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Fahad AlHajeri, CEO, center3

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center3

center3: The Powerhouse of Digital Transformation

As the world embraces digital transformation, the Middle East is emerging as a vital player in global connectivity and data infrastructure. At the forefront of this shift is center3, a subsidiary of stc Group, dedicated to advancing digital capabilities across the region. Since its launch in October 2022, center3 has rapidly established itself as a powerhouse, leveraging Saudi Arabia's strategic location to bridge data connectivity between Asia, Europe, and Africa.

With a robust portfolio comprising 25 carrier-neutral data centers, 16 subsea cable systems, and three internet exchanges (IXs), center3 is setting new standards in data center hosting and redefining the region's digital landscape. The company's ambitious mission is to become a fully integrated digital infrastructure provider with over 300 MW of data center capacity. This robust capacity ensures that hyperscalers, cloud providers, government entities, and businesses across the Middle East have access to reliable, world-class digital infrastructure designed to meet the demands of a data-driven world.

In just over two years, center3 has achieved rapid growth, securing partnerships with major global cloud providers and establishing itself as the leading data center and connectivity provider in Saudi Arabia. With expansion projects underway in Bahrain and strategic initiatives to enhance connectivity across Africa and the Middle East, center3 is well-positioned to fulfill its vision of creating a "Digital Hub" at the heart of the region. This hub, powered by cutting-edge technology, aims to drive economic growth, stimulate innovation, and cement the Middle East's position as a global digital leader.

From Vision to Reality: The Establishment of center3

center3 was founded in direct response to Saudi Arabia's Vision 2030, which envisions the Kingdom as a global hub of digital innovation. This national vision, focused on economic diversification and digital advancement, led stc to establish center3 as a specialized entity dedicated to meeting the advanced infrastructure needs of hyperscalers, enterprises, and content providers. By successfully fulfilling its mandate, center3 has created a powerful digital ecosystem capable of rapid data exchange and accommodating the hosting requirements of a digital-first economy, solidifying Saudi Arabia's presence on the global technology stage.
Since its inception, center3's strategic effort has focused on three pillars:

1. **Developing New Carrier-Neutral Data Centers:** Central to center3's strategy is the development of advanced, carrier-neutral data centers that offer customers unparalleled flexibility and choice. These data centers serve as hosting hubs, attracting a diverse client base ranging from global cloud providers to local enterprises. Carrier neutrality ensures that clients retain complete control over their connectivity options, empowering them to build resilient, adaptable digital operations across Saudi Arabia. The expansion of center3's data center capacity, including new facilities in Saudi Arabia and Bahrain, adds over 100 MW of operational capacity. This expansion showcases center3's aggressive growth, especially in support of new requirements like high-computing power, artificial intelligence (AI), and large-scale data analytics, underscoring its commitment to supporting the digital needs of the region's evolving economy.

2. **Innovating in Subsea Connectivity:** As digital communication becomes the backbone of global commerce, center3 has invested heavily in subsea cable systems that enable seamless data transmission across continents. These systems are essential to strengthening Saudi Arabia's connectivity to the global internet, supporting uninterrupted digital interactions and data exchange. Key initiatives include investments in the 2Africa cable and its Pearls extension, as well as the Saudi Vision Cable, which significantly enhance regional and international data flow. Moreover, the acquisition of CMC Networks, a global service provider specializing in networking across Africa and the Middle East, broadens center3's reach into these expanding markets, strengthening connectivity across the Middle East and into the African continent.

3. **Expanding Partnerships with Global Hyperscalers:** Understanding that cloud technology is crucial to the digital transformation of businesses worldwide, center3 has proactively formed partnerships with leading global cloud providers. These alliances position center3 as the preferred regional partner for hyperscale operations, providing tailored hosting solutions that meet the specialized demands of cloud computing and storage in the Middle East. These collaborations expand the footprint of major cloud platforms across the region, empowering local organizations to leverage state-of-the-art cloud capabilities and ensuring that data remains close to where it's needed most.

In the intense regional competitive landscape, center3 sets itself apart by offering a fully integrated service platform that bundles hosting solutions, extensive connectivity, and access to an established cloud and content ecosystem into a cohesive offering. This integration simplifies deployment and expansion for partners, enabling them to thrive more effectively in the Middle-Eastern market.

Building a Customer-Centric Future in Connectivity

Since its inception, center3 has made customer experience a central pillar of its strategy. By embedding this focus into every aspect of its operations, center3 has achieved customer satisfaction levels that align with best-in-class benchmarks typically seen among established international infrastructure providers. This early success reflects center3's commitment to understanding and meeting customer needs as a core driver of growth.

With a well-defined, customer-centered strategy, center3 continues to enhance its approach, fostering stronger client relationships and ongoing improvements in satisfaction. By prioritizing customer feedback and addressing evolving needs, center3 is building reliable, future-oriented connections and laying the foundation for sustainable, customer-focused growth.

