos also helps organizations scale their generative AI applications by providing cloud-based platforms that allow for easy deployment across multiple locations. These platforms are designed with security in mind, ensuring that sensitive data always remains protected.

In addition to building and scaling generative AI applications, Atos also provides ongoing support through training programs and consulting services. This ensures that organizations can fully leverage the power of AI over time as new challenges arise.

"In conclusion, Atos is playing an important role in facilitating organizations' efforts towards creating more efficient and sustainable smart cities through generative Al applications. By working closely with local governments and other stakeholders, collecting relevant data sources, developing machine learning models, deploying them on secure cloud-based platforms and providing ongoing support services, Atos empowers its customers to achieve their goals while improving quality life standards," affirmed Veelenturf.

Prioritizing Sustainable IT Practices

For Zain KSA, sustainability and environmental responsibility are key pillars of a broader ESG strategy that aligns with the national goals as well as the global sustainable development goals. We believe that responsible business practices today start with responsible connectivity, and that can only be achieved through collaborations with the right partners that share our same commitment to sustainability."

As a global leader in digital services, Atos' commitment to sustainable IT services is not just a trend; it's a revolution that is reshaping the landscape of corporate responsibility and environmental conservation. "We understand the importance of reducing our carbon footprint, as the future of technology correlates with the future of the planet," said Veelenturf.

With a holistic approach to sustainable IT services, Atos invests in renewable energy sources and optimizes its data centers. The company prioritizes sustainability in its data center operations and is committed to sourcing considerable amount of its global electricity consumption from renewable sources.

Moreover, Atos is actively engaged in carbon offset programs, ensuring that the company's net carbon emissions are not just reduced, but effectively neutralized. Integrating circular economy principles into its business model extends the lifespan of Atos' IT equipment, reducing electronic waste and promoting responsible recycling.

Veelenturf emphasized that these sustainable IT practices are not only for them but for their customers as well. "By leveraging cutting-edge technology and innovative strategies, Atos is reducing its carbon footprint while simultaneously empowering businesses to do the same."

With the support of AWS, Atos reduces the energy footprint of their computing, decarbonizes networks and increases sustainability and energy efficiency through the use of cloud-based data, highlighted Najm. Meanwhile, Zain KSA is utilizing AWS' silicon innovation to reduce the energy footprint of their mobile cores and their radio access networks.

Smart city environments can benefit from the reduced carbon and energy footprint of cloud-based solutions. They also provide the means to further improve sustainability of cities through the steering and management of resources based on the use of smart data.

"Together, with our partners, such as Atos, we are bringing this innovation to telecom operators and to their customers using fast-paced innovation that we are really excited about," concluded Najm.

"Zain KSA's collaboration with market-leading partners serves our sustainability agenda which focuses on creating cutting-edge digital solutions that support the Kingdom's transition to a circular economy that serves people and the planet," Al-Sadhan added.

Without a doubt, Atos helps businesses optimize their IT infrastructure, reducing energy consumption and costs. In the supply chain management sector, the company works closely with suppliers who share the same commitment to sustainability and ethical business practices. This includes ensuring that suppliers comply with environmental regulations and reduce waste throughout the supply chain.

Overall, Atos focuses on developing and adopting cutting-edge technologies, such as artificial intelligence and machine learning algorithms, to optimize operations, coupled with education and awareness at the forefront of their efforts.

Despite the common challenges many telecom providers face in enabling smart city initiatives, some of them, like Zain KSA, are successfully harnessing the opportunities, navigating these obstacles through collaboration with local governments and private sector partners who share similar goals towards building smarter communities. "Using technology innovations like 5G networks and IoT devices, Zain KSA will help improve quality of life for citizens, while also driving economic growth through new business models enabled by digital transformation," noted Veelenturf.

Zain KSA's ethos of harnessing tech for sustainability and their cutting-edge 5G and 5G-advanced infrastructure position them as a driver of the Kingdom's advancement toward a future-proof business ecosystem and a digital economy. "We believe in the transformative potential of technology in shaping sustainable, hyper-connected urban hubs in the Kingdom.



The Power of Partnership in the ICT Ecosystem

In an era where technological innovation is advancing at an unprecedented pace, it's easy for telecommunications companies to get lost in a market that's swarmed with competitors. The ICT sector consists of several key segments, including IoT, AI, telecommunications, software and computer systems, 3D printing and cybersecurity. o navigate these choppy waters, communication companies must strive to establish partnerships that can help support

them in crossing over to stable markets. Once the ideal strategic partnership has been forged, the company must develop an ecosystem of devices and services to push it further into the mainstream, where it can hope to capture a higher market share from its rivals.

Successful and Innovative Collaboration Is a Must

The global IT market was valued at \$341.64 billion in 2022 and will grow at a CAGR of 11.26% to reach \$582.33 billion by 2027. To be a profitable business in such a massive market, telecom companies need to collaborate with global technology companies, industry frontrunners, startups and local businesses in order to explore innovative solutions. By leveraging synergies and capitalizing on unique expertise, these partnerships can drive growth, provide variations in product offerings, and expand the customer base by delivering superior digital experiences. Many of the regions in the Middle East and Asia hold tremendous growth potential with their digital transformation operations. Technologies like 5G mobile networks, edge computing and cloud provide the infrastructure to enhance connectivity and computational capacity; such partnerships expand their reach to a wider audience with specific needs and demands. A prime example of strategic partnership is e&'s launch of the digital brand 'Onic' in Pakistan as part of its partnership with Circles X, a cloudnative, digital-first platform, to elevate digital experiences for digital-native customers of Mobile Network Operators (MNOs). Through such collaboration, e& aims to help smaller MNOs build on their offerings by providing e&'s technical and operational expertise and ultimately benefiting the whole ecosystem.

Meeting the Ever-Changing Needs of Customers

The needs and demands of consumers are the key drivers for the growth of digital solutions. Global ICT spending reached close to \$4.9 trillion in 2020 and is expected to grow to \$5.8 trillion by the end of 2023, according to IDC estimates. Bain and Company projects the market for enterprise information and communication technology (ICT) services will grow 5% annually through 2026. Telecom companies must develop diverse and personalized solutions for their customers that challenge and expand their perceptions of connectivity and digital experiences. Enterprise business operations are struggling to identify the most compatible tool for boosting their profit margins from the many

choices now available on the ICT market. Telcos have an advantage in helping these businesses integrate the most suitable technology and act as a guide for developing smart ICT operations, including connectivity, unified communications, cloud infrastructure, cybersecurity and so on. For instance. Ooredoo is transforming the digital landscape of Oman with an extensive list of valueadded telecommunications solutions. fast and seamless network coverage across Oman, and cutting-edge digital services through various touch points, including its award-winning app, across Oman to stay connected with its customers at any given time. Similarly, from a connectivity perspective, 5G technology can be used to create new experiences and monetize them. A case in point is the network operations of notable UAE operator du. By leveraging the vast potential of this cutting-edge connectivity combined with strategic collaboration to provide premium and unique experiences to its customers, du now boasts that 60% of its mobile network traffic is driven by 5G usage. As of Q3 2023 results, du's mobile customer base has increased by 9.4% to 8.1 million and its fixed customer base by 12.4% to 573.000. As such. partnership and collaboration should be the cornerstones for the continuous enhancement of customer experience initiatives for telcos across public, commercial and enterprise sectors alike.

Planning the Road Map

Digital transformation is changing the global economic and social environment. Investments in digitalization in the Middle East, Turkey and Africa (META) alone are set to double across the 2021– 2026 period, as per the recent IDC forecast.

For the ICT industry, this means an opportunity for investment in more R&D, strategic partnerships, M&As and resource development. Technologies such as 5G, edge computing, cloud and AI need a further infrastructure facelift to enhance their connectivity and computational capacity. Below are some considerations that telcos should be mindful of while planning their next course of action:

- The operational efficiency and flexibility of hybrid cloud infrastructure are growing among organizations, facilitating work across multiple computing environments and easing the interplay of managing data to ensure security, privacy and compliance in both cloud-based and on-premise solutions.
- · As technologies like artificial intelligence, IoT, big data and cloud services advance, virtual or remote real-time operations and process automation will increasingly drive the future of work. Building internal ICT capabilities and automating workflows will become priorities in keeping pace with digitalization. Moreover, the UAE's telecom regulator, TDRA, expects to bring all inhabited areas of the country under 5G network coverage by the end of 2025, requiring more resources to manage the various requirements of end-users.
- In addition to the above factors, sustainable and energy-efficient IT operations will be a determining factor for the success of all telco operations. Making network infrastructure power-aware and energy-efficient is seen as an important step towards reducing the energy footprint in the ICT sector. It is estimated that by infusing green ICTs across the industry, up to ten times more energy can be saved.

As one of the main pillars of modern economic infrastructure, the ICT industry is vital, and thus its smooth functioning is imperative. To navigate the dynamic complexity of the industry, telcos will have to rely on like-minded partners who share similar visions of creating ambitious success stories in the digital age. Indeed, the success of such partnerships has already been proven by some of the industry's leading companies to date. The time is now for others to heed these examples and make their move.



Bayobab. Connecting Africa

Inspired by Africa's 'Tree of Life', Bayobab (formerly MTN GlobalConnect) is committed to providing Africa with next-gen digital solutions across its vast regions. With a foundation rooted in partnerships and a vision marked by ambitious and bold initiatives, Bayobab has successfully merged its rich heritage with its forwardlooking aspirations. ike the roots of the baobab tree that merge to form a single trunk, Bayobab is connecting Africa by converging strategic, global, and

local partnerships to work in harmony. Ultimately, Bayobab sees connectivity and possibility.

Bayobab: Transforming Innovation into Business Value

The Bayobab narrative takes inspiration from Africa's majestic Adansonia digitata tree. Just as the baobab tree can grow to monumental sizes and thrive for millennia, the brand embodies a commitment to enduring vision and long-term investments.

Symbolized by the baobab tree, the brand's roots and expansive branches represent the foundational pillars of the business: Bayobab Fibre and Bayobab Communication Platforms. These pillars serve as the bedrock of its operations, propelling it forward with strength and resilience.

Bayobab's influence extends through the delivery of tens of thousands of terabytes of data via its central communication platforms. Bayobab Fibre acts as the digital gateway to Africa, reinforcing its ecosystem by forging connections with GSMs and their extensive subscriber networks. This distinctive business model sets it apart, positioning Bayobab as the exclusive company dedicated to providing digital solutions at both ends of the connectivity spectrum.

Bayobab: Firmly Rooted in Partnership

Collaborations are defining moments, and Bayobab has built its legacy on attracting like-minded partners. It has strategically aligned with global industry leaders, cementing its reputation as a trusted collaborator in the digital landscape.

Bayobab's recent partnership with Africa50, an affiliate of the African Development Bank, is of great significance. The partnership represents a significant investment of up to USD 320 million in the development of a pan-African terrestrial fibre network known as Project East2West. The initiative intends to roll out proprietary fibre across ten countries from 2023 to 2025, bridging Africa's connectivity gap and promoting inter-regional exchanges, while meeting the rising data demands of its customers.

Bayobab is poised to continue shaping Africa's digital landscape, forging meaningful partnerships, and inspiring creative solutions to further connect the continent.

Bayobab: Transforming Africa's Digital Landscape

Bayobab is increasing its influence across the African continent to strategically position itself as the most significant African carrier on a mission to connect Africa.

This transformation journey mirrors Bayobab's unwavering dedication to achieving the strategic goal of deploying 135,000 kilometers of proprietary fibre. Presently, it has already laid down 112,000 kilometers of fibre and is committed to further investments in advancing this initiative.

To foster stronger connections with stakeholders in various regions, Bayobab has established local offices. In line with its business strategy, it has expanded operations into eight key African nations: Kenya, Ghana, Zambia, Nigeria, Uganda, Côte d'Ivoire, South Africa, and the Central African Republic. Furthermore, each of its FibreCos are actively enhancing their roles to harness distinct business potential within Bayobab's broader expansion strategies.

Bayobab: Strategic Expansion

Bayobab established a significant partnership with the Central African Republic (CAR) government to manage the national fibre infrastructure, securing the CAR PPP License—a substantial achievement. CAR was strategically selected based on the most efficient routing option to establish a full link between East and West Africa, playing a crucial role in expanding existing fibre routes and creating new routes to connect various parts of the continent. Bayobab believes that Africa's connectivity relies on strategic partnerships to foster innovation, expand the African digital economy, and impact growth in the countries where it operates.

This public-private partnership leverages the strengths of the public and private sectors simultaneously, paving the way for the expansion of access to connectivity to underserved populations. The partnership between Bayobab and the CAR Government also plays a key role in enabling one of the Project East2West projected routes.

Bayobab also earned an International Network License in Zambia and obtained a National Long-Distance Operator License in Nigeria. The license empowers Bayobab Zambia to seamlessly transport fibre capacity between neighbouring nations. This supports the company's ability to connect people and businesses, and fuels innovation, collaboration, and economic growth in the region.

This milestone marks a significant breakthrough for Bayobab Zambia, opening new doors and strengthening its position in transforming Zambia into the digital hub of Southern Africa. With a population exceeding 19 million, the connectivity landscape in Zambia continues to undergo significant digital transformations that plays a role in shaping how the country accesses information, conducts business and engages in various aspects of modern life.

Nigeria is regarded as Africa's largest ICT market with about 82% of the continent's telecoms subscribers and 29% of internet usage on the continent. Nigeria's connectivity landscape has undergone remarkable growth, altering how its population accesses information, conducts business and engages globally.

With a population exceeding 200 million, as reported by GSMA Intelligence, the adoption of digital services by governments, businesses, and consumers is fundamentally reshaping daily life in Nigeria. Mobile technology is playing an instrumental role in the nation's economy, where mobile broadband is the predominant means of internet access, unlocking a realm of new possibilities. The ensuing surge in digital services, ranging from the realms of mobile financial solutions to dynamic e-learning platforms, has ushered in a revolution. influencing the way Nigerians engage with essential services, consequently fuelling an escalated demand for data. Bayobab Nigeria will play a pivotal role in fortifying the nation's digital infrastructure.

Bayobab is on a mission to connect Africa while creating business value through strategic partnerships and deliberate expansion plans, significantly shaping the evolution of Africa's digital landscape.



Like the roots of the baobab tree that merge to form a single trunk, Bayobab is connecting Africa by converging strategic, global, and local partnerships to work in harmony





Danial Mausoof, Head of Sales for Mobile Networks, Nokia MEA

Nokia: Bridging the Digital Divide to Empower Communities

In an exclusive interview with Telecom Review, Danial Mausoof, head of sales for mobile networks, Nokia MEA, shares the latest on his company's innovative solutions as well as its projects related to digital inclusion and enhanced connectivity. ow does Nokia address the challenges of connectivity in rural areas, and what innovative solutions are

being put in place to enhance digital access?

Connectivity has a profound impact on economic development and social cohesion. While there has been growth in internet penetration globally at about 5.3 billion people, just over 34% still do not have high-speed broadband. The statistics get worse as we look at Africa, as it is the least connected continent, where only 36% of people were connected in 2022.

Nokia continues to work on many fronts in Africa to expand connectivity across the continent. First, as 5G licenses continue to be issued across Africa over the next two years, Nokia will continue to expand on the 5G coverage in urban and rural areas in partnership with the CSPs. Additionally, we continue to develop cost-effective solutions that are targeted for rural areas with lower population densities. Together with our partners, we continue to improve the total cost of ownership (TCO) of these solutions and innovate on using different backhaul solutions, including microwave links, satellite backhaul or fiber deployments, depending on the local infrastructure conditions.