Recognition and Certifications

In 2023 and 2024, center3 has been honored with several prestigious awards and certifications, reinforcing its leadership and commitment to excellence in digital infrastructure. Among these achievements is the 'Advanced' Data Center Certification from the Commission of Space and Technology, underscoring center3's high operational standards. The company received the 'Operational Excellence Award' for its exceptional service reliability, and the 'Innovation in Connectivity Award' for the successful launch of the 2Africa submarine cable system, achieving a milestone in regional and global connectivity. Recently, center3 was also recognized as the 'Best Subsea Operator' at the Global Connectivity Awards 2024 during Capacity Europe—an accolade

that highlights its role as a leader in providing robust and reliable subsea infrastructure. Additionally, center3 was awarded the 'Sustainability Leadership Award' for integrating sustainable practices across operations, and achieved the 'Best Employer Certification,' reflecting its dedication to fostering a supportive and growth-oriented workplace. These recognitions demonstrate center3's impact and ongoing commitment to setting benchmarks for quality, innovation, and responsible business practices in the MENA region.

Navigating Tomorrow: The CEO's Strategic Vision

CEO, Fahad AlHajeri, leads center3 with a vision centered on seizing market opportunities, driving geographic expansion, and establishing a world-class digital infrastructure operator that supports regional and global growth. His extensive expertise in telecommunications and digital infrastructure has propelled center3 to achieve rapid growth and operational excellence.

At the heart of this vision is the concept of a "Digital Hub," a highly interconnected

ecosystem of data centers, internet exchanges, and subsea cables that facilitate global data traffic. This model enhances the efficiency of digital services, fostering economic growth through collaboration, innovation, and high-speed connectivity. By positioning Saudi Arabia as a central node in global digital networks, center3 is advancing the region's digital transformation and cementing its reputation as a key player in the global economy.

center3's expansion includes not only infrastructure development but also significant investment in Saudi talent. Through specialized training programs, internships, and strategic collaborations, center3 is actively cultivating a skilled workforce in digital infrastructure, network management, and data center operations. This dedication to talent development aligns with Vision 2030, reinforcing the Kingdom's position as a hub for digital innovation and leadership in the MENA region.

Building on a Legacy of Excellence
Looking toward the future, center3 remains committed to expanding

its Digital Hub by onboarding new partners and broadening its service offerings while extending its geographical footprint through both organic and inorganic growth. This strategy focuses on building an interconnected digital ecosystem to enhance the quality and accessibility of services for center3 and its partners. This commitment is reflected in the development of new connectivity routes and expanded data center capacity, ensuring that center3 maintains its leadership in digital infrastructure for years to come.

center3's ambitious investments are reshaping the digital infrastructure landscape in the Middle East. Guided by AlHajeri and driven by a comprehensive Digital Hub strategy, center3 is firmly positioning both the company and the region on the global digital map. As it continues its journey, center3 remains committed to advancing digital transformation in alignment with regional goals and international standards. Under its CEO's leadership, center3 is poised to drive progress, connect continents, and shape the digital future of the Middle East and beyond. TR

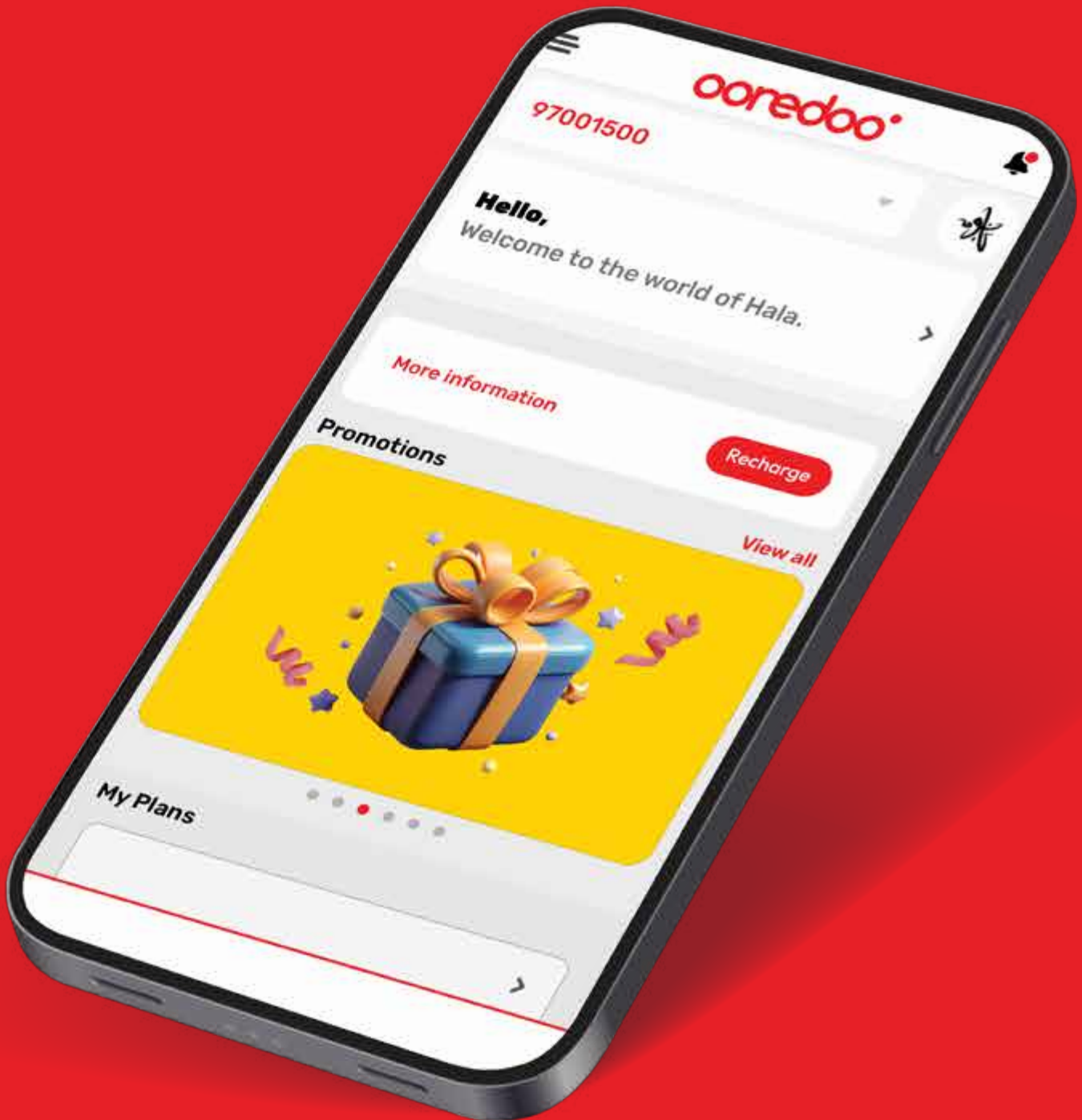center3 is setting new standards in data center hosting and redefining the region's digital landscape

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ooredoo

Quique Vivas, Chief Commercial Officer, Ooredoo Oman

Ooredoo Oman: Fast and Furious in Adopting a Digital-First Strategy

In its quest to solidify its role as a leader in Oman's digital transformation, Ooredoo Oman won't stop until it positions itself as the undisputed leader in Oman. Expanding on this trajectory, Quique Vivas, Chief Commercial Officer, Ooredoo Oman, shared his expertise from a commercial perspective with Telecom Review.

After stepping into a new position as Chief Commercial Officer, what is your main role when it comes to Ooredoo Oman's strategy and goals?

My role is definitely to help drive and bring life to our commercial strategy. A big part of this is our customer experience. Every customer journey should be unique, tailored and exceptional from the very first contact with us to becoming a loyal ambassador. Of course, that aligns with providing unmatched value in our services, providing the latest in digital tech and upgrading and innovating plans and products to meet changing needs—and ever-hungry data needs! We also really listen to our customer feedback to make sure we're hitting the sweet spot and getting it right.

This year, we accomplished a great deal, from revamping our fiber plans, offering faster speeds and unbeatable value, to keeping people connected during their summer holidays and providing unforgettable rewards like our 'Manzili' home giveaway, and our current 'Win Gold' campaign. We are committed to recognizing and rewarding our subscribers and ensuring they enjoy the best possible internet experience—whether they are streaming, gaming, working or learning.

It is a competitive market, and it is important to stay ahead of the competition. This means staying on our toes to innovate and lead, with everything; from CX, products and services and putting customers first, to being agile and keeping one eye on the latest developments so that we can be first-to-market and unique-to-market.

How does Ooredoo Oman serve the digital future through modern technology and sustainable solutions?

Our commitment to adopting a digital-first strategy, in line with Ooredoo's vision and Oman Vision 2040, drives us to innovate and adapt, and we have to be fast and furious! Our nationwide 5G network stands as a testament to this commitment, enriching lives and fueling the growth and diversification

of Oman's economy. We don't want 5G just for the sake of 5G. Indeed, our nationwide 5G is, and will be, customer centric, and opens the door to new revenue streams through immersive experiences, smart city applications, and enhanced business solutions. It is important for us to leverage cutting-edge technologies and sustainable practices to drive both innovation and commercial success; but more importantly, to unleash the potential of Oman as a key player in the region.

We empower our customers with digital tech. This includes our multi award-winning app and, most recently, our upcoming digital mobile wallet, "walletii". We view walletii as a driver of financial inclusion and a testament to our commitment to innovation beyond traditional telecom services.

Our commitment to sustainability is reflected in our push for digital inclusion, our eco-friendly initiatives and our development of energy-efficient network infrastructure, which reduces operational costs and enhances profitability. By embracing technological leadership and responsible growth, we are well-equipped to maintain our competitive edge and, at the same time, make a real difference in the nation's economic growth and development.

In what ways is Ooredoo Oman supporting small and medium enterprises and startups as they contribute to the national economy?
We definitely empower small and medium enterprises (SMEs) and SoHos, recognizing their crucial role in economic growth and diversification. By fostering a vibrant entrepreneurial ecosystem, we align our efforts with Oman Vision 2040.