How does Nokia collaborate with local governments, NGOs or other stakeholders to ensure the sustainability of inclusive rural connectivity projects?

Bridging the digital divide might seem like a marketing statement, but it is a complex task. It is crucial to understand that the digital divide includes not only physical connectivity but also an overlapping divide in digital skills, digital use, access to content, etc. The United Nations International Telecommunication Union (ITU) organizes its goals into two buckets: universal connectivity and meaningful connectivity. Collaborative approaches involving international players working closely with local and government players are needed.

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Nokia plays an important role in working collaboratively with regulators and agencies to help shape policies that help promote and advocate for favorable spectrum allocation and licensing processes.

We collaborate with governments, mobile network operators and nonprofit organizations in the region to extend connectivity to underserved rural areas. In addition to infrastructure deployment, Nokia has been involved in digital inclusion initiatives in Africa. This includes providing digital literacy programs and tools to help rural populations make effective use of digital technology.

Nokia has been at the forefront of empowering communities and promoting gender equality through its collaboration with United Nations Women. Since signing the Women Empowerment Principles (WEPs) in 2021, Nokia has executed successful pilots in the Middle East and Africa region. In Kenya, Nokia has continued to provide STEM education for girls and families, raising awareness about gender-based violence and planning to expand these initiatives in collaboration with UN Women and the Kenyan Ministry of Education. In South Africa. Nokia's second cycle program aimed at enabling financial independence for underprivileged women who survived gender-based violence has been met with high demand, leading to plans for a new program.

Nokia has also partnered with UNICEF and the Orange Foundation to empower young people in Morocco through digital, entrepreneurial and environmental skills, coupled with knowledge about climate change. Employees from Nokia and the Orange Foundation are contributing to this initiative through mentoring and training. This collaboration not only extends Nokia's shared value relationship but also brings tangible outcomes to Morocco.

Furthermore, Nokia and UNICEF are working together to bridge the digital divide in select parts of Senegal. More than 100 teachers and over 10,000 middle school students in underserved areas will benefit from a dedicated digital education and coding program. This initiative includes specialized sessions on digital skills, equipment upgrades, and enhanced connectivity, demonstrating Nokia's commitment to providing quality education and empowering communities across the globe. Through these collaborative efforts, Nokia continues to make a significant impact, fostering positive change and empowering individuals in diverse communities.

What are your thoughts on the future outlook and potential for innovative developments in rural connectivity, and how does Nokia intend to play a role in this evolving landscape?

Africa has been facing a tough economic downturn, and the current devaluation and rising costs have pushed up opex for our customers and partners in our region. This becomes even more difficult in smaller ARPU rural areas. As per the World Bank, \$100 billion is required to connect an additional 1.1 billion online by 2030. Achieving this target is a significant undertaking and will require the deployment of nearly 250,000 new 4G base stations and at least 250,000 kilometers of fiber across the region, as per the report. Given the complexity. new innovative solutions and business models are required to ensure that we continue to bridge the connectivity divide. We will continue to collaborate with operators to introduce 5G in urban areas as the licenses become available. Today, Nokia has 306 commercial 5G deals and 110 live 5G operator networks globally. We continue to focus on new business models, including RAN as a service model with the regional tower companies in Africa.

Our focus on energy-efficient solutions such as Rural Connect allows a quick return on investment and plays a critical role in new business models, like RAN infrastructure sharing arrangements and Network-as-a-Service (NaaS), to lower the TCO.

What progress is Nokia making in the realm of Cloud RAN, and what benefits have been noted in terms of network performance and flexibility? Nokia has been very actively driving cloud RAN development at the global and regional level and has announced a number of collaborations and pilots with major operators. At Nokia, we believe that the networks of the future will be hybrid, with a mix of cloud RAN and purpose-built RAN. In this context, it is crucial that cloud RAN networks not only enhance flexibility and automation while enabling new use cases but also maintain the carrier-grade performance standards currently provided by purpose-built networks. That's why Nokia's approach to cloud RAN is to enable seamless coexistence with purpose-built RAN systems by offering feature parity between the two while maintaining consistent performance based on Nokia's leading inline acceleration. Finally, Nokia announced advanced collaborations with the main server makers and hyperscalers that enable a collaborative advantage for our CSP and enterprise customers and allow them to translate it into more efficiency and flexibility in their operations.



Given the complexity, new innovative solutions and business models are required to continue bridging the connectivity divide



TELECOM Review



Tamara Al Bakri, Head of Roaming and Carrier Services, Vodafone Qatar

Vodafone Qatar Revolutionizes Roaming With 5G Dominance and Global Connectivity

Vodafone Qatar aims to lead the market by continually investing in its technological capabilities, forging global partnerships and providing cutting-edge roaming solutions at affordable prices. Learn more in this exclusive interview with Tamara Al Bakri, head of roaming and carrier services, Vodafone Qatar. ow does Vodafone Qatar ensure secure, consistent and reliable roaming at 5G speeds in top destinations

and the widest 4G roaming around the globe?

As a leading telecoms operator, our mission is to connect people and their devices, ensuring they receive the best possible service wherever they may be in the world.

Vodafone Qatar is proud of its global reach, meaning that our customers can keep in touch with friends and family or carry out their business affairs, whether they are at 40,000 feet or in the middle of the ocean.

Strategically, we are investing heavily in our 5G capabilities and technology and upgrading our systems to boost connectivity, improve the quality of our calls and expand our coverage. From a domestic point of view, Qatar has a very advanced and modern infrastructure, and we want to play a key role in the digital transformation of the country.

The advent of our 5G service means we've created a new mobile experience that guarantees stressfree roaming: it offers virtually no lag time with a greatly improved capacity that is up to ten times faster than 4G.

In fact, 85% of our data roaming today is carried out on 5G. What's more, visitors coming into Qatar, whether on business or holiday, can also enjoy a world-class 5G experience as our coverage encompasses the whole nation. We're fortunate that most of our buildings are enabled for the adoption of new technologies, and the penetration of optical fiber is high.

We also have one of the widest levels of 4G coverage — it's available practically all over the world in over 183 countries globally. From a product development point of view, we've worked really hard to ensure there is a roaming pack or solution that works for all our customers.

What makes Vodafone Qatar's carrier services competitive in the market? What innovative, cutting-edge

solutions have you deployed in 2023? Vodafone Qatar continues to be at the forefront of developments in mobile communications, including the rollout of 5G networks, the first of which we launched commercially back in 2019, the Internet of Things (IoT) and cloud services.

Our first consumer IoT product, the Smart Tracker, launched last summer and enables customers to find and track their most important belongings, such as wallets, luggage, laptops and even cars, not only in Qatar but in more than 155 countries across the world.

Such innovation and advancement enable us to offer faster, more secure and more reliable connectivity services that genuinely cater to the evolving needs of consumers and businesses. This is also bolstered by our incredibly strong network of global partners, and we have a significant presence across the GCC, Middle East, Europe, Africa, Asia and the USA.

The host of effective data services is specially designed to offer flexibility and scalability, be it in International Private Leased Circuit (IPLC), Ethernet services or IP VPN services, and our International Carrier Relations team has purchased and leased network assets reaching major cities in the world.

Voice, data and IP traffic is now exchanged with our carrier partners in many of the world's traditional business centers, as well as in many of the emerging territories around the globe.

With the year coming to an end, what are the challenges and opportunities that Vodafone Qatar will continue to leverage in terms of roaming and carrier services for 2024 and beyond?

With more people than ever before traveling internationally, the demand for mobile data is increasing exponentially, and it looks set to do so for many years to come. This provides us with an opportunity to meet the exacting demands of today's traveler, who requires seamless and affordable connectivity while on-thego.

The telecoms industry is highly competitive, and as mobile operators, we cannot afford to be complacent.

It's essential that we work hard to differentiate our offering in order to attract and retain customers. We aim to stay ahead of the market by continually investing in our technological capabilities, forging global partnerships and providing cutting-edge roaming solutions at affordable prices.

One of the ways we've been able to do this is with the launch of GigaNET VoLTE (Voice Over Long Term Evolution) technology, which provides superior voice and video calling and a fast internet connection simultaneously with no interruptions.

From a roaming perspective, it represents an extraordinary evolution in mobile telecommunications, giving roaming mobile subscribers the ability to experience VoLTE features including crystal clear calls, faster call setup times and longer battery life, all while traveling between different networks and regions.

With over 15 years of experience in the mobile telecom industry, what are your key learnings as a woman? How can you encourage other women to delve into the Information and Communication Technology (ICT) path?

I take my role as a senior female figure in the tech sector very seriously and feel lucky to work for an organization that has made a genuine commitment to empowering women by improving access to education and digital skills.

Throughout my career, I've been fortunate to receive a huge amount of support, and for this reason, I feel a strong sense of responsibility about doing everything I can to be a mentor to women in the ICT sector, especially those who may not have access to a strong support system. It's incredibly important to me that other females in this industry can follow a similar pathway to the one that I have created.

My overriding message to any young female graduate thinking of pursuing a career in ICT is: go for it! The future for women in this industry is bright; it's a very rewarding field to work in, offering numerous opportunities for career growth and personal development.

It's important to remind ourselves that a woman's perspective is vital for creating inclusive and user-friendly solutions that can address a diverse range of needs. Perhaps most exciting of all is that by choosing a career in ICT, women can actively shape the future of technology and also that of the wider society around them.



We aim to stay ahead of the market by continually investing in our technological capabilities, forging global partnerships and providing cuttingedge roaming solutions at affordable prices



TELECOM Review



Evolving Metropolis: How Digital Technologies Define the City of Tomorrow

The destiny of our world is intricately tied to the quality of its future cities. Technology plays a central role in enhancing urban life, and the aspiration of creating genuinely smart cities is alive like never before. As long as human civilization thrives within urban hubs, the drive to enhance the urban landscape will persist.

hroughout the history of cities, spanning some 6,000 years, humans have consistently sought ways to augment their daily existence with technological innovations. With the rapid pace of technological progress today, it is imperative to stay abreast of the current technological landscape and its coming trajectory to effectively address specific urban needs.

Visionaries have projected the state of the world and its cities through the year 2050, imagining a 'city of the future' as an intricate network of information, data and technology. This interconnected matrix has and will continue to reshape the way we live, work and play.

Work in Progress: The Unveiling of Smart Digital Cities

In order to attain the label of "smart," a city must first and foremost become digital. Forecasts predict that smart city expenditures will reach an impressive \$327 billion by 2025. In addition, 70% of this investment in smart city technology is expected to come from the United States, Western Europe and China by 2030.

A digital city is a contemporary urban environment that harnesses various electronic methods and sensors to gather specific data. Such digital cities are completely interconnected in the digital realm, linking homes, streets and public spaces and maximizing a full array of opportunities through real-time data availability. The core objective of a smart city is to utilize digital connectivity to enhance the urban setting. It does this by effectively managing its system, thus improving the quality of life.

In a smart digital city context, such advanced technology serves not only to optimize air quality, promote cleaner transportation and enhance energy efficiency in its buildings but also to foster convenience, happiness and overall well-being for its inhabitants.

A suite of cutting-edge digital capabilities, including but not limited to Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing and 5G connectivity, continues to advance in terms of quality, coverage and affordability. These technologies collectively offer a potent set of tools to make cities more intelligent, secure, environmentally friendly and inclusive.

Which Cities Are Paving the Way for a Smart Future?

The effectiveness of technology and its development are intrinsically linked to the infrastructure and environment within cities that enable its application. In this regard, technologies such as AI, IoT and other innovations find their true potential in cities equipped with appropriate digital infrastructure. Therefore, a city's "preparedness" to enable smart technology is significantly influenced by its infrastructure.

One key report, the Digital Cities Index (DCI) for 2022, supported by NEC Corporation, assessed cities across four essential themes: digital connectivity, services, culture and sustainability. The top-performing cities included Copenhagen, Amsterdam, Beijing, London and Seoul, and each excelled in these areas.

A smart city's infrastructure forms the basis for smart mobility, smart economy, smart living, smart governance, smart people and smart environment. However, the specific components of smart infrastructure are context-specific and shaped by the city's level of development and its unique challenges toward such. And in developing countries, the immediate focus may be on providing adequate urban infrastructure to cope with rapid urbanization.

Several key indicators contribute to the transformation of a city into a smart and innovative hub:

- 1. Interoperability and Connectivity: Connectivity lies at the core of these newest urban processes and interactions. It encompasses features like secure and free Wi-Fi hotspots, high broadband download speeds, the prevalence of IoT networks and companies, and the number of 5G network towers. Multimodal transport systems driven by renewable energy sources and interoperable software platforms enhance urban mobility and services as well.
- 2. Green Infrastructure: Cities are evolving into testing grounds for innovative, tech-savvy solutions that are capable of harmonizing with the natural environment. Green infrastructure involves interconnected ecosystems, ecological-technological hybrids, and built infrastructures that fulfill social, environmental and technological functions. It includes public-access electric vehicle charging points, green-certified buildings, hybrid energy systems, open parks, flood protection, land conservation initiatives and urban canopies.
- **3. People-Centric Community:** Smart cities must progress in two key aspects: advancing technology and emphasizing people. A smart city must adapt to residents' behaviors and needs and should facilitate efficient community living. The success of smart cities hinges not only on sophisticated technology

but also on a consistent focus on the well-being of residents. To this end, the demand for tech jobs within smart digital cities is expected to surge, as human competencies remain essential for controlling, maintaining and monitoring technology.

In the urban landscape of the future, smart digital cities will be characterized by data-driven governance, resilience, economic growth, sustainability, advanced mobility and inclusive communities. Ultimately, they will provide a brighter, more sustainable and more fulfilling urban future for all. These cities will evolve into dynamic, interconnected hubs that prioritize the well-being of their residents, ushering in a new era of urban living that embraces technology while keeping people at its core.



In order to attain the label of "smart," a city must first and foremost become digital





Telecom Review Panel on 5G: Minimizing Downtime and Optimizing Experience

Telecom Review successfully presented its 8th virtual panel of 2023 entitled 'Trends in 5G and Digital Transformation' on November 16, 2023.

he lineup of esteemed speakers included: • Mohamed Radwan, Director Strategy & Architecture, NEC GCC

- Noman Waheed, CTO, Middle East, Mobile Networks, Nokia
- Ersen Omuris, Head of Technology Strategy & Planning, Vodafone Qatar
 Majd Coussa, VP Business
- Development IoT & AI, e& enterprise

Ming Chan, Associate Partner, TMT, PMP Strategy, was the moderator for the panel session.

Below are the edited excerpts from the wide-ranging discussion on 5G.

Best Practices for 5G Use Case Monetization

There has been a lot of discussion about 5G and what the future might bring, but practically speaking, Noman Waheed emphasized the key use cases in the near term for 5G monetization: enhanced mobile broadband, fixed wireless access (FWA) and social services such as cloud gaming and metaverse.

"I've been here in the Middle East since we had the first 5G commercial launch in the Gulf countries in 2018," stated Nokia CTO. "What we have seen compared to the previous technologies is that the rollout and adoption of 5G has been faster than any of the previous generations." In fact, 300 operators have deployed commercial 5G networks, and the number of 5G subscribers is expected to grow to 8 billion by 2028. "We see that service providers across different parts of the world continue to deploy 5G despite the global macroeconomic condition and political uncertainties," added Waheed.

From another vendor's perspective, Radwan highlighted that CSPs — the ones who invest heavily in 5G — are the ones working hard to monetize this good investment.

Radwan confirmed Waheed's thoughts on the two most killer use cases: enhanced mobile broadband and FWA. More importantly, he pointed out that "5G is not more about the consumer; it's more of a service-based architecture."