Our flagship initiatives, "Springboard" and "SpringForward", are tailored to support SMEs and startups on their journey to success. "Springboard", developed by women for women, provides training opportunities for participants across the country, and promotes the inclusion of Omani women in the workplace. It empowers them with the skills and the know-how to achieve their aspirations and

become future business owners, with a particular focus on digital innovation. Meanwhile, "SpringForward", for both men and women, provides a broad basis for entrepreneurship training and skills development, serving as an ideal platform for young aspiring talent to become the nation's future business leaders and owners.

Through these programs, we are not only promoting innovation and entrepreneurship; we are also directly contributing to job creation, economic growth, and the development of a dynamic digital economy in Oman.

Last but certainly not least, we have our hugely successful women's incubators. These are learning hubs that support women across Oman in developing vocational skills and setting up businesses in information technology, beauty, cooking, sewing, and handicrafts. Since its launch in 2015, the incubator program has trained more than 10,000 women to set up and promote their businesses and overcome the challenges of starting a business.

How does Ooredoo Oman's business strategy differentiate it from other regional telecom companies?
What sets us apart is a combination of things: mainly a strong focus on customer experience, innovation and a willingness to have a positive impact on Omani society. We are always on the lookout for new and forward-thinking avenues for growth, anticipating customer needs, and strategically diversifying our offerings to deliver exceptional value.

I mentioned financial inclusion via 'walletii' above, and this is just one example of staying on the leading edge. But there are many more, such as the diversification of our business verticals. Through this diversification, we have provided cable landing facilities at our new cutting-edge data centers and we have invested in tower companies and unique business services too, such as cloud solutions and services, disaster recovery solutions and IoT. By investing in critical infrastructure, we are not only bolstering our own business but

advancing the technology landscape and its resilience.

This strategic position sets us up for sustained growth and success, and by anticipating and addressing the future needs of our customers and stakeholders, we are solidifying our role as a leader in Oman's digital transformation—and we won't stop until we get Ooredoo to its natural position: undisputed leader in Oman.

As a leading telecommunications company, how does Ooredoo maintain its competitive edge and prepare for potential challenges and gaps in the market?
We have a multi-faceted strategy focused on customer-centricity, innovation, and staying agile and adaptable. We prioritize listening to, understanding, and exceeding customer expectations, with the aim of making every interaction seamless, personalized, and value driven. This commitment is reflected in our investments in state-of-the-art digital platforms and our 'Voice of the Customer' program, which tackles customer pain points and feedback head-on with a direct link to our ongoing product and service development as well as the way we interact with our customers.

We embrace emerging technologies to benefit our customers and the nation. Our pioneering 5G network and ventures into fintech highlight our commitment to staying on point. As a leading telecom company, we are a digital enabler that unleashes the potential of its customers. Through strategic initiatives, we create new revenue streams and enhance resiliency against market fluctuations and fierce competition.

Our deep understanding of the Omani market, our best in class technology, combined with a culture of agility and adaptability, enables us to anticipate trends, identify opportunities, and proactively tackle challenges. We remain committed to continuous improvement, and will always be on the hunt for new ways to create value for our customers and contribute to Oman's digital future. **TR**

Fixed Wireless Access: A Revenue Game-Changer

FWA is one of the best services for operators to achieve business success in the 5G era.

Since the beginning of 5G commercialization in 2019, more than 50% of the world's 5G operators have offered FWA as one of their main services. FWA subscribers are growing strongly. By the end of 2023, the number of global 5G FWA subscribers exceeded 20 million. It is estimated that this number will reach 300 million by the end of 2029. FWA service has contributed 10% of the total revenue for some pioneering operators.

Looking at the global trends, I see the following latest industry changes:

- In terms of spectrum, more and more operators can obtain a second or a third large-bandwidth TDD spectrum, providing ultra-large bandwidth capabilities for the wireless networks. Currently, some leading operators, such as du UAE, e& UAE, stc Saudi Arabia, and CMCC, have deployed three TDD carrier aggregation (CA) on a large scale.
- In terms of terminals, 5.5G CPEs supporting 3CC CA have been marketed, and high-end CPEs (which support it) have been mass-produced, including brovi, MeiG, and T&W. The launch of RedCap CPE makes

the price of 5G CPE less than USD 60. According to the GSA report, the terminal ecosystem is booming. 311 CPE models have been released and more than 212 CPE models have been commercialized.

- In terms of user requirements, pure connection requirements are shifting to richer applications, such as AIGC, online education, cloud gaming/cloud storage, and home IoT.

Looking at the Middle East region, 5G was commercialized in 2019, making it one of the world's first regions to do so in the 5G wave. Operators in the region are actively deploying 5G national networks and provisioning services. Due to their accumulated experience in 4G WTTx, FWA is one of the key services being pursued as 5G evolves, while all GCC operators have commercialized 5G FWA.

So far, more than 3 million FWA users have been recorded, demonstrating that 5G traffic accounts for more than 50% of the total network traffic. Operators are actively exploring applications such as guaranteed high-speed services and FWA B2B private lines, attracting a large number of household and enterprise users. FWA has brought huge business returns to the regional operators.

In the home market, more and more operators are exploring scenario-based packages.

Technological progress is driving market development. Huawei's innovative FWA Service Turbo solution works with CPEs to ensure optimal user experience, such as reducing the latency of cloud gaming services and stabilizing the network speed of video services. This solution surpasses the existing home broadband experience boundary, supports operators to develop scenario-based packages, enriches service contents, and increases business revenue.

For example, the home wireless service of a UAE operator not only provides basic packages, but also entertainment packages and gaming packages. The entertainment packages focus on providing free subscriptions to video streaming and online shopping applications, and the gaming packages provide free subscriptions to Xbox games. By guaranteeing service experience in different scenarios, differentiated package services are enabled, improving uses experience and bringing greater business value to operators.

As another example, a Finnish operator is providing FWA packages by adding benefits to different

scenarios to improve user experience and ARPU. The FWA packages include differentiated internet access rates, Mesh-Wi-Fi coverage across the whole house, and multiple OTT content bundles. These services help the operator increase ARPU by 25%.

FWA Brings Broader Market Prospects to Operators

With the evolution from 5G to 5G-Advanced, FWA is bringing wider market prospects to operators. I see three aspects:

- **Better Experience:** FWA can provide a higher-speed bandwidth of 500 Mbps to 1 Gbps and provide guaranteed user experience through end-to-end experience management solutions, which is comparable to that of optical fibers.
- **Higher Cost-Effectiveness:** 5G Redcap CPE will attract more consumers and accelerate the migration from 4G WTTx to 5G FWA.
- **More Connections:** In addition to connecting homes, FWA can also be leveraged in connected vehicles, connected things, and connected industries, providing a larger market space.

Based on the preceding three aspects and market development, FWA use cases, which are widely used and expanded by operators, are B2B private line and its derivative scenario.

In fact, when 5G was commercialized in 2019, some GCC operators were the first to pursue innovation use cases. Kuwait and UAE operators started private line services for small- and medium-sized enterprises through 5G networks as well as 5G CPE. The fast provisioning and deployment solutions quickly gained market popularity. With more 5G spectrum and upgraded experience management solutions, FWA B2B private lines have developed further, offering larger private line bandwidth (from 20 Mbps to 200 Mbps), more provisioning capacity, higher reliability, and lower latency, which enable operators to monetize SLAs (Service Level Agreements).

The Middle East is pioneering the exploration of commercialized 5G private line derivative scenarios, such as 5G CCTV. Smart oil wells in the hinterland of the desert represent the first commercial use case. A Kuwait operator used 5G networks, 5G CPEs, and common cameras to quickly deploy and roll out the desert oil well security solution, solving the challenge of high optical fiber deployment costs in the desert. This solution has been widely recognized in the Middle East. As 5G-enabled cameras further reduce costs, the solution will be further simplified and commercially available.

Up until now, 90,000 5G FWA B2B private lines have been developed in the Middle East. We see that operators are seeking to add more ICT services and tap into new spaces, such as fixed and mobile private line backup, to maximize the reliability of industry scenarios. The ARPU can be increased by three-to-five times on the basis of home broadband.

In Conclusion

After five years of development, FWA has proved its strong ability to increase revenue for operators. To continuously obtain new opportunities in FWA development, operators are advised to accelerate the acquisition of new TDD spectrums or re-cultivate existing spectrums, build digital platforms and end-to-end experience management capabilities, and continuously incubate and innovate FWA add-on services. **TR**

By Alex Xu, President of Carrier Business, Huawei Middle East & Central Asia

With the evolution from 5G to 5G-Advanced, FWA is bringing wider market prospects to operators

NOKIA

Middle East as a Recurrent Pioneer: Where the Future of Broadband is Happening, Now

The fixed broadband landscape has undergone a dramatic transformation in recent years, and the Middle East is no exception. As a global hub for innovation, the region is embracing cutting-edge technologies faster than many other regions. This rapid digital transformation extends well beyond the traditional telecom ecosystem. Governments and businesses are prioritizing digitalization to improve health, public safety, sustainability, and economic stability.

So, what does this mean for the fixed broadband landscape in the Middle East?

Firstly, operators in the region have long focused on fiber-based connectivity, and their efforts have paid off. The UAE, for example, has consistently ranked among the global leaders in FTTH (Fiber-to-the-Home) connections, while other nations are setting ambitious targets to catch up. As fiber penetration grows, the focus has shifted towards enhancing the overall customer experience, with faster broadband speeds driving this new phase of evolution. Leading operators in the Middle East are evaluating Nokia's cutting-edge 100G PON (Passive Optical Network) technology, pushing the limits of what's possible in terms of speed and capacity. Qatar has already launched a 25 Gbps service. Meanwhile, service providers across the region are adopting the latest Wi-Fi technologies to guarantee a seamless experience inside homes, meeting the rising demand for uninterrupted, high-quality, premium connectivity.