From an operator's perspective, Majd Coussa said that they indeed serve both B2B and B2C customers. One real-life case study he shared is e& enterprise's partnership with DMCC to transform the JLT area into Dubai's first 5G-powered smart, sustainable district. With their collaboration, the Smart District Platform enhances residents' and visitors' experiences and offers operational control and efficiencies.

Another notable use case is being the Digital Services Premier Partner of EXPO 2020. e& enterprise is proud to have enabled EXPO 2020 Dubai, making it the first 5G commercial site of the MEASA.

When it comes to the public sector, Omuris specified some use cases within the public sector. He started by saying that both the public and private sectors have different motives and interests. Smart cities, public safety, healthcare, education and environmental monitoring are key considerations for 5G adoption in the public sector.

Integration of 5G, Automation, AI, Cloud and CNOC

As for AI/ML and automation and how they are shaping industries and the future of telecommunications, Coussa said, "For AI to function effectively, it needs data. This includes both structured and unstructured data, which must be stored, transmitted and analyzed for AI and machine learning models to work properly. The collected data can then be processed by AI algorithms to generate predictive insights and use cases."

He highlighted a single area of focus, which is industry-specific use cases. In his opinion, these are prevalent not only in the United States but also in the region. Industry 4.0 represents the transformation of different industries. For example, the manufacturing industry is currently experiencing this transformation, utilizing AI to optimize operations, increase productivity and enhance manufacturing practices. Another area where AI is beneficial is supply chain optimization within enterprises. Real-time data analytics enable better inventory management, understanding demand patterns, identifying outages and aligning with customer needs.

There are several other AI use cases, both internally and externally, that add value to businesses. Language models, such as bilingual ones, are utilized to support interactive chat and voice-based services to provide consumers with personalized recommendations and assistance regarding consumption-related queries.

In summary, the power of AI lies in its ability to address industry-specific challenges and bring relevant value to businesses. Utilizing AI effectively is crucial in order to achieve desirable outcomes. From a backend perspective, network optimization plays a significant role as well.

Investment in Public and Private Infrastructure

The focus shifted to the considerations businesses should weigh when choosing between public, private, or hybrid infrastructures for deploying 5G. Omuris emphasized the transformative impact of 5G on communication and operations within private industries, acknowledging the uniqueness of each industry's case.

He highlighted key points, including the convergence of all connectivity into a single pipeline, the growing interest in private 5G networks and the disruptive nature of 5G across various industries. Omuris highlighted the expectation of 5G transforming current networks into more responsive systems and distinguished between fixed wireless access, cloud gaming and the metaverse.

He also explained that agility emerged as a crucial factor, emphasizing the need to rapidly offer services. Collaboration with key hyperscalers and active engagement with a diverse range of enterprise customers across industries underscored the commitment to adapt to evolving technological landscapes.

While asking about the role of investments in fiber, including WiFi-6, data centers and satellite services, particularly Low Earth Orbit (LEO) satellites, in advancing the broader objective of enhancing 5G connectivity, Radwan shared insightful observations. Addressing the connectivity landscape, he pointed out that approximately 2.7 billion people remain unconnected to the internet, highlighting the pressing need for inclusive solutions.

Radwan then brought attention to the future, noting that 6G will play a significant role in addressing connectivity challenges. He projected ambitious data rates of up to 20 gigabits, signifying a leap in network capabilities.



Given the complexities of new technologies today, collaboration among industry players for the success of 5G networks is crucial to driving innovation



TELECOM Review

Telecom's Role in Sustainable Networks

Coussa responded to a question about the growing prominence of the climate agenda within organizations and industries. The question focused on how the telecom industry can expedite the development and implementation of green and sustainable networks.

"As a telecommunications company, e& is dedicated to decarbonizing its activities, modernizing the mobile network and promoting energy efficiency. Many organizations are moving in this direction, addressing inefficiencies to achieve sustainability targets," he said. He also pointed out that the power of 5G networks, particularly in smart cities, supports initiatives like smart utilities, citing an example of Dubai's utility company DEWA using AI and telecom connectivity to detect and reduce water consumption.

The Role of Collaboration and Innovation in the Future of 5G Networks

Given the complexities of new technologies today, collaboration among industry players for the success of 5G networks is crucial to driving innovation.

In response, from a vendor's perspective, Waheed aptly cited an African proverb that says, "If you want to go fast, you go alone. But if you want to go far, go together." In regards to 5G, he said that this was the first time where not only vendors and CSPs but other industry players such as the 5G Automotive Association (5GAA) and satellite providers, among others, were also part of the 3GPP discussion on 5G on how to best use the 5G technology for the greater good of mankind. He referred to the introduction of eMBB, URLLC and mMTC communication functionality as part of 3GPP Releases 15 and 17. He also projected an optimistic view of the enhanced non-terrestrial networks (NTN) and RedCap for better functionality in 5G. He stressed the importance of satellite communications to bridge the "white gaps" for "ubiquitous" connectivity.

He said that Nokia was working with direct-satellite connectivity solution providers to help CSPs enhance revenue generation capabilities.

Talking about innovation using emerging technologies in shaping the future of 5G networks, Radwan pointed out that the importance of AI and ML cannot be overlooked and cited "near-real-time" scenarios as examples of such enhanced capabilities. He also emphasized the capabilities of Open RAN as being instrumental in 5G innovations.

Strategies to Drive Digital Transformation

"Before approaching any initial plan, it is a must to identify your scope," stated Omuris. "Defining all the pieces of the puzzle will be the engine in building the target use cases."

In this way, telcos and other digital transformation drivers can modify their use cases by "considering the end goal." To sum it up, a combination of people, culture and process transformation is needed in businesses in the long run.

"To achieve successful digital transformation, the last step is cultural transformation — the alignment of technological and organizational capabilities," cited Omuris. Agreeing to this, Coussa said that "the transformation of the culture and the mindset of the people can generate more use cases."

In addition, he stressed that "it's not about the journey; it's about the end result."

Another key reason to fail is not only having the right people involved but also not having the right management. "It's crucial if the decision-makers are just signing the checks and supporting the budgets but not closely monitoring, understanding and following the progress of the development."

In a nutshell, a successful digital transformation journey must have the support, budget and ecosystem forces to rely on.

The results of the poll questions initiated for the audience were as follows:

1.Digital transformation accelerators

- Cloud 13%
- IoT 0%
- Artificial Intelligence 0%
- All of the above 87%

2.Cost Optimization differentiator

- Human resource and work culture – 13%
- Customized B2B services 13%
- Network virtualization and cloudification 25%
- All of the above 49%

3.Best Sustainability initiatives for operators

- Renewable energy to "green networks" – 67%
- AI and machine learning tools 33%
- Sun setting of legacy networks 0%

4. Network Competitiveness Factors

- Quality of experience (QoE) 57%
- Deployment speed 0%
- Innovation in network services 43% III



A successful digital transformation journey must have the support, budget and ecosystem forces to rely on





The Age of Intelligence: How Technology Is Reshaping Our World

The introduction of driverless cars for public use is arguably one of the most anticipated developments in the modern world. For most of us, it stretches our imaginations to even visualize cars running on the streets without drivers. However, it's soon set to be a reality as governments and technology companies are preparing to launch the services sooner than we expected.

> or this to be a safe proposition, apart from excellent roads and standards for construction, on-road telematics, lanes, signage, crash barriers,

sidewalks and curbs must become "smarter" and more reliable. If not, the consequences can be catastrophic. Experts point to investments in vehicle-to-vehicle (V2V), vehicle-toinfrastructure (V2I) and vehicle-toeverything (V2X) technologies that facilitate communication between the systems for safe navigation of autonomous vehicles (AVs). There are talks on whether dedicated short-range communications (DSRC) or cellular vehicle-to-everything (C-V2X) systems are good options for connected vehicles and so on. The point is that future smart cities will benefit from advanced vehicle technology and systems that can facilitate more advanced driverassistance systems (ADAS), such as sensors and cameras for safe autonomous driving, smart parking, adaptive cruise control, lane centering, etc. Add to this the inevitable presence of unmanned aerial vehicles (UAVs) that are rapidly becoming part of the public transport mix in smart cities.

Indeed, it is nothing short of magical how technology is enabling possibilities that were, until now, reserved only for the pages of fiction.

Promoting Safety

According to Gun Violence Archive reports, around 100 people are killed and 200 more wounded by guns every day in the United States. In 2021 alone, 48,830 people died from gunrelated injuries in the US, according to the Centers for Disease Control and Prevention (CDC). These incidents take place despite surveillance cameras being installed in most public places, including schools, malls, parks, stadiums, etc. However, the good news is that such events can be greatly reduced with today's AI and IoT-powered surveillance systems that can guickly identify people who might pose a potential security threat to the public. Harnessing the power of data, these surveillance camera systems can detect various on-body weapons, masked faces, suspicious objects and traffic. Combined with human intelligence, these systems have the potential to save thousands of lives and increase public safety in homes, communities and public spaces alike. Furthermore, technologists are working on large datasets to enhance such systems' robustness at scale and improve the prediction accuracy of the devices.

Personalizing Healthcare

Humans are complex beings, and although we may engage in similar activities most of the time, these can affect us differently as individuals, especially in terms of health. With this in mind, the Abu Dhabi government has endorsed plans presented by the Department of Health to launch Biobank in Abu Dhabi. This project aims to support the provision of precision and personalized medicine through advanced treatment programs that use human stem cells and tissues to develop medical research. This information will support advanced technology and scientific methods to treat more than 80 diseases. including blood disorders, cancer. bone marrow diseases and immune system disorders. Many other uses of hi-tech innovations in healthcare are entering the market regularly, promising effective interventions for life-threatening ailments. Such projects are a breakthrough in research and innovation in life sciences that promise excellence in the healthcare ecosystem an outcome that can transform our daily lives.

Entering Next-Gen

As we ponder the seemingly endless possibilities of what technologies like generative AI can do, the latest consumer products launched by Meta are themselves mind-blowers. Its new Al products include bots that can create photo-realistic images, smart glasses capable of answering gueries and advanced VR headsets. The company touts the products as "bringing together virtual and real worlds" and plans to make them affordable for ubiquitous use cases. Plans are underway to add Meta AI to the smart glasses as an assistant, with a software update next year that will give the assistant the ability to identify places and objects users are seeing as well as perform language translation. Indeed, with open-source artificial intelligence models easily available for developers, it will be interesting to see how AI can impact our interactions with the world around us.

Technology Takes Flight

From accurately analyzing climate change temperature variations to executing complex global financial transactions and exploring human stem cells, technological advancements have consistently amazed us by what they have achieved so far. In the past two decades, communication has surpassed emails and fax machines to include chatbots, video conferencing, social media, cloud computing and AI to connect and work with various businesses globally. A Kaspersky report notes that by the year 2050, technology will dominate the workplace, with artificial intelligence and smart assistants as regular features. This will combine with the consistent increase in the use of augmented and virtual reality. Within this ecosystem. telecommunications have been the pillars on which the whole infrastructure relies. Both fixed and wireless networks have been the transformative agents of this evolution. With the addition of satellite internet to the connectivity mix, the positive impact that telecom networks can provide simply cannot be overlooked. The dependence on the telecom sector for a well-functioning digital world is immense. Innovative and strategic collaboration remains at the heart of the industry to bolster the technological advancements that will ultimately define and justify sustainable human existence thus far. 🎹



Innovative and strategic collaboration remains at the heart of the industry to bolster the technological advancements that will ultimately define and justify sustainable human existence thus far





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TDRA Announces the Launch of the Radiocommunication Assembly 2023



The Telecommunications and Digital Government Regulatory Authority (TDRA) has announced the initiation of the Radiocommunication Assembly 2023 (RA-23), in anticipation of the forthcoming World Radiocommunication Conference WRC-23 scheduled to take place in Dubai from November 20 to December 15 of this year.

The proceedings of the

Radiocommunication Assembly (RA) commenced with an opening speech by H.E. Eng. Mohammad Al Zarooni, TDRA Deputy Director General of the Information and Digital Government Sector, in his capacity as the Dean of the ongoing RA session. In his address, he extended a warm welcome to the leaders and members of the participating delegations, emphasizing the significant role played by the RA. He said, "The significance of these meetings lies in the key role of the RA in adopting resolutions, recommendations, and studies within the Radio Sector of the International Telecommunication Union (ITU-R). The decisions and discussions that the Assembly will produce will shape the framework for vital studies, which will contribute to the development of radiocommunication standards and practices in a way that reflects our commitment to the highest levels of innovation and cooperation. This reflects our unwavering commitment to the highest levels of innovation and cooperation. The tasks addressed in this forum will mark the initiation of a series of actions leading to effective outcomes in the upcoming period, provided that the efforts of the Study Group are directed towards addressing the most critical issues within the context of our mission."

Al Zarooni added, "In every meeting held within the RA, everyone assumes a profoundly significant humanitarian role, embodying the spirit of a unified and cooperative humanitarian team. Here, the endeavors of nations and sectors converge on all aspects of radiocommunications, reflecting our shared aspirations for development, prosperity, and progress for our communities and humanity at large. This collective effort aims to chart a course toward a future where technology aligns seamlessly with societal needs, all in harmony with the shared spectrum we navigate together."

The activities of the first day of the RA also included opening speeches by Her Excellency Doreen Bogdan-Martin. Secretary General of the ITU: His Excellency Mario Maniewicz, Director of the ITU Radiocommunication Bureau (BR); and Ms. Carol Wilson. Chair of the Radiocommunication Assembly. In their speeches, they underscored the significance of the RA's work, which is dedicated to advancing services through cutting-edge infrastructure and technologies that benefit communities and foster economic development. They emphasized that the impact of the BA's efforts resonates globally, contributing no less than other institutions affiliated with the United Nations to the benefit of humanity. Following these speeches, the session engaged in a thorough examination of the RA's agenda. This encompassed discussions on the draft agenda for the RA's launch, the preliminary agenda for its inaugural plenary session, the proposed organizational structure, the draft meeting schedule, the heads of delegations' meetings, and the recommendations for appointing chairs and vice chairs for the RA and study groups.

Qatar and Rwanda Deepen Collaboration in ICT Domains



During a recent visit by Qatar's Minister of Communications and Information Technology, H.E. Mohammed bin Ali Al Mannai, and a delegation to Rwanda, the two countries formalized their commitment to collaboration in the field of communications and information technology.

This partnership underscores Qatar's ongoing efforts to bolster ties and

cooperation in information and communication technology (ICT) across Africa.

The Memorandum of Understanding (MoU) was signed between H.E. Minister Al Mannai and H.E. Paula Ingabire, Rwanda's Minister of Information Technology, Communications and Innovation. The agreement encompasses various areas of collaboration, including: public key infrastructure; the development of ICT policies and strategies; support for research and development in artificial intelligence; the exchange of experiences in digital transformation and e-commerce; as well as cooperation in smart cities and cross-border data flow.

H.E. Minister Al Mannai emphasized, "This collaboration is a testament to our commitment to promoting innovation and technological advancement on both local and international levels."

He further highlighted that the partnership aims to fortify synergy for mutual growth and development, facilitating the exchange of knowledge and resources in key areas of the ICT sector. The visit exemplifies the strategic importance placed on fostering technological advancements and sharing expertise between Qatar and Rwanda.



Responsible Revolution: Can Al Chart Its Path Sustainably?

Artificial intelligence (AI) holds many promises for us today, including guidance toward our ecological future. However, if we do want to save the planet with AI, we must also consider the environmental footprint that comes with deploying this technology itself. It's hard to predict exactly how much AI will scale over the next few years, but it is crucial to take steps to make it as energy-efficient as possible moving forward.



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cross the globe, data servers are humming away to bring our digital world to life. The planet's approximately 8,000

data centers are the foundation of our online existence and will grow further with the advent of artificial intelligence. However, along with this presence come the vast amounts of megawatts that are needed to operate these essential tools.

According to research projections, by 2025, the information technology (IT) sector may account for 20% of the total global electricity consumption and contribute as much as 5.5% to the world's carbon emissions.

Hence, the environmental repercussions associated with AI cannot be discarded, as neglecting them could lead to lasting and irreversible consequences. The adaptation of the world's data servers in order to prepare for AI integration is already underway. Indeed, it is being described by a Google executive as a rare and pivotal turning point in the field of computing.

The training of GPT-3 on a database of more than 500 billion words is estimated to require 1,287 megawatt hours of electricity and 10,000 computer chips. This is the same amount of energy that can power around 121 homes for a year in the United States.

A recent study by Google and the University of California, Berkeley, reported that training GPT-3 resulted in 552 metric tons of carbon emissions, which is equivalent to driving a passenger vehicle for 2 million kilometers or flying from Australia to the UK over 30 times.

The Exhaustive Work of AI

Artificial intelligence has emerged as one of the most revolutionary technologies, bringing about unprecedented transformations in various industries and already exerting a significant influence on our daily lives.

The development of generative AI tools such as OpenAI's GPT-4 or Google's PaLM2 can be dissected into two pivotal stages: the initial training phase and subsequent execution or inference. With this in mind, modern and larger AI models necessitate the utilization of increasingly powerful graphics processing units (GPUs) and protracted training times, leading to heightened resource expenditure and energy usage.

In the year 2023, AI witnessed an explosive surge in popularity, transitioning from the technological periphery to its central focus. AI-driven machines engage in memory-toprocessor transactions, with each of these interactions consuming energy. As these tasks become more intricate and data-intensive, two key factors undergo exponential growth: the requirements for expanded memory storage and the escalating demand for energy resources.

Environmental Costs

The growth of AI technology and the expansion of data centers are contributing to a significant increase in energy demand, raising immediate concerns about their adverse effects on environmental sustainability and climate change.

In greater detail, AI language models operate on extensive distributed systems that span multiple servers and data centers. Consequently, the energy consumption cannot be attributed to a single model or server but is shared across the entire infrastructure, making it challenging to pinpoint specific energy usage for any individual model. Furthermore, as AI models serve various purposes and are concurrently accessed by numerous users, both the workload and energy required tend to fluctuate.

Al facilities rely on large-scale operations and the substantial energy usage that those entail. According to an expert at the University of Pennsylvania School of Engineering, each of these facilities annually consumes between 20 and 40 megawatts of power. Even at the lower end, this is enough to power nearly 16,000 households.

As companies like OpenAl, Google and Microsoft compete to develop increasingly advanced Al models, they do not fully disclose the precise amount of electricity and water they use for training and running their Al models, the sources of energy powering their data centers or the locations of some of their data centers.

One non-peer-reviewed study by researchers at UC Riverside estimates that the training of GPT-3 in Microsoft's state-of-the-art US data centers could have possibly consumed 700,000 liters of freshwater.

Additionally, manufacturers are racing to produce faster chips, and the faster these chips operate, the more heat they generate. This necessitates greater cooling, a process that accounts for 40% of the total energy expenditure in a data center. The global shift to liquid cooling presents its own set of challenges, as it in turn requires substantial water usage.

Addressing the Challenge

Imagine the prospect of AI alone increasing global energy demand by 10%, a figure that seems highly plausible considering the limited number of models currently in existence. This estimate may even be a conservative one, as businesses and governments are more and more compelled to embrace AI technology.

In response to this surge in energy demand, every conceivable energy source, including oil and gas wells, wind turbines, coal mines and nuclear plants, will be pressed into service, pending a breakthrough in energy efficiency.

While artificial intelligence holds promise for enhancing efficiency across various sectors, questions arise about whether this heightened efficiency actually contributes positively to the bottom line, especially when the costs exceed the savings in labor and waste reduction.

To mitigate AI's carbon footprint, numerous experts recommend that AI pioneers incorporate renewable energy sources into their operations. In practical terms, the emphasis should be placed on discovering more sustainable methods to meet the substantial energy requirements of AI.

The relocation of AI processing to data centers is contributing to the reduction of AI's carbon footprint due to the increasing operational efficiency of data centers and their adoption of environmentally friendly energy sources.

Particularly concerning are the generative AI models, which consume the most substantial energy amounts; there is a pressing need to make them more green before they become more widespread. For instance, fine-tuning and prompt training within specific content domains is considerably more energy-efficient than training entirely new large models from scratch. Moreover, these approaches often provide more value to many businesses than generic model training. Furthermore, while standard CPUs consume an average of 70 watts and GPUs consume 400 watts of power, tiny microcontrollers require just a few hundred microwatts, which is a thousand times less power, to process data locally without relying on data servers.

Given these considerations, there is a growing movement to make AI modeling, deployment and utilization more environmentally sustainable. The objective is to replace energy-intensive practices with eco-friendly alternatives. Both vendors and users must embrace this change to ensure that AI algorithms can be deployed widely without harming the environment. The technology is unprecedented, and it's here to stay. We must therefore be sure to navigate this journey in a sustainable manner.

> Artificial intelligence (AI) holds many promises for us today, including guidance toward our ecological future



TELECOM Review



The 5G Revolution: Unprecedented Transition Is Underway

As 5G transitions from concept to reality, the increased utilization of AI is poised to significantly escalate data traffic demands. This advancement will require a resilient infrastructure capable of delivering substantial bandwidth with minimal latency and power consumption. With this in place, 5G has the potential to facilitate a plethora of valuable new applications.

I's Market Surge and 5G's Crucial Role Precedence Research, the noted market research and consulting organization, has projected that the AI market will exceed \$1,597 billion by

2030, with a robust compound annual

growth rate of 38% from 2022. This growth is driven by burgeoning demand across various industries, including retail, healthcare, food and beverage, automotive and logistics. These various industries are increasingly harnessing AI applications, often powered by 5G technology. To support these applications effectively, there is a critical need for higher bandwidth transmission capacity and extremely low latency, all while maintaining energy efficiency and performance.

As their data needs and complexity mount, these Al-driven applications apply significant and growing pressure on data centers, requiring substantial enhancements to their infrastructure. Meeting this demand necessitates the establishment of more interconnects within data centers. This is primarily due to the parallel computing algorithms used and the reduced latency, or minimal time delay, requirements that data center interconnects must meet. The efficiency of these interconnects directly impacts the overall performance of data centers in this data-intensive AI and 5G era.

Essential Technologies Bolster 5G Applications

The adoption of 5G is experiencing rapid expansion, with projections of 5G connections in North America reaching 410 million by 2025. To accommodate this surge, existing 5G networks must enhance their capacity while simultaneously reducing their power consumption and latency for data transmission. In this context, optical technology emerges as a critical component, streamlining efficient and sustainable data transfer over existing fiber deployments. This ensures the requisite infrastructure is available to support these diverse use cases effectively.

Empowering Smart Cities and Industrial Applications

As the expansion of smart cities drives the demand for 5G, industrial applications — both within and outside of facilities — stand to benefit significantly. The push toward smart cities is driven by several key goals, including the enhancement of systems, sustainability, mobility and more. Such a system relies heavily on robust and consistent connectivity — the true cornerstones for enabling these transformations.

In the deployment of smart city infrastructure, the introduction of 5G – and eventually 5.5G and 6G – introduces the need for greater optical capacity in front, mid and backhaul networks, all running on the same limited amount of available fiber. Smart cities depend on continuously connected networks to implement constant communication, leading to a heightened demand for low-latency and high-bandwidth performance. Rather than the costly and disruptive process of laying more fiber to meet this demand, technology vendors and service providers are turning to high-speed, power-efficient and cost-effective optical solutions. Such remedies can fulfill the requirements for latency and bandwidth using the existing underground infrastructure. 5G opens the possibilities for creating an "always-connected city" that can provide scalable and reliable connectivity for dataintensive applications. For instance, sensors deployed throughout the city can transmit real-time data to a central system, which can then analyze this data and optimize the performance of various applications. Optical technology takes this one step further by offering the costeffectiveness, small footprint, low power consumption, ultra-low latency and high-performance capabilities that are essential for meeting the demands of 5G applications. Ultimately, this will enhance the efficiency and effectiveness of smart city systems.

5G Technology Enhancing Industrial Operations

The integration of 5G technology is reshaping our interaction with virtual environments, particularly in the context of industrial and operationsrelated education. The adoption of 5G facilitates the broader utilization of both AR and VR technologies by addressing key aspects such as ensuring dependable connectivity, enhancing data streaming quality, minimizing latency and surmounting some of the barriers that previously hindered companies from embracing these new technologies.

Optical technology itself assumes a crucial role in meeting the challenges of adapting AR and VR for educational purposes. It achieves this by optimizing existing infrastructure while concurrently enhancing connectivity to ensure accessibility from virtually anywhere. By augmenting bandwidth, reducing power consumption and minimizing latency, we can enable the fiber networks already in place to effectively support both current and future use cases, even in remote and challenging settings.

In summary, the convergence of 5G and AI is driving significant changes while demanding a robust infrastructure for high-speed, lowlatency data transmission. The AI market powered by 5G is booming. and optical technology plays a crucial role in meeting these demands. It enhances 5G connectivity for smart cities, industrial applications and AR/VR education, ensuring efficient use of existing infrastructure while addressing critical challenges that remain. This transformation stands to make our world smarter and more connected. 🎛

The AI market powered by 5G is booming, and

optical technology plays a crucial role in meeting these demands



TELECOM Review



The Race for Space Internet Builds Up Pace

The competition to provide broadband from low Earth orbit (LEO) satellites is slowly but steadily growing. The futuristic prospect of wirelessly accessing high-speed, low-latency internet connectivity has become an appealing proposition for both enterprises and consumers.

does not have internet access, non-terrestrial communications, such as satellite communications, are becoming integral to promoting inclusivity in an increasingly connected world. The non-requirement of local ground infrastructure like DSL, fiber or 5G wireless makes satellite internet the perfect option for rural and underserved areas.

oreover, in a

world where

one-third of the population

In August last year, the Digital Cooperation Organization (DCO), the intergovernmental organization established to enable digital prosperity for all, took in Omantel as the first official observer organization from Oman. As a leading telecommunications provider in Oman, Omantel will provide unique insight and experience in innovation, startups and telecoms technology to the DCO to support the DCO's mission to create digital prosperity for all.

Satellite connectivity is the perfect tool for organizations such as the DCO, which focuses on digital economy initiatives supporting youth, startup entrepreneurs and women. This purview includes 11 member states with a combined GDP of over US\$2 trillion and a population of nearly 600 million. With 70% of future economic growth set to be digital, DCO member states provide an especially valuable market opportunity to investors and entrepreneurs alike.

Enabling New Applications

Wireless coverage is expected to expand from 2D "population coverage" on the ground surface to 3D "global and space coverage." Integrating non-terrestrial and terrestrial communications systems will achieve this 3D coverage of the Earth. It will not only provide communications with broadband and wide-range IoT services around the world but also provide new functions such as precision-enhanced positioning and navigation as well as observation of the Earth in real-time.

As a case in point, OQ Technology, the leading 5G IoT satellite operator, is collaborating with the European Space Agency and the Luxembourg government to launch an in-orbit pathfinder mission (MACSAT) with the aim of strengthening its space and ground infrastructure and thus expanding its satellite coverage. The mission will bolster their 5G IoT capabilities that can address pressing needs like greenhouse gas monitoring, supply chain sustainability for governments and other sectors, including transportation, agritech, utilities, smart cities, mining, telemedicine, maritime and energy/O&G services and so on.

Moreover, SATCOMs have become key enablers of emergency first responder operations to implement disaster relief plans, even amidst widespread outages. As technology advances, businesses and government organizations are increasingly looking to satellites as a proactive disaster relief measure that can mobilize faster and more efficient response plans.

Innovative services such as inflight connectivity and maritime navigation are the primary growing market segments for satellite internet. Furthermore, LEO constellations have the potential to enable long-range communication with low latency. Integrating this with flourishing unmanned aerial vehicle (UAV) assisted non-terrestrial networks is expected to become a disruptive solution beyond 5G systems, provisioning large-scale, three-dimensional connectivity.

The latest satellite connectivity trend that has gripped the smartphone sector is exemplified by Apple and Huawei launching products that boast ubiquitous connectivity on the go.

Viability of Satellite Internet Business

Satellite internet has been around for over 25 years; however, its adoption has been limited for a variety of reasons, including its relatively high costs and poor performance compared with terrestrial options. Although the initial projects did meet with several setbacks, satellite operators have endeavored to stay relevant in today's market.

For example, Elon Musk's SpaceX Starlink operates over 40% of all active satellites in Earth's orbit. In recent reports, Starlink's broadband-bysatellite service now has more than 2 million "active customers" in over 60 countries – double the number from just nine months ago. Taking a cue from its May financial statement, Starlink is poised to beat the market forecast of 2.2 million subscribers by the end of 2023, up from "about" 1.5 million, which it said it held then. Starlink aims to roll out 12,000 satellites as part of the LEO network around the world, with a particular focus on remote areas that terrestrial internet infrastructure struggles to reach.

Competitors such as OneWeb, Amazon's Project Kuiper and Telesat are launching operations in new markets to benefit from the leveraging of LEO technologies. These constellations vary significantly, and the commercial realities around service delivery and user terminals are also markedly different. Judging by the key metrics of these operators, the best business models for target consumers can unlock the technology's potential.

In Conclusion

The rapidly growing demand for high-speed and superior-quality connection services - itself a gateway to innovative technologies that enhance the user experience - is not going to slow anytime soon. With increased data rate capacity delivered at smaller sizes, satellite systems are poised to offer and transmit increasingly advanced services to more locations. With the development of new High-Throughput Satellite (HTS) and Non-Geostationary-Satellite Orbit (NGSO) systems, such as the Medium-Earth-Orbit (MEO) system, O3b, and the many proposed LEO and very low Earth orbit (VLEO) systems, the cost of satellite internet is projected to drop significantly. This reduction will further increase the access capabilities and reduce the time delay of satellite connections. Such developments, along with accompanying improvements in spectrum allocation policies by

standardization bodies such as the International Telecommunication Union (ITU), are proof that the satellite internet landscape is rapidly evolving.

Leading operators such as Telesat and Amazon's Project Kuiper are moving ahead with plans for NGSO broadband. Amazon has recently invested a jawdropping \$120 million in a satellite internet facility to deploy its over 32,000 satellites to provide broadband services to underserved locations. Indeed, satellite internet services will offer a truly unique service differentiator, enabling greater digital opportunities for a wide range of business operations.

Finally, in 6G scenarios, where unmanned flying devices are expected to densely populate aerial space, fully integrated 6G heterogeneous networks, ground, aerial and satellite networks will need to coexist to realize spaceair-ground integrated communication networks for such scenarios. All this makes for an exciting and rapidly approaching reality. The real question remains: is the ICT sector ready to take it on?

> The rapidly growing demand for high-speed and superior-quality connection services is not going to slow anytime soon



TELECOM Review



Shaping Our Future: How Innovation Is Driving Short-Range Wireless Growth

In the realm of electronics, the concept of range is paramount, as it determines the distance over which wireless devices can communicate through antennas. Short-range wireless technologies have sparked a revolution in various industries, including industrial equipment, household appliances and healthcare.

ver the past quarter-century, short-range wireless connectivity technologies have reshaped our world, paving the way for an expansive ecosystem of connected devices. It is estimated that by the close of 2023, this ecosystem will encompass a staggering 48 billion installed devices.