But, fiber deployments are increasingly seen as critical infrastructure that supports not just telecom services but broader national objectives,

from economic diversification to the development of smart cities. Many regional governments have set ambitious national agendas, such as Saudi Arabia's Vision 2030, the UAE's Centennial 2071, and Qatar's National Vision 2030. These agendas are driving digitalization across critical sectors like healthcare, education, and public services. For example, in Saudi Arabia, mega-projects such as NEOM and the Red Sea Project rely on high-speed broadband to enable advanced technologies like IoT and AI, creating future-ready urban ecosystems.

The UAE's Masdar City is another prime example of how fixed broadband is supporting the development of smart, eco-friendly urban environments. Qatar's Lusail City, built on advanced fiber-optic infrastructure, is pioneering similar innovations, while others are also investing heavily in broadband to support their own smart city initiatives and national transformation programs. These projects are not only transforming daily life but are also crucial for economic diversification. By enabling new tech-driven industries, smart cities, and innovation hubs, enhanced connectivity is attracting global investments and fostering the growth of new digital economies. In embracing fixed broadband as a cornerstone of its future, the Middle East

is setting a global standard for what next-generation smart societies can achieve.

With its strong commitment to innovation and partnerships in the region, Nokia is well-positioned to support the Middle East's broadband evolution. As a leader in cutting-edge connectivity solutions, Nokia offers future-proof networks that deliver faster connections and superior customer experiences. By providing innovative solutions, Nokia is not only enhancing overall connectivity but also enabling the region's digital transformation, helping governments and businesses meet their goals.

Nokia's Vision for the Middle East's Broadband Landscape

To support the Middle East's broadband evolution, a robust ecosystem is essential across various sectors and use cases. Nokia is at the forefront of this transformation, uniquely providing all next-generation fiber technology options. Nokia's innovative solutions enhance customer experience, boost monetization, and leverage AI to drive efficiency and insights. By empowering businesses to meet current and future connectivity demands, Nokia accelerates time-to-market (TTM) and facilitates growth across diverse industries.

Advancing PON Technology: PON has long been the technology of choice for broadband operators. In today's hypercompetitive broadband landscape, operators need to differentiate themselves, and disruptive technology plays a key role. Nokia's 25G PON solution is an excellent example of such innovation. This technology allows operators to deliver ultra-fast broadband services to both consumers and businesses, unlocking greater network potential and exceptional efficiency.

The adoption of 25G PON is growing globally, and the Middle East has been an early adopter. For instance, Vodafone Qatar has showcased the power of 25G PON by transforming Msheireb Smart City into the first giga-city in the region, delivering hyper-speed connectivity ranging from 1 Gbps to 25 Gbps. Similarly, Advanced Communications and Electronics Systems for Neutral Host (ACES-NH) in Saudi Arabia is deploying Nokia's 10G and 25G PON technologies to build a robust FTTH network.

As the market transitions to 10 Gbps and 25 Gbps fiber speeds, Nokia's Lightspan MF Fiber PON platform enables service providers to unlock even higher speeds with future-ready capabilities for 50G, 100G PON and beyond. This flexibility empowers service providers and businesses to select the right mix of technologies for their specific needs.

Elevating Customer Experience and Broadband Monetization: In today's world, where a stable broadband connection has become essential, Nokia is helping service providers tackle the challenge of home connectivity. With Nokia's Wi-Fi portfolio, we are not only bringing superfast speeds into the home through Wi-Fi 6, 6E and the latest Wi-Fi 7 devices. Nokia's Corteca software suite brings a unique combination of local, real-time Wi-Fi optimization and a network-wide, cloud-based optimization.

Recently, a marketplace for value-added services has been introduced, offering applications for cybersecurity, work-from-home, gaming optimization, and more. These services generate new revenue streams while also allowing service providers to differentiate themselves by providing added value to their customers. Nokia's nano data center concept, utilizing idle processing capacity on its customer premises equipment (CPE), seamlessly onboards these third-party applications, which are available through the Corteca Marketplace. Nokia's Corteca Cloud manages the full entire application lifecycle, from installation to updates and removal.

Driving Efficiency and Time-to-Market with AI-Powered Broadband

Nokia has adopted a holistic approach to fiber deployment, focusing on protecting investments with future-proof PON technologies, accelerating time-to-market by streamlining processes, and controlling costs to ensure right-the-first-time installations. Central to this approach is the integration of AI throughout the entire deployment lifecycle. Nokia's Broadband Easy Connect program enhanced by AI-driven computer vision technology guides technicians through the installation process while ensuring compliance with procedures. Automated tests validate installations and guarantee end-user service quality, allowing for zero-touch ONT activation.

At the core of this process is Nokia's Altiplano Access Controller, a network automation tool that visualizes, manages, and optimizes fixed access services. By using AI, Altiplano enables operators to detect network anomalies faster, anticipate service-affecting issues, and improve network utilization. Through the use of big data analytics, digital twins, and trained AI-agents, Nokia helps operators increase efficiency and drive higher levels of automation in network and service operations.