Across the various market sectors, shortrange wireless technologies play diverse roles, sometimes complementing each other and other times competing directly. The selection of a technology often depends on the unique requirements of the end devices. For instance, smartphones utilize a blend of Wi-Fi for video streaming, Bluetooth for audio, UWB for precise range, and NFC for mobile payments. In the smart home, a combination of these technologies is harnessed to cater to applications ranging from battery-powered sensors to voice-controlled devices, smart appliances, video surveillance cameras and intelligent door locks. Furthermore, short-range wireless technologies are evolving to serve multifunctional roles. Initially designed for data transfer between devices, they now incorporate advanced features like positioning, ranging, radar and sensing, and even wireless charging capabilities.

Ultra-Wideband (UWB)

UWB wireless technology is a short-range wireless communication protocol — one that has been gradually accepted and adopted by users worldwide. This wireless technology is used to locate items in the real world with great precision, as it boasts extremely high location and directional accuracy. UWB technology has already found its place in tracking devices such as the Samsung Galaxy SmartTag Plus and the Apple AirTag.

Within the automotive industry, UWB technology facilitates precise realtime tracking of the key fob's exact location, with an accuracy of just a few centimeters. UWB chips can also be seamlessly incorporated into various other devices, including smartphones and smartwatches.

UWB adoption is expected to rapidly grow from 386 million units in 2023 to more than 1.3 billion by 2028. By 2028, nearly 1/3 of vehicles shipped are also expected to be equipped with UWB as a secure access technology.

Depending on the frequency, UWB can hit data rates of 675 Mbps or more, which is faster than NFC's 424 Kbps and Bluetooth's standard 2.1 Mbps speeds. UWB is advantageous when it comes to high-speed data transfers, fast location detection with high accuracy, and a low risk of interference.

Bluetooth

Bluetooth technology is evolving, thanks to continual advancements. In the past, Bluetooth used a portion of the 2.4GHz spectrum, but the next version of Bluetooth Low Energy (BLE) is set to operate at higher frequencies. This shift not only promises faster data rates but also reduces the likelihood of interference in areas with a high density of radio signals.

This marks the third wave of innovation for Bluetooth, opening up new avenues

for wireless audio access, sharing and usage. It also enhances secure access and digital key capabilities, supporting digital wallets. Notably, Bluetooth LE is particularly well-suited for power-efficient applications and is a go-to choice for wearables, smart IoT devices and batterypowered accessories.

According to Bluetooth's yearly market update, we can expect annual shipments of Bluetooth-enabled devices to exceed six billion by 2025. With various Bluetooth technologies available, Bluetooth LE stands out as an effective solution for short-range communications, optimized for power efficiency, cost-effectiveness and compact project design.

After several years in the making, Bluetooth LE Audio started debuting commercially in the Google Pixel 7 and continues to gain traction in smartphones and wireless headsets, delivering an evolution to Bluetooth Classic Audio by providing better audio quality, lower power operation and new use cases because of its new broadcast, multi-channel and upgraded audio codec capabilities.

A technology known as periodic advertising with response (PAwR) is a part of this wave, serving as the new transport designed to allow up to tens of thousands of devices to communicate.

The leading use case for PAwR is electronic shelf label (ESL), which is suited for applications such as interconnected home/building alert systems, automotive EV battery monitoring systems and agricultural moisture sensors.

The final key enabler of this innovation wave is channel sounding, a time-of-flight measurement of physical distance. This advancement facilitates secure access applications for home and building entry, allowing your smartphone to serve as your digital key, along with a range of proximity-based presence detection applications.

Near-Field Communication (NFC)

NFC enables wireless communication between two electronic devices in close proximity. While the official NFC range is specified as up to 1.5 inches (3.81 cm) apart, practical usage often allows for distances of up to four inches. NFC represents an evolution from radiofrequency identification (RFID), offering enhanced features and improved security.

The introduction of NFC chips has transformed our interactions with the surrounding world. These cheap electronic components have enabled several use cases. In fintech, NFC technology enables contactless payments, making transactions guick and convenient, with popular examples being Google Pay and Apple Pay. For creative purposes, NFC can be utilized in sharing media content and creating digital business cards. In healthcare, NFC-enabled wristbands or cards allow healthcare providers to guickly access patient records, reducing the risk of errors and streamlining the admission process.

The NFC Forum is in the process of examining ranges that are four to six times the current operating distance of the NFC technology. A slight extension in range would enhance the speed and convenience of contactless transactions and activities. Moreover, the development of a multi-purpose tap feature will elevate the contactless user experience by enabling multiple actions with a single tap. The driving scenarios for this initiative encompass delivering receipts directly, identifying loyalty memberships and facilitating comprehensive journey ticketing.

Enabling the NFC to share data on its composition as well as promoting the ways in which products can be recycled would have multiple benefits: it would meet evolving consumer demands and regulatory requirements and foster a healthy circulatory economy.

As NFC technology continues to gain prominence in our daily interactions, the planned enhancements stand to significantly transform the methods we use for payments, engage with our preferred brands, empower our devices and access goods and services.

Although the timeframe for development spans two to five years, the features are currently in varying stages of development, ranging from research to market requirements to draft specifications.



Wi-Fi Sensing

Wi-Fi sensing is an emerging technology that leverages RF signals from Wi-Fi infrastructure to detect presence and motion. The technology is fast becoming one of the most competitive sensing solutions on the market, and with the final standardization of IEEE 802.11bf on track for March 2025, this will enable Wi-Fi to evolve from a communication-only standard to a dual-function technology.

By combining communication and sensing, the overall value of Wi-Fi deployments and devices over the coming decade will increase, thanks to the creation of valuable new services across both consumer and enterprise environments. IEEE 802.11bf is targeting operation across the 2.4 GHz, 5 GHz, 6 GHz and mmWave bands, including 45 GHz and 60 GHz, each with its own unique advantages. This will empower room sensing, gesture recognition, healthcare, in-car sensing and 3D vision, among other applications.

Wi-Fi sensing offers an economical and innovative approach to home security. It can be effortlessly delivered to customers through a convenient over-the-air software update to their existing Wi-Fi access point (AP). Once this Wi-Fi sensing software is integrated into the AP, it transforms the client's Wi-Fi-connected devices into effective motion sensors. This creates a dynamic motion network that pinpoints the exact location of detected motion.

What sets Wi-Fi sensing apart is its ability to minimize false alarms. Unlike traditional systems that rely on a single data point, such as detecting movement at a single entry point, this technology is designed to track motion as it travels across various devices within the home. Thus, this comprehensive approach enhances the accuracy and reliability of home security, offering peace of mind in a simple, costeffective manner.

Short-Range Wireless Technologies: Shaping the Interconnected World

The short-range wireless connectivity market is currently undergoing a profound transformation. Increasing demand for wireless devices in both consumer and enterprise markets has fueled remarkable growth in recent years, with most shortrange wireless technologies projected to ship billions of units annually by the end of the decade. This ongoing evolution signifies the pivotal role that short-range wireless technologies play in shaping the interconnected world of tomorrow. Increasing demand for wireless devices in both consumer and enterprise markets has fueled remarkable growth in recent years





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Zain KSA in Q3 2023: Highest Quarterly Revenues, 234% Net Profit Growth



Zain KSA achieved highest quarterly revenues exceeding SAR 2.5 billion, a notable 10% increase compared to the SAR 2.2 billion generated in the third quarter of the previous year, as well as recording SAR 285 million in net profit, a significant growth of 234% compared to the corresponding period in 2022.

The company's strong financial performance also reflected the gains achieved by the tower infrastructure sale and leaseback deal which generated gains totaling SAR 139 million during this quarter, as part of the total financial impact which the company expects to reach SAR 1.1 billion over the 18-month period of the tower ownership transfer.

Sustained business growth across all sectors has fueled Zain KSA's robust Q3 profit growth. This growth is particularly evident in the enterprise sector with strong demand for cutting-edge services and solutions such as cloud computing, the Internet of Things and artificial intelligence. Beyond the growth in 5G revenue, Zain KSA has also witnessed a steady uptick in its consumer services and a surge in demand for Yaqoot digital services and micro-finance solutions offered through Tamam, its fintech arm.

Commenting on the financial results, Zain KSA CEO Eng. Sultan Bin Abdulaziz Al-Deghaither stated: "In Q3 2023, our revenue and profit continued to soar, reaching an all-time high for Zain KSA. These accomplishments underscore the effectiveness of our operational and financial strategies, which are firmly grounded in innovation and strategic investments. Our unwavering focus remains on maximizing our impact across technology, economy and society, particularly by enhancing our robust 5G services ecosystem within the business sector. During Q3 2023, we achieved remarkable milestones that cemented our position as a champion of digital transformation Kingdomwide. One notable achievement was the launch of the world's first zeroemission 5G network in partnership with Red Sea Global. Furthermore, our

commitment to localizing the sector was strengthened through strategic collaborations, including a significant partnership with Pioneers Systems, a leading organization specializing in electronic circuit design and manufacturing. Together, we aim to localize cutting-edge products and expertise in the realm of the Internet of Things."

He added, "Cultivating operational and financial efficiency is essential, but equally important is our firm dedication to sustainable innovation and achieving positive impact for all stakeholders and our beloved Kingdom. We remain steadfast in our commitment to being genuine catalysts for Saudi Arabia's nationwide digital transformation, fully aligned with the goals of Saudi Vision 2030. Our aim is to empower an ambitious nation, cultivate a thriving economy and foster a vibrant society. We will continue to meet the evergrowing demand for our advanced services and solutions by seamlessly integrating innovation, sustainability and investment, aspiring to deliver exceptional digital experiences across the telecommunications, fintech, digital entertainment and cloud computing sectors."

Omantel Group Achieves Strong Q3 Performance with 28.7% Increase in Net Profit



Oman Telecommunications Company Group (MSX: OTEL) reported significant growth for the nine months ended September 2023, with net profit increasing 28.7% from RO 195 million to RO 251 million at the end of September 2023. Group revenue grew 10.6% from RO 1981.5 million to RO 2192.5 million at the end of September 2023.

Omantel's Domestic Operations Performance

At the level of domestic operations, Omantel's revenues grew by 8.2% to reach RO 458.1 million, compared to the corresponding period. Revenue growth is mainly coming from wholesale transit voice revenue, which increased by RO 17 million, and device revenue, which increased by RO 10.9 million.

Growth in retail revenue is contributed by Mobile Postpaid revenue, which

increased by 11.4%, and Fixed Broadband revenues, which increased by 4.4%.

Net profit for the nine months ending September 2023 stands at RO 54.7 million, compared to RO 54.9 million in the previous period. In spite of the aggressive competition in both the Mobile and Fixed segments, net profit is maintained at similar levels compared to last year on account of sustainable revenue growth in Postpaid Mobile revenue, fixed broadband revenue and reductions in finance costs and tax expenses.

du, Dubai Silicon Oasis to Expand Dubai Digital Park Into Integrated Smart City



du, from Emirates Integrated Telecommunications Company (EITC), and Dubai Silicon Oasis, the special economic zone for knowledge and innovation and a member of the Dubai Integrated Economic Zones Authority (DIEZ), have announced their partnership to expand the smart services offered at Dubai Digital Park. This collaboration aims to contribute to Dubai Digital Park's status as Dubai's first integrated smart city and enable a transformative digital experience for its residents, visitors and employees.

Leveraging du's technology, Dubai Digital Park will add more than 20 smart services to its existing portfolio of 60 services. The new smart services will enable DSO to embrace an innovative model that creates a holistic, responsive and integrated platform for district management and continuous improvement at DDP. Jasim Al Awadi, chief ICT officer (Acting), du, said, "As a digital telco, du has been at the forefront of driving digital transformation in the UAE. We firmly believe that the infrastructure is the backbone of any successful project, and in the case of Dubai Digital Park, it plays a crucial role in enabling a truly connected and smart city. Our partnership with Dubai Silicon Oasis is a testament to our commitment to delivering cutting-edge solutions that will not only enhance Dubai Digital Park but also the overall quality of life for residents and visitors of Dubai."

The Smart Community Services Development of Dubai Digital Park will revolutionize everyday living. Featuring advanced technologies, services will include signage and wayfinding screens, smart parking solutions, smart access, wireless sensing networks and comprehensive community portal services, among many others.

Abduljalil Mohammad Al Abbasi, senior vice president - Planning & Design at DIEZ, said, "We remain keen at DIEZ on collaborating with key partners to offer our business partners and stakeholders best-in-class services and solutions that streamline their interaction with their surroundings. Through our collaboration with du to enable a transformative digital experience for entrepreneurs, employees, residents and visitors in DDP at DSO, we aim to fulfill our promise of providing world-class smart services that are in line with DDP's status as Dubai's first integrated smart city."

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As Dubai gears up to host the United Nations Climate Change Conference 2023 (COP28), Abduljalil emphasized that DSO's overall digitalization drive is aimed at boosting efficiency, in line with the UAE Net Zero by 2050 strategic initiative.

Under the collaboration, du will oversee the end-to-end functional delivery of key components, including on-premise co-location space and servers for data hosting, fixed network structures, fiber connections, Wi-Fi UAE, teleworking capabilities and WSN Sensors for monitoring various aspects such as noise levels, air quality, water quality, floods, weather and traffic. Additionally, voice communication services (IP telephony) will be seamlessly integrated.

UAE Telecom Operators Adopt New Royalty Regime in 2024



du and e& announced receiving the new Royalty Guidelines for the telecommunications sector from the Ministry of Finance. This included details of the new Telecom Federal Royalty Regime, applicable from 2024-2026 in the context of the new corporate tax regime. The federal royalty rate of 38% will be applied for both UAE operators, as well as the royalty and corporate tax rate of 9% on profit.

For e&, the aggregate annual amount of royalty and corporate tax shall not be lower than AED 5.7 billion. On the other hand, the aggregate amount of royalty and corporate tax payable by EITC shall not be lower than AED 1.8 billion per year.

"We believe that the new royalty structure is more simplified and avoids complexity in the calculation. In addition, based on our initial assessment, the combined impact of royalty and corporate tax will be neutral to e&'s financials," notified the company's statement at Abu Dhabi Securities Exchange (ADX).

e& recently announced its consolidated financial results for Q3 2023, with

consolidated revenues of AED 13.4 billion and consolidated net profit of AED 3 billion. Moreover, the aggregate group subscribers reached 167 million, a 3.3% increase.

"EITC welcomes this resolution, recognizing it as a positive step towards fostering the growth and sustainability of the telecommunications industry within the UAE," disclosed the company at Dubai Financial Market (DFM).

Du reported a total net profit to AED 504 million and revenue growth of AED 3.3 billion for the third quarter of the year, as revenue grew on high demand for mobile and fixed services. This year, the company's mobile customer base increased by to 8.1 million, while its fixed customer base grew to 573,000.

Telecom Egypt Q3 2023 Results: Macro Pressure, Yet Solid Performance



During the past year, Telecom Egypt's consolidated revenue grew significantly, reaching EGP 42.0bn, a 30% YoY increase. This growth was driven by a nearly doubled year-on-year IDD revenue of EGP 4.3bn, thanks to increased traffic and USD appreciation.