Optical LAN Solution for Industry 4.0: With a surge in infrastructure projects across the Middle East — ranging from smart cities to airports, hotels, business parks, and hospitals — the demand for advanced connectivity is growing rapidly. However, many enterprises still reply on outdated copper cabling within their Local Area Network (LAN).

Nokia's Optical LAN effectively addresses this challenge by delivering exceptional network performance across various sectors and use cases. More businesses are choosing Optical LAN because it not only reduces Total Cost of Ownership (TCO) through simplified network design and maintenance but also significantly decreases power consumption. By transitioning to Optical LAN, enterprises can boost their operational efficiency while actively contributing to environmental sustainability, aligning with the region's commitment to greener, more responsible infrastructure development.

Conclusion: Nokia and the Middle East, Pioneering the Future of Broadband Connectivity

As the Middle East embraces a new era of digital transformation, it is setting a global benchmark for the future of broadband connectivity. Due to the increasing interest in ambitious infrastructure projects like smart cities, healthcare advancements, and educational initiatives, the region is leveraging cutting-edge technologies to create vibrant, interconnected societies. Nokia stands at the forefront of this evolution, empowering businesses and governments to enhance connectivity through innovative solutions such as PON technology, Optical LAN, and AI-driven services and applications.

The region's commitment to sustainability and economic diversification is evident in its aggressive adoption of fiber technology, with nations like the UAE and Qatar leading the way in FTTH connections and ultra-fast broadband services. By prioritizing exceptional customer experiences and streamlining operational efficiency, Nokia is helping enterprises not just keep pace but thrive in this hypercompetitive landscape. As the Middle East continues to redefine what's possible in broadband, it reinforces its position as a pioneer in the ICT industry, inspiring the world with its vision of a digitally connected future. **TR**

By Mohamed Salama, Head of Fixed Networks, Nokia Middle East and Africa

Smart RCA in Telecom: How Explainable AI Transforms Network Troubleshooting

In today's data-intensive telecom landscape, operators face constant fluctuations in key performance indicators (KPIs), alarms, and network failures. Identifying the root causes of these issues is critical to maintaining optimal network performance and ensuring high-quality service. However, this task is often complex due to the multitude of variables involved.

To address this challenge, Yuvo integrates Explainable AI (XAI) techniques into VCause Analysis (RCA) solution. This advanced approach enables telecom operators to not only pinpoint the most probable root causes but also understand why certain patterns emerge, ensuring faster and more accurate resolutions.

The Automated Root Cause Analysis Process

Our RCA solution starts with a machine learning (ML) model trained to understand the dynamics of a specific KPI—whether it be network latency, packet loss, or user throughput. Using historical network data, the model learns how various factors influence KPI behavior. Beyond merely predicting future KPI values, the model's true strength lies in explaining the underlying causes when a KPI exceeds its normal thresholds.

Once the model is calibrated, we use SHAP (SHapley Additive exPlanations) to analyze how different factors contribute to KPI anomalies, providing operators with clear, actionable insights into the root causes of network issues.

Prediction Model Development

In the telecom sector, KPIs are influenced by many interconnected variables. Factors like user traffic, configuration changes, and environmental conditions all impact performance, but their exact relationships can be difficult to define. This is where AI excels.

At Yuvo, we leverage machine learning to map these complex dependencies, effectively discovering the "formula" that drives KPI behavior. Our prediction process involves ingesting vast amounts of historical and real-time network data from multiple layers, including the control plane, user plane, and network configurations. This data serves as the foundation for training robust models that capture the intricate dynamics of KPIs.

However, AI's real value goes beyond prediction; it lies in explaining why certain network behaviors occur. This aspect is critical for telecom operators who must trust the AI-driven insights.

Explainable AI: Bridging the Gap Between Data and Decisions

While AI models can detect patterns and predict KPI trends, it's the explainability of those predictions that transforms data into actionable insights. At Yuvo, transparency is key. Our models not only forecast KPI deviations but also provide logical explanations for the factors driving these anomalies.

This level of explanation is essential for two key reasons:

1. **Building Trust:** Telecom experts—our Subject Matter Experts (SMEs)—need to understand the reasoning behind AI recommendations. XAI reveals the AI model's "thought process," aligning its logic with the real-world expertise of SMEs, fostering trust in the system.
2. **Unlocking New Insights:** Often, AI uncovers patterns that even experienced engineers might not anticipate. These "Aha" moments occur when the model reveals hidden correlations, offering fresh perspectives and opening new avenues for network optimization and management.

By providing clear explanations alongside predictions, our solution enhances decision-making, blending AI-driven insights with the deep operational expertise of telecom professionals.

SHAP: Unveiling Key Drivers Behind KPI Anomalies

SHAP is a game-theory-based technique that breaks down AI predictions, offering a transparent view of how each feature influences a KPI. In simple terms, SHAP treats every feature—such as network configuration parameters, user activity, or alarms—as a "player" in a game, distributing the model's

prediction (the "payout") among these features based on their contribution.

For instance, if there's a spike in network latency, a SHAP analysis can pinpoint whether the primary driver was a surge in user load, a configuration change, or an alarm trigger. This clear attribution helps operators quickly understand the root causes of anomalies, enabling targeted actions to resolve the issue.

By making AI model outputs interpretable, SHAP enhances trust, allowing operators to confidently address deviations in KPI behavior.

SME-Designed Decision Trees

Identifying the root cause of KPI anomalies is more complex than simply mapping factors to outcomes. Different vendors define counters in varying ways, and KPIs such as reliability, integrity, and availability each require tailored approaches. To address this complexity, Yuvo's SMEs have encoded their deep telecom knowledge into structured decision trees that guide the RCA process.

Each decision tree organizes network factors (or counters) into specific paths, with each path representing a potential root cause defined by a unique combination of counters. These paths are scored based on the aggregation of individual counters' SHAP values, allowing the system to rank potential root causes and prioritize the most likely contributors to KPI breaches. This structure generates more accurate and actionable insights, even across different vendors and network elements.
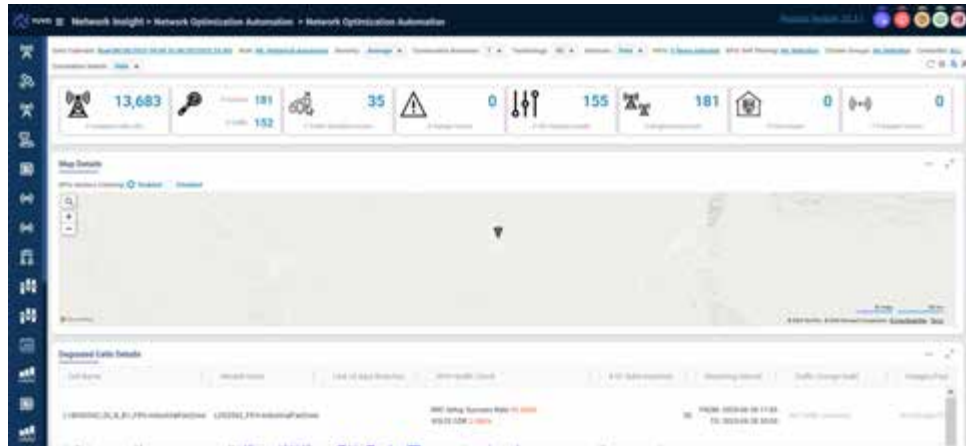
Furthermore, our decision trees are customized for different KPIs. For example, a tree designed for network reliability may focus on hardware and traffic congestion, while a tree for data integrity might emphasize transmission errors or packet loss. This customization ensures our RCA solution is precisely tailored to the needs of each network, enabling operators to act quickly and confidently.

Benefits of Explainable AI in Root Cause Analysis

Yuvo's use of XAI in RCA delivers several key advantages for telecom operators:

- **Enhanced Decision-Making:** With clear explanations of how various factors impact KPIs, operators can act decisively, addressing the true drivers of network performance issues.

- **Faster Time-to-Resolution:** By identifying the root causes of anomalies, operators can directly target issues, reducing downtime and improving overall reliability.
- **Improved Trust in AI Systems:** XAI provides transparency, ensuring human operators can confidently rely on AI-driven recommendations.
- **Scalability:** The explainability framework can be applied across multiple KPIs, ensuring consistent, scalable RCA processes across different network segments.

Dashboards for Actionable Insights

Our Network Insight (NI) platform provides operators with interactive dashboards that visualize the results

of the Automated Root Cause Analysis process. These dashboards offer both high-level overviews and granular details, allowing operators to quickly interpret insights and take action: As illustrated in the above, the

integration of XAI into Automated Root Cause Analysis plays a crucial role in building the trust telecom operators need to confidently embrace AI-driven solutions. By providing transparent and understandable insights into network anomalies, XAI goes beyond simple predictions, enabling stakeholders to trust and act on AI-driven recommendations.

Yuvo's solution, backed by mathematically grounded methods and decision trees crafted by telecom experts, offers a clear, data-backed approach to effectively addressing network issues. 🆃🆁

PMP Strategy
positive impact

James Semple, Senior Manager, Telecom, Media & Technology, PMP Strategy UK

Jordan Kotler, Senior Consultant, Telecom, Media & Technology, PMP Strategy UK

What Goes into the Meta Cloud?

Cloud adoption in Africa is set for rapid growth by the end of the decade. PMP Strategy forecasts suggest a >30% CAGR in hyperscaler demand from 2023-2030, resulting in over 1,400 MW of live capacity across the continent to serve the needs of hyperscalers alone. Driving these trends are a confluence of factors, including economic growth, the need for digital transformation, and the benefits of cloud computing seen for many years now in more mature markets.

Added to the inherent challenges faced by African enterprises, such as significant data center infrastructure investment required to meet demand, a range of differing regulatory environments, and limited end-to-end connectivity services, is the fact that cloud adoption is becoming increasingly complex due to the growing need for organizations to implement clouds from multiple providers.

The concept of the meta cloud, which integrates and manages multiple cloud services and environments, offers a promising solution. As

implementations of the meta