Additionally, cable revenue increased by 50% YoY, reaching EGP 3.1bn, while both fixed and mobile data revenues continued to increase at a rate of 18% YoY, landing at EGP 15.9bn. On the customer front, Telecom Egypt achieved growth across all segments, with its fixed voice subscriber base reaching 12.4 million (+9% YoY), fixed data subscriber base reaching 9.3 million (+8% YoY), and mobile subscribers increasing by 6% YoY, reaching 12.5 million.

This growth led to an improved revenue mix, allowing it to achieve an EBITDA hike to EGP 17.6bn with a strong margin of 42%. Despite the 38% YoY increase in D&A costs, the operating profit reached EGP 10.6bn, up 23%. Net profit also grew by 48% YoY, reaching EGP 9.1bn due to positive operational results and higher investment income, despite a 3.7x higher interest expense.

They invested a total of EGP 11.7bn in in-service CapEX, implying in-service CapEX/sales of 28%, while cash CapEX (including license) reached EGP 18.4bn, implying cash CapEX/sales of 44%. Excluding the license installments, cash CapEX/sales would reach 37%. Even though gross debt increased due to foreign currency exposure revaluation, net debt/EBITDA remained flat at 1.5x, compared to FY 2022's 1.4x.

Finally, telecom Egypt generated a net operating cash flow of EGP 11.4bn, although FCFF amounted to a negative EGP 2.3bn, mainly due to vendor payments to secure CapEX and hedge against expected FX fluctuations.

Mohamed Nasr, managing director and chief executive officer, commented: "I'm pleased with our 9M 2023 financial results, as we head towards year-end on a strong note. Total revenue amounted to EGP 42.0bn, culminating from good broad-based growth across all business units and reflecting the value of our consistency in enhancing our services. Retail came through at the top again with EGP 23.2bn in revenue, up 16% YoY, driven by meaningful growth in fixed & mobile data services. Our wholesale also gained traction with EGP 18.8bn in revenue, up a strong 52% YoY. Across the board, we once again recorded an increase in customer numbers. EBITDA margin came in at 41.9%. and operating profit grew by 23% YoY.

"Looking ahead to 2024, our strategy will be to focus on the pathways that will deliver significant and sustainable profitability. We will pursue and prioritize different growth options and opportunities to monetize our assets, especially U.S. dollar-generated assets, to bring more agility to the investment outlays for our core business, and to manage our operating costs. We will continue to deploy and develop innovative technologies to enhance the business and improve the end-user experience while enhancing our pricing and marketing strategies. I remain confident in our long-term trajectory, as we already have the right formula in place for continued success and long-term growth."

Umniah Introduces Dynamic Senior Management



Umniah, a leading telecommunications provider in Jordan, is thrilled to introduce its esteemed Senior Management team. Comprising a group of exceptionally talented and experienced professionals in the fields of telecommunications and information technology, this team is well-equipped to drive Umniah's ambitious vision for the future while positively impacting the lives of its valued customers. One of the key objectives of Umniah's Senior Management team is to deliver cutting-edge services and solutions to their customers. By leveraging their collective expertise, they aim to revolutionize the telecommunications landscape in Jordan and enhance connectivity options for both individuals and businesses alike. With a strong focus on technological advancements, Umniah is uniquely positioned to meet the everchanging demands and expectations of its customers.

The team's passion for innovation is demonstrated through its continuous investment in advanced technologies and infrastructure. By constantly upgrading its network capabilities, Umniah is ensuring that its customers receive the highest quality of service possible. This commitment not only enhances the overall customer experience but also enables Umniah to offer innovative solutions that cater to the evolving needs of the market.

In addition to delivering exceptional services, the Senior Management team at Umniah is dedicated to fostering a work environment that promotes creativity, collaboration and employee growth. By empowering their talented staff, they create a culture of excellence that enables the team to flourish and contribute significantly to Umniah's success. Through their inclusive leadership style, the senior executives strive to inspire their employees to excel in their respective roles, ultimately leading to greater customer satisfaction and business success.



Strategic Evolution: MENA's Robust IT Investments Gain Momentum

IT spending in the Middle East and North Africa (MENA) region is anticipated to accelerate to over \$180 billion in 2024 – a notable and consistent trend.

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ccording to Gartner, organizations, particularly in the GCC, are continuing to focus on digitalizing their IT infrastructure. To this end, IDC

statistics reveal that ICT investments in the Middle East, Turkey and Africa (META) will surge relative to other regions in the coming years.

Saudi Arabia and the UAE, the Arab world's two largest economies, are likely to spend over \$20 billion each to drive their digital economic transformation. More than \$2 billion in ICT spending is also expected this year in Bahrain, with such spending set to grow to \$1 billion by 2026. Additionally, Qatar is predicted to spend \$5.6 billion on ICT this year, with its budget for IT spending reaching as high as \$3.6 billion by 2026. With this in mind, it's important to look at the primary factors shaping this growth.

Cybersecurity

Cybersecurity is the invisible shield defending us from digital intruders. But are our defenses strong enough to keep pace with the ever-evolving tactics of cybercriminals?

The emergence of various disruptive technologies such as cloud, IoT and 5G has facilitated ease of working and automation, particularly adding new capabilities in the ICT sector. However, it has also made IT and telecom companies vulnerable to cyberattacks. It is essential for telcos to synchronize their cybersecurity strategy with their transformation plan in order to fully benefit from their growing investments.

Expenditures on cybersecurity-related services, hardware and software are projected to approach the \$300 billion mark by 2026. In parallel, the World Security Report found that almost half of security chiefs at the world's biggest companies expect to increase their budgets significantly over the next year. Asked about future spending, 42% of respondents said they intended to invest in AI and AI- powered surveillance to spot threats more quickly.

Cloud

According to a noted AWS report, the UAE alone stands to generate an additional \$181 billion in economic value over the coming decade by expediting the adoption of cloud technology. BMI industry research also predicts that the UAE will surpass Saudi Arabia in terms of cloud expenditure.

Cloud computing has been one of the most continuously disruptive forces in the IT market since the early days of the digital era. By 2024, more than 45% of IT investments in system infrastructure, infrastructure software, application software and business process outsourcing are anticipated to transition from traditional solutions to the cloud.

As organizations pursue novel IT architectures and operational philosophies, they establish a foundation for new and exciting opportunities in digital business, including cutting-edge IT solutions. Thus, organizations that embrace dynamic, cloud-based operational models are well-positioned for enhanced competitiveness, particularly in today's swiftly evolving business landscape.

According to Gartner, the momentum behind the shift to cloud computing is unprecedented, with more than half of enterprise IT spending in key market segments projected to migrate to the cloud by 2025. This accelerating transition to the cloud presents both opportunities and challenges for technology and service providers as they adapt to the evolving market dynamics.

For instance, prominent telcos are expected to allocate an average of \$1 billion each to transform their network infrastructure to a cloudbased model in the coming years, as per Capgemini's research. The potential for top-line improvement ranges from \$110 to 210 million per year per operator, while the potential for bottom-line improvement could vary between \$260 and 380 million per year per operator.

Data Management

The need for data is rapidly increasing, with businesses sourcing information from a greater variety of channels and investing more heavily in its acquisition. According to a recent survey by a data science company, 44% of firms acquire external data from five or more providers. Budgets for external data are significant and growing, as over 20% of respondents said they were spending over \$500,000 on external data, with 13% saying they spent over \$1 million.



Saudi Arabia and the UAE, the Arab world's two largest economies, are likely to spend over \$20 billion each to drive their digital economic transformation



According to IDC, spending on big data analytics will grow 11.4% to top \$4.1 billion in 2023. As per data from Appledore Research, investments in network automation software by telecom operators grew by more than 42% between 2020 and 2022 to \$6.21 billion, with network data management identified as the fastest-growing segment in the market.

The rise of data management as a leading IT priority coincides with the ongoing adoption of AI and machine learning (ML). The effective adoption of those technologies heavily depends on data.

Data Centers

Data centers are typically owned and operated by large corporations, such as cloud providers, banks or telcos, or by co-location firms. Currently, the influence of AI is significantly impacting data center expenses, mainly due to increased power consumption that necessitates advanced cooling systems, which tend to be pricier than traditional cooling methods.

These cost escalations should prompt chief information officers and other IT leaders to reevaluate their data center strategies. Simultaneously, data center operators must find ways to better anticipate future demands and optimize their capacity utilization.

Tirias Research predicts that, based on current trends, the combined expenses for generative AI data center infrastructure and operational costs will exceed \$76 billion by 2028. This growth poses challenges to the business models and profitability of emerging services like search, content generation and business automation incorporating generative AI. To put this in perspective, this cost surpasses the estimated annual operating expenses of AWS, which currently holds one-third of the cloud infrastructure services market.

According to Uptime Institute's Data Center and IT Spending Survey for 2022, more than two-thirds of enterprise and co-location operators anticipate increased spending on data center costs in 2023.

In the Middle East, investor interest in data centers is surging as the region,



particularly GCC countries, accelerates its digital transformation. The data center capacity in key markets — Egypt, Saudi Arabia and the UAE — is expected to more than double in the next two years as the region advances its digital transformation goals.

CBRE analysts project that the combined data center capacity of these three markets is currently estimated at around 336 megawatts but is expected to grow to 707 megawatts by 2025, with Saudi Arabia and the UAE contributing the majority of the additional capacity.

Conclusion

Will companies seize the opportunities presented by strategic investments to shape their digital futures or risk falling behind in this rapidly evolving landscape? Only time will tell. But those who recognize the potential of well-planned investments will not only stay competitive but also spearhead innovation and ultimately reshape the digital landscape, all while championing digital excellence. 66

Those who recognize the potential of well-planned investments will not only stay competitive but also spearhead innovation and ultimately reshape the digital landscape



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Protecting Privacy in the Age of Al

In today's digital era, where data is generated and processed at an unprecedented rate, artificial intelligence (AI) has emerged as a transformative force. AI algorithms possess remarkable capabilities to analyze vast amounts of information, enabling advancements in fields such as healthcare, finance and transportation. However, as AI becomes increasingly integrated into our daily lives, concerns about privacy have come to the forefront.

reserving privacy in the age of AI is a complex challenge that requires striking a delicate balance between the innovative potential of AI and the protection of individuals' personal information. On one hand, AI algorithms rely on vast datasets to learn and make accurate predictions, often necessitating access to sensitive personal data. On the other hand, individuals have legitimate concerns about the potential misuse or unauthorized access to their personal information.

The risks associated with AI and privacy are multifaceted. There is the

possibility of data breaches where personal information can be exposed to malicious actors. Moreover, the potential for algorithmic bias and discrimination raises concerns about fairness and equity in decision-making processes. Additionally, the pervasive collection and analysis of personal data can lead to a loss of individual autonomy and a sense of constant surveillance.

To address these challenges, it is crucial to implement robust privacy safeguards. This includes adopting privacy-by-design principles, where privacy considerations are embedded into the development of AI systems from the outset. Anonymization techniques can be employed to protect individuals' identities while still allowing for meaningful analysis. Encryption and secure data storage methods can help mitigate the risks of unauthorized access. Furthermore, transparency and accountability mechanisms should be in place to ensure individuals have control over their data and understand how it is being used.

Preserving privacy in the age of AI requires collaboration between policymakers, technology companies and individuals themselves. Governments must enact comprehensive privacy regulations



By promoting transparency and accountability in Al systems' data handling practices, we can create an environment where individuals feel empowered and secure in their privacy



that strike a balance between promoting innovation and protecting individuals' rights. Technology companies must prioritize privacy as a core principle and proactively implement privacy-enhancing measures. Lastly, individuals must be empowered through education and awareness to make informed decisions about the use of their personal data.

As AI continues to advance and shape our society, it is imperative to navigate the ethical and privacy considerations it presents. By addressing the challenges and implementing effective privacy solutions, we can ensure that AI is harnessed for the benefit of society while respecting the privacy rights of individuals. Only through this delicate balance can we fully unlock the potential of AI without compromising privacy in the age of AI.

The Significance of Transparent Data Handling Practices in AI Systems

In the age of AI, transparent data handling practices play a vital role in preserving privacy. Transparency and accountability are paramount when it comes to AI systems, as they help build trust and ensure that individuals have control over their personal information.

One important aspect of transparent data handling is promoting transparency in data collection. Organizations should clearly communicate what data is being collected, why it is being collected and how it will be used. This transparency allows individuals to make informed decisions about sharing their data and gives them confidence that their information will not be misused.

Similarly, transparency in data sharing is crucial. When data is shared with third parties or used for collaborative purposes, individuals should be aware of who has access to their data and for what specific purposes. This transparency can be achieved through secure data sharing protocols and clear information sharing agreements. Additionally, transparency in data usage is essential. Individuals should have a clear comprehension of how AI systems are using their data. This includes understanding the algorithms used, the purpose of the analysis and any potential impacts on their privacy or decision-making processes. By receiving this level of clarity, individuals can give meaningful consent and have greater agency over how their data is used.

Clear consent mechanisms and easy-to-understand privacy policies are also essential components of transparent data handling practices. Such consent mechanisms should be user-friendly, allowing individuals to provide explicit authorization for the use of their data. Privacy policies should be written in plain language, avoiding complex legal jargon and clearly outlining how data is handled, protected and shared.

By promoting transparency and accountability in AI systems' data handling practices, we can create an environment where individuals feel empowered and secure in their privacy. Such openness helps establish mutual trust between individuals, organizations and AI systems. Ultimately, these transparent data-handling practices form the foundation for a responsible and privacy-conscious AI ecosystem.



Edge Computing in IoT: Enhancing Efficiency and Security in Real-Time Data Processing

In the rapidly evolving landscape of the Internet of Things (IoT), the concept of edge computing has emerged as a promising solution for enhancing efficiency and security in real-time data processing. As IoT devices continue to proliferate, generating massive amounts of data, traditional cloud computing approaches face notable challenges, particularly in terms of latency, bandwidth limitations and data privacy. Edge computing offers a paradigm shift by bringing data processing closer to the source, enabling real-time analysis and decision-making at the edge of the network. This topic aims to delve into the understanding of edge computing in IoT, while also comparing it with cloud computing, to explore its potential in enhancing efficiency and security in real-time data processing.

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rotecting Real-Time Data Processing and Mitigating Data Breach Risks

Security considerations play a crucial role in edge computing for IoT

devices, as they handle sensitive data and operate in diverse and distributed environments. Exploring how edge computing enhances security in realtime data processing is essential to understanding the advantages it offers over traditional cloud computing.

One key aspect is the ability of edge computing to process sensitive data locally, closer to the source or device. By keeping the data within the local network, the risk of data breaches during transmission to the cloud is significantly reduced. This is particularly important for applications that deal with sensitive information, such as in the healthcare, finance or government sectors.

Secure communication protocols are essential in edge computing environments. Encrypted communication channels, such as Transport Layer Security (TLS) or Secure Sockets Layer (SSL), help protect data during transmission between edge devices and other components in the network. By ensuring that data is encrypted, edge computing provides an additional layer of security that mitigates the risk of interception or unauthorized access.

Authentication mechanisms are crucial in edge computing to verify the identity of devices and users. This ensures that only authorized entities can access and process data. Implementing robust authentication mechanisms, such as digital certificates or multifactor authentication, helps prevent unauthorized access and strengthens the overall security of edge computing systems.

Securing edge devices poses unique challenges due to their distributed nature. These devices are often located in remote or harsh environments, making them more vulnerable to physical tampering or attacks. Addressing these challenges requires implementing security measures such as tamper-proof hardware, secure boot processes and regular firmware updates to patch vulnerabilities.

Additionally, edge computing environments must have robust security monitoring and incident response mechanisms in place. Continuous monitoring helps detect any suspicious activities or anomalies, allowing for timely response and mitigation of potential security threats. Incident response plans should be established to address security incidents promptly and minimize the impact on the system.

To ensure the overall security of edge computing in IoT, ongoing security assessments and audits should be conducted. Regular vulnerability scans and penetration tests can help identify and address any potential vulnerabilities in the system. Furthermore, establishing industry standards and best practices for securing edge devices and networks can contribute to a more secure and reliable edge computing ecosystem.

In summary, edge computing enhances security in real-time data processing for IoT devices by processing sensitive data locally, reducing the risk of data breaches during transmission. Secure communication protocols, encryption and authentication mechanisms play a vital role in ensuring the confidentiality and integrity of data in edge computing environments. However, securing edge devices and addressing the unique challenges they pose require additional measures such as tamperproof hardware and robust incident response mechanisms. Regular security assessments and adherence to industry standards further contribute to the overall security of edge computing systems.

Future Trends and Advances in Edge Computing for IoT

The future of edge computing in IoT holds exciting possibilities, with several potential advancements on the horizon. One key area of development is with edge devices themselves. As technology continues to evolve, we can expect to see more powerful and efficient edge devices that can handle complex computations and data processing at the edge. These devices will become smaller, more energyefficient and capable of handling a wide range of IoT applications.

Another significant trend is the integration of machine learning at the edge. By bringing machine learning capabilities closer to the data source, edge computing enables real-time and context-aware decision-making. This opens up opportunities for autonomous systems, predictive maintenance and intelligent edge analytics. Machine learning algorithms running on edge devices can analyze data locally, reducing the need for constant data transmission to the cloud and enhancing privacy and security.

Furthermore, the emergence of 5G technology will play a crucial role in advancing edge computing in IoT. 5G networks offer ultra-low latency, high bandwidth and massive device connectivity, making them ideal for supporting edge computing infrastructure. With 5G, edge devices can seamlessly communicate and process data in real-time, enabling rapid response and enabling new use cases that require high-speed data processing and low latency.

The integration of edge computing with 5G will lead to transformative developments in various industries. For example, in smart cities, edge computing combined with 5G can enable real-time traffic management, intelligent energy grids and efficient waste management systems. In healthcare, edge computing can support remote patient monitoring, real-time health analytics and personalized medicine.

In conclusion, the future of edge computing in IoT is promising, with advances in edge devices, machine learning at the edge and integration with emerging technologies like 5G. These developments will pave the way for more efficient, secure and intelligent IoT applications, revolutionizing industries and enhancing our daily lives.

Huawei Cloud: Redefining Media and Entertainment Productivity



Huawei Cloud made a remarkable impact at the Global Media Congress 2023, a top media industry international gathering platform hosted at the Abu Dhabi National Exhibition Centre (ADNEC).

As Cloud Sponsor of the Global Media Congress 2023, Huawei Cloud's presence at the event provides a comprehensive view of the redefining of media and entertainment sector productivity with new experiences, capabilities and operational efficiencies to drive the evolution of the media industry. The company demonstrated its commitment to the "Everything as a Service" philosophy, and the exhibition area not only highlights Huawei Cloud's achievements but also underscores its role in revolutionizing the media and entertainment industry, facilitating efficient content production, enabling ultra-low latency live streaming for OTT platforms, and empowering businesses with continuous innovation through the MetaStudio Digital Production Line.

During the Huawei Cloud Media and Entertainment Forum, Huawei Cloud introduced its innovative E³ Model, which addresses the demands of the media and entertainment industry in three key areas: content production, content distribution, and business innovation.

The E³ Model, which stands for "New Efficiency, New Experience, New Evolution," promises to usher in a new era of productivity enhancement, improved user experiences, and business growth for the media and entertainment industries.

Unlocking New Growth for the Media & Entertainment Industry

Roy Luo, Vice President of Cloud Consulting Solution Sales at Huawei Cloud Middle East & Central Asia, delivered an opening speech. He stated, "Innovation has always been the core of Huawei Cloud, and we are committed to providing systematic innovation for your digital journey. Wherever your business goes, our cloud goes."

Inspiring New Growth with Partners and Customers

Local enterprise representatives also shared word on their development and Huawei Cloud's cooperation prospects. Eva Wu, XRender global business development executive, unveiled the partnership's latest strides in enhancing 3D rendering capabilities on Huawei Cloud. She highlighted XRender's ongoing collaboration with Huawei, emphasizing the global reach of their cooperation.

Jerome Goubier, head of sales at Vianeos, shared invaluable insights into the world of OTT and monetization. During his presentation, Jerome shed light on the dynamic landscape of OTT and its potential for monetization. He introduced two remarkable solutions by Vianeos: OctoAds, an Ad insertion solution for OTT, and OctoReco, a cutting-edge recommendation engine. These tools were showcased as pivotal in delivering optimized content experiences to viewers.

Nokia Bell Labs and Aramco Announce R&D Collaboration



Nokia's research arm, Nokia Bell Labs, and Aramco, the world's largest energy company, have signed a non-binding R&D collaboration agreement to support Industry 4.0/4IR digital use-case creation and proof of concept development for priority industrial sectors in the Kingdom of Saudi Arabia and beyond.

The companies are expected to collaborate on research and development efforts, develop joint proof-of-concept

solutions, and validate technologies in real-world deployments to expand enterprise industrial automation applications, thereby unlocking new potential for industrial operations. The collaboration will also aim to focus on fostering a comprehensive ecosystem for 5G and emerging technologies to integrate cutting-edge technologies that will help shape the future of industrial sectors.

Nabil Nuaim, Sr. VP of Aramco Digital and Information Technology, said: "We are thrilled to collaborate with Nokia's award-winning research arm, Nokia Bell Labs. This MoU signifies a major step towards digitalizing our industries and transforming our national talent capabilities. Together, we aim to foster a culture of innovation, pushing the boundaries of what's possible in our industrial sectors during this Industry 4.0 era."

Thierry E. Klein, president of Bell Labs solutions research at Nokia, added: "This collaboration with Aramco reflects our commitment to driving innovation and jointly developing advanced industrial use cases with world-leading ecosystem partners. Together, we will accelerate the digital transformation of industries, providing new technologies for a safer, more productive and more sustainable future. We look forward to co-creating ground-breaking solutions that can unlock new business opportunities for industrial operations in Saudi Arabia and globally."

ZainTECH's Participation at GITEX Global 2023: A Resounding Success



ZainTECH, the integrated digital solutions provider of Zain Group, concluded its successful debut at GITEX Global 2023. The company took this opportunity to showcase the depth and breadth of its solutions portfolio and to announce a series of strategic partnerships, as well as an agreement to acquire Specialized Technical Services Company (STS).

STS is pioneering and one of the largest digital transformation solution providers in the region and the Kingdom of Jordan. This strategic move enables ZainTECH to expand its service offerings to enterprises and government bodies, access top talent, foster innovation and enhance its competitive position across the region. During GITEX, ZainTECH showcased its cutting-edge products and services spanning cloud, cybersecurity, artificial intelligence, data services, digital solutions and drones and robotics. The company demonstrated its pipe inspection robot as well as a roving four-legged robot (anymal), which generated significant interest from the visiting public.

Commenting on this GITEX debut, Andrew Hanna, CEO of ZainTECH, said, "We are proud of what has been achieved in the two-year lifespan of ZainTECH so far, as the company strives to meet the vision of being Zain Group's all-encompassing integrated digital solutions provider. There is still much work to be accomplished, but I am confident we are on course towards making ZainTECH the digital transformation company of choice in the Middle East and beyond."

Hanna added, "Participating at GITEX allowed us to showcase our unique one-stop offerings as well as our future roadmap, which is ultimately focused on supporting customers to generate new revenue streams while monetizing their data and digital assets and expediting time-to-value."

ZainTECH announced a series of technology agreements at the show, reflecting the company's commitment to enhancing its service offerings and driving innovation:

Disrupt-X is a UAE-based IoT company that provides a platform for developing and implementing end-to-end Internet of Things (IoT) solutions, offering fullstack solutions. ZainTECH will work with the company to expand its IoT capabilities within its Digital Solutions offerings, supporting governments and enterprises in managing operations more efficiently. This partnership will expand ZainTECH's data analytics capabilities, offering clients deeper insights into their IoT data and empowering them to make smarter, more informed decisions in a rapidly evolving digital landscape. The partnership is also set to assist regional governments and enterprises' sustainability efforts and net-zero 2050 targets by optimizing resource use, reducing waste and minimizing environmental impact through data-driven insights and efficient management.

Telenor to Sell Satellite Unit to Space Norway



Telenor Group has entered into an agreement with Space Norway regarding the sale of its subsidiary, Telenor Satellite. Space Norway is a leading player in the Norwegian space industry.

The sales price is NOK 2.36 billion on an enterprise value basis. As Space Norway is wholly owned by the Norwegian Government, the transaction is subject to approval by the Norwegian Parliament. Closing of the transaction is expected in January 2024, according to a company statement.

"For more than 20 years, we have served our customers with premium, highquality broadcasting and data services via satellite. Now the time has come for a new era for Telenor Satellite. With Space Norway, Telenor Satellite will have an industrial owner who has the right competence and who will prioritize the required financial resources to realise the company's potential. We are proud of what we have achieved together and look forward to following the company's future development," said Dan Ouchterlony, EVP and head of Telenor Amp. "Satellite-based capabilities are more important than ever. The combination of Space Norway's partly governmental customers and Telenor Satellite's commercial customer base will give the new company a strong platform to grow the business in both sectors. We are very excited to enter into this agreement and look forward to contributing to the long-term development of Telenor Satellite."

Telenor and Space Norway have already signed a letter of intent outlining a strategic partnership and possible joint business development initiatives, in particular regarding additional satellite capacity and satellite consulting services.



The Potential of SDN and NFV in Next-Generation Networks

In today's ever-evolving digital landscape, the demand for more efficient, flexible and scalable networks is at an all-time high. This is where Software-Defined Networking (SDN) and Network Function Virtualization (NFV) come into play.

DN and NFV are transformative technologies that offer immense potential for revolutionizing nextgeneration networks. SDN introduces a new approach to network architecture by separating the control plane from the data plane. This decoupling allows for centralized network control, enabling administrators to dynamically manage and allocate network resources, optimize traffic flow and adapt to changing network requirements in realtime.

NFV, on the other hand, focuses on virtualizing traditional network functions that were traditionally tied to dedicated hardware devices. By virtualizing network functions such as firewalls, load balancers and intrusion detection systems, organizations can experience increased agility, scalability and cost savings. With NFV, network services can be rapidly deployed, scaled and adapted to meet evolving business needs. The potential benefits of SDN and NFV in next-generation networks are immense. They provide enhanced network programmability, improved resource utilization and simplified network management. Organizations can achieve greater operational efficiency, scalability and costeffectiveness by leveraging these technologies. They also lay the foundation for innovative services like network slicing, softwaredefined security and intelligent traffic engineering. However, it is important to acknowledge that the implementation of SDN and NFV comes with its own set of challenges. Ensuring network security, managing the complexity of virtualized architectures and integrating legacy systems with SDN and NFV are some of the key considerations that need to be addressed.

Challenges in Implementing SDN and NFV

Implementing Software-Defined Networking and Network Function Virtualization can bring numerous benefits, but doing so also comes with its fair share of challenges. These challenges must be addressed and overcome to fully realize the potential of these technologies. Here are some key challenges that organizations may face during the implementation of SDN and NFV:

1.Network Security: As networks become more dynamic and virtualized, ensuring robust security becomes critical. The distributed nature of SDN and NFV introduces new vulnerabilities, and organizations must implement comprehensive security measures to protect against potential threats such as unauthorized access, data breaches and service disruption.

2.Complexity and Integration:

Implementing SDN and NFV often involves complex architectural changes and integration with existing network infrastructures. Migrating from traditional hardware-based solutions to software-defined environments may require significant planning, testing and coordination across various technology domains. Organizations must carefully manage this complexity to ensure a seamless transition.

3. Interoperability and Standards:

SDN and NFV technologies are evolving rapidly, leading to a lack of standardized approaches and compatibility issues between different vendors' implementations. Organizations need to ensure interoperability between different components and solutions, enabling seamless communication and management across the network.

4. Performance and Scalability:

While SDN and NFV offer greater flexibility and scalability, there could be performance challenges due to increased software processing overhead, network congestion, or inefficient resource allocation. Organizations must carefully plan and optimize their networks to ensure that performance targets are met and that scalability is achieved without compromising efficiency.

- **5. Skillset and Training:** Implementing SDN and NFV requires a shift in knowledge and skillsets within the IT teams. Traditional networking expertise may need to be supplemented with software programming and automation skills. Organizations need to invest in training and upskilling their workforce to ensure they have the necessary expertise to manage and operate software-defined environments effectively.
- 6. Vendor Selection: With a multitude of vendors offering SDN and NFV solutions, selecting the right vendor becomes crucial. Organizations need to thoroughly evaluate vendors based on their capabilities, reliability, support and adherence to industry standards. Making the right vendor choice can significantly impact the success and longterm viability of the SDN and NFV implementation.

Overcoming These Challenges for Next-Gen Networks

Addressing the challenges associated with the potential of SDN and NFV in next-generation networks requires strategic solutions. Firstly, network operators should invest in comprehensive training programs to upskill their workforce, ensuring they have the necessary expertise to design, implement and manage these advanced technologies effectively. Additionally, industry collaboration and partnerships are crucial in order to foster the development of standardized solutions and frameworks that enable seamless interoperability between different SDN and NFV implementations.

Furthermore, network operators can leverage open-source platforms and frameworks to accelerate innovation, reduce costs and promote community-driven development. Addressing security concerns requires implementing robust security measures such as encryption, authentication and access control to protect virtualized network functions and data traffic.

Lastly, regulatory bodies must stay proactive in adapting policies to accommodate the evolving landscape while also ensuring privacy, data protection and fair competition in next-generation networks. By embracing these solutions, the full potential of SDN and NFV can be realized, leading to more flexible, efficient and secure next-generation networks.



Addressing the challenges associated with the potential of SDN and NFV in next-generation networks requires strategic solutions





From Smoke Signals to High-Speed Data: The Evolution of Our Telecommunications Journey

The history of telecommunications extends from ancient practices like smoke signals and drums in Africa, the Americas and Asia to the emergence of fixed semaphore systems in Europe in the 1790s and contemporary technologies. This article delves into the evolution of telecommunications, spotlighting influential figures and innovations that have molded the field and discussing modern technological advancements.

he Emergence of the Telecommunications Industry The early era of telecommunications featured a diverse range of communication methods, including the aforementioned smoke signals and talking drums. As a foray into early, emerging technology, in 1792,

Claude Chappe introduced the first visual telegraphy system in France, using pulleys and rotating beams of wood, followed by a different system by Swedish engineer Abraham Edelcrantz. However, these semaphore systems required skilled operators and costly towers, leading to their eventual abandonment in 1880. The birth of the telegraph system, pioneered by Samuel Morse in 1844, marked a significant leap in telecommunications, with the U.S. Postal Service running a successful line from Washington to Baltimore. The telegraph expansion paralleled the growth of America's railway network, and the first coastto-coast telegraph line opened in 1862. The formation of Western Union as a telecommunications monopoly in 1856 and the Civil War's impact on telegraphy further shaped

the industry. International telegraph systems eventually crossed oceans, transforming global business and government affairs. The invention of the telephone in the 1870s, primarily attributed to Alexander Graham Bell. led to the establishment of commercial telephone services in the late 19th century. Mechanically automated telephone switches emerged in the early 20th century, expanding telephone services. The United States rose to prominence in teledensity with the proliferation of independent telephone companies after the Bell patents expired in 1893 and 1894, cementing its position as a leader in telecommunications.

Telecommunications in the 20th Century

In the 20th century, the telecommunications landscape witnessed remarkable developments. By 1904, the United States boasted over three million phones, although they were still connected through manual switchboard exchanges. By 1914, the U.S. had established itself as the global leader in teledensity, surpassing Sweden, New Zealand, Switzerland and Norway by more than twice the teledensity. Despite competing telephone networks that remained disconnected, the U.S. excelled. Over the following 50 years, the telephone network expanded and became more efficient, with minimal instrument changes - that is, until the introduction of touch-tone signaling in the 1960s. Transatlantic voice communication only became feasible in 1927 through radio connections, with cable connections emerging in 1956 via TAT-1. Transcontinental telephone service was enabled around 1915 thanks to amplifier technology. After World War II, technological advancements, including coaxial cable and microwave links, emerged, revolutionizing telecommunications. Satellite communication came into play during the Cold War era, and the development of mobile phones can be traced back to two-way radios. The concept of "cellular" systems and handheld cellular mobile phones was introduced in the 1970s, with the FCC approving analog cellular mobile

telephone systems in 1982, ushering in a new era of growth. Furthermore, cable television companies in the late 1980s began providing telephony services through their cable networks, working in partnership with major telephone companies.

Digital Technology and the Internet

Digital technology revolutionized American telecommunications when AT&T introduced the T1 Carrier System in 1962, significantly increasing capacity and signal quality. The advent of digital telephone switches further enhanced network flexibility. However, the most profound transformation occurred with the deployment of fiberoptic cables, which carried voice, data and video signals, offering immense capacity that outpaced anticipated growth. In parallel, the Internet evolved, with early experiments in remote computing leading to packet-switching technology. ARPANET, born in 1969, eventually expanded to 213 nodes by 1981, incorporating non-U.S. nodes. The 1970s witnessed the emergence of key LAN link protocols. Internet access became widespread in the late 20th century, utilizing existing telephone and television networks. By 1995, the Internet, rooted in government networks since 1969, had become a public network. The World Wide Web's development and user-friendly interfaces opened vast information resources, leading to broad public adoption. However, overoptimistic growth projections in the early 2000s underscored the divergence between expectations and reality in the telecommunications and Internet industries.

Tech Innovations Redefining the Future

In 2023, five emerging tech trends are taking the spotlight. Computer Vision harnesses artificial intelligence to enable intelligent reactions to visual inputs, from facial recognition to traffic sign detection and healthcare applications. Natural Language Processing bridges human language and computers, offering efficient customer service and language translation. Virtual Reality and Augmented Reality bring immersive virtual environments and digital overlays to diverse fields, from medical training to retail experiences. Deep Machine Learning represents a subset of AI, mimicking human learning patterns with powerful neural networks and offering vast potential and concerns. Finally, the groundbreaking Neuralink project, led by Elon Musk's company, aims to implant devices in the human brain to translate thoughts into external actions, potentially revolutionizing how we interact with technology.

In 2023, we are witnessing a new chapter in the ongoing evolution of telecommunications. The emerging technologies listed above are reshaping how we communicate and interact with the digital world. These innovations represent the latest milestones in a rich history of human communication, showcasing the ever-advancing quest to connect more efficiently and effectively.

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TELECOM Review

M-Pesa Exceeds One Million Users in Ethiopia

M-Pesa, Africa's largest financial technology (fintech) platform, has gained 1.2 million members in Ethiopia within the first two months of launching its mobile money service. The telecommunications company confirmed this achievement in its 2023/2024 halfyear results announcement.

M-PESA commenced operations in Ethiopia on August 16th following approval from the National Bank of Ethiopia.

Jointly operated by Vodacom Group and Safaricom, M-Pesa stands out as the continent's most successful mobile money platform, proving to be a key revenue source for both telecom companies. The introduction of M-Pesa in Ethiopia marked a significant stride for Safaricom, which aims to expand its services in one of Africa's most populous nations.

Safaricom reported a substantial increase in transaction values, reaching \$288 million since the start of the service. The platform has gained traction with 23,000 M-Pesa agents and 12,000 businesses adopting the service.

Safaricom CEO Peter Ndegwa expressed optimism about Ethiopia's role in supporting future growth, emphasizing the intention to sustain momentum in the year's second half. Safaricom's strategic goal in Ethiopia is to promote financial inclusion and establish a cashless economy.

With a population exceeding 100 million, Ethiopia presents a highly prospective market for M-Pesa. Safaricom disclosed that its client base had expanded to 4.1 million people, with a presence in 22 cities across the country.

EXA Infrastructure and Lancom's Alliance Transforms Greece into Connectivity Hub

EXA Infrastructure, the largest dedicated digital infrastructure platform connecting Europe and North America, and Lancom, one of the fastest growing providers of data centre, cloud and telecoms services in Greece, announced their strategic partnership to bolster connectivity and infrastructure services, establishing Greece as a critical link to internet exchanges in Europe.

Expanding its presence, EXA is now live in Lancom's Balkan Gate data center (DC), the largest carrier neutral DC in Northern Greece located in Thessaloniki. The strategic location borders Bulgaria, North Macedonia, Albania and Turkey, with links to Italy the Middle East, Africa and beyond. Greece is fast becoming a hot spot for connectivity with its strategic location in the Mediterranean and its network junction to multiple subsea cables systems attracting international appeal. Lancom CEO George Nolis said, "EXA Infrastructure and Lancom are shaping a robust digital future for the region, with EXA's dedication and expertise playing a pivotal role in turning our vision into reality. This collaboration forges direct pathways to Europe's most critical Internet Exchanges – a move that will catalyse an era of enhanced digital services and internet reliability across South and Eastern Europe. We eagerly anticipate the opportunities this partnership will unlock and look forward to our continued success and growth alongside EXA Infrastructure."

EXA Infrastructure CCO Nicholas Collins commented, "Our strategic partnership with Lancom is another step into delivering our vision and growth plans for the Mediterranean region, further enhancing connectivity and diversification in Greece and across Europe. EXA are focussed and committed to building the infrastructure needed to support the increasing demand for international bandwidth. Our combined forces will create an important digital connectivity hub to enable our customers ambitions to scale and grow."

ST Telemedia Global Data Centers Expands Footprint in Malaysia

ST Telemedia Global Data Centers (STT GDC), a rapidly growing data center provider, has announced its plans to develop a second data center campus in Malaysia. This new campus will have the capacity to support up to 120 megawatts of critical IT capacity. STT GDC recently entered the Malaysian market through a partnership with Basis Bay to develop their first data center campus in Cyberjaya.

The CEO of STT GDC Southeast Asia, Lionel Yeo, expressed excitement about this new phase of growth and emphasized the company's commitment to advancing Malaysia's digital transformation. The expansion into Johor is a natural progression for STT GDC as they aim to provide digital infrastructure services that meet the evolving demands of their customers, including highperformance computing workloads for AI and visual computing.

The company is dedicated to supporting their customers' global digitalization efforts. Spanning over 22 acres of land, the upcoming STT Johor data center campus holds a development potential of 120 megawatts of IT power. It will be located in the Nusa Cemerlang Industrial Park in Iskandar Puteri, Johor, which is approximately 15 kilometers from Singapore.

With access to essential telecommunication links, the site will effectively cater to local needs and establish connectivity with STT Singapore 5. The latter functions as STT GDC's regional interconnection hub. Construction of the first building, supporting 16MW in IT load, will begin in the coming months and is expected to be completed by 2025.

SES Launches Two Additional Satellites

SES has successfully launched two additional O3b mPOWER satellites into space via the SpaceX Falcon 9 rocket from Cape Canaveral Space Force Station in Florida, a milestone for the global content connection provider.

Following the successful launch of the fifth and sixth O3b mPOWER satellites, the system of six satellites that will operate in medium Earth orbit (MEO) has been completed. As a result of this accomplishment, SES is now able to provide high-performance network services, which include high throughput, predictable low latency, exceptional flexibility, and service availability.

SES Operations in the Philippines

SES has been maintaining a strong presence in the Philippines through strategic alliances. The company also provides instructional content to over 2,000 distant schools utilizing ComClark Network and Technology. Cignal and GSAT, the country's leading direct-tohome (DTH) operators with over 95% market share, also use SES for connection.

Furthermore, SES has supported the Department of Information and Communications Technology's digital inclusion efforts, such as partnering with We Are IT (WIT) to deliver internet connectivity to 43 Mindanao Commission on Elections (COMELEC) facilities, showcasing its commitment to digital infrastructure.

Infrastructure Upgrades

Last month, SES announced that it would add two Boeing O3b mPOWER satellites to the constellation, bringing the total to 13. The new investment is expected to fit within SES's committed CapEx framework. The first four O3b mPOWER satellites launched last year have reached their target orbit and are undertaking in-orbit examinations, including space and ground component system validation testing.

SES deployed and tested over 160 O3b mPOWER terminals in 2023 for mobility, telecom, government and business customers.

"With the fifth and sixth O3b mPOWER satellites launched and going operational in the next few months, we are gearing up to deliver the high-performance connectivity services our customers need. By building resiliency into the network, we are confident our customers will be able to depend on us to deliver the reliable and secure connectivity required to run their operations," said Ruy Pinto, CEO of SES.

Now Corporation Advances Connectivity in Remote Philippines

NOW Corporation has signed a memorandum of understanding (MoU) with AST SpaceMobile, a US-based Low Earth Orbit (LEO) satellite company. The purpose of this partnership is to connect remote areas in the Philippines that have limited or no infrastructure.

NOW Corporation aims to provide comprehensive communication services, including voice, video, data, and internet connectivity to these regions. The chairman of NOW Corporation, Mel Velarde, stated that every Filipino will be able to connect their mobile phones, nationwide, through AST's single cell site in the sky. This collaboration supports NOW Corporation's Trusted Network initiative, which focuses on partnering with vendors that are not considered a security risk. In addition to this partnership, NOW Corporation has also signed a MoU with Mangata Networks to offer satellite broadband and edge computing services to businesses in the Philippines.

The partnership between NOW Corporation and AST SpaceMobile is poised to revolutionize connectivity in remote areas of the Philippines, addressing infrastructure limitations and advancing NOW Corporation's goal of providing comprehensive communication services, while also aligning with their Trusted Network initiative.

Investor Interest Drives Speculation on Frontier Communications' Future

Cerberus Capital Management, a New York-based alternative investment firm, has secured the position of the secondlargest shareholder in Frontier Communications, holding a 10% stake in the telecommunications company.

Reuters reports that the investor, by transitioning from a 13G to a 13D 'Statement of Beneficial Ownership', has conveyed its intention to actively pursue change or influence control at Frontier.

Cerberus outlined in its SEC filing that it is currently "engaged in, and may in the future engage in, discussions with members of the company's Board and members of the company's management team regarding constructive ways to enhance and maximize value for all stockholders." Meanwhile, Ares Management, based in Los Angeles and the current largest shareholder in Frontier with a 16% stake, also expresses aspirations to instigate change within the telecommunications company.

These developments follow closely after activist investor Jana Partners confirmed its position in Frontier, advocating for the company's management to explore the possibility of putting the telecom entity up for sale.

In the past month, Frontier's stock price has surged over 20%, reflecting heightened speculation about the company's future.

Firms Compete for Mauritania's Next Submarine Network

Sonatel, the Senegalese subsidiary of French giant Orange, Mauritania Submarine Link Consortium and Ireland-based EllaLink, have expressed interest in the project aiming to connect Mauritania to a second fiber optic submarine cable.

The Public Procurement Commission of the Ministry of Digital Transformation, Innovation, and Modernization of Administration has confirmed the receipt of bids from all three companies. Launched in August by the Mauritanian government, the tender seeks to establish the cable, submarine equipment supply, reception infrastructure construction, connectivity service provision, network maintenance, etc. The project is expected to be completed in 24 to 36 months at the most.

Initiated in May 2022 as part of the "WARCIP Mauritania" project, supported by the World Bank and the European Investment Bank, and contributing €10 million and €25 million respectively, the endeavor aims to expand high-capacity bandwidth networks and reduce communication service costs in Mauritania. This additional cable will enhance the country's digital infrastructure, complementing the existing "African Coast to Europe" (ACE) cable connected in 2011. The project is expected to deliver reliable. high-quality broadband Internet connectivity, fostering Mauritania's digital transformation.

As per the latest data from the Autorité de Régulation (ARE), Mauritania is projected to have 3.28 million Internet subscribers (fixed and mobile) in 2021, reflecting a penetration rate of 76%.

Arelion Establishes New PoP at DataVerge

Arelion, global connectivity provider and owner of the world's number one ranked Internet backbone, AS1299, has joined the growing ecosystem at DataVerge, the owner and operator of the only carrier-neutral interconnection facility in Brooklyn.

Arelion provides an industry-leading customer experience along with direct, high-quality connectivity at scale to AS1299's ecosystem of cloud, content and application providers. The partnership provides DataVerge customers access to Arelion's portfolio of leading connectivity services, including high-speed IP Transit, Dedicated Internet Access (DIA), Cloud Connect, Global 40G Ethernet Virtual Circuit (VC), IPX and DDoS Mitigation services. High availability is guaranteed by dual entry points and diverse paths into the DataVerge facility.

"Arelion's new PoP at DataVerge brings our affordable, fast connectivity services to our wholesale and enterprise customers in the region, supporting further investment in Industry City, Brooklyn's innovation hub," said Art Kazmierczak, director strategic sales and network development for Arelion. "DataVerge provides sufficient power, physical security and connectivity to help us serve our customers' connectivity requirements and strengthen the region's tech ecosystem through direct access to our high-performance global Internet backbone."

"We're delighted that Arelion has joined our growing connectivity ecosystem," said Ray Sidler, CEO and Co-Founder of DataVerge. "Arelion will help support our customers' demand for fast, reliable connectivity at scale. Our two companies share a customer-focused philosophy as we both prioritize delivering enterprisegrade systems at competitive rates while connecting our customers with highly trained service teams, ensuring we provide fast support and response times to meet their business goals."

DataVerge's vast resources and growing customer base enable Arelion to deliver Ethernet services that offer a significant scale advantage over competitive providers. This means customers can access up to 40G virtual circuits delivered on 100G ports available globally with network protection and automatically optimized latency technology.

On the other hand, the addition of Arelion increases DataVerge customer access to long-haul transport providers that – along with direct access to the facility's dark fiber, metro and other long-haul transport providers – enables DataVerge to offer an unbeatable interconnection advantage.

Zambia Plans to Deploy New Telecom Towers

The Zambia Information and Technology Authority (ZICTA) plans to deploy over 160 new telecom towers across the country. This strategic initiative aims to enhance connectivity and supplement the ongoing efforts of telecom operators.

This tower installation project is part of ZICTA's broader program, which aims to install 980 communication towers by 2025. The goal is to address the communication gap in the country, aligning with the objectives of the Universal Access Master Plan. Furthermore, the government's digital transformation program plans to achieve comprehensive telecommunications coverage for the entire population by 2030.

In pursuit of these goals, the Zambian government has granted authorization to Starlink to provide high-speed satellite Internet services in the country. Additionally, various other initiatives have been undertaken, including the elimination of roaming charges with neighboring countries, and the strengthening of ICT cooperation with Angola.

2023

Telecom Review Leaders' Summit

The 17th edition of the leading ICT gathering will convene industry leaders and partners to tackle the latest industry trends.

Place: Great Ballroom at Le Meridien Dubai Hotel & Conference Centre, UAE



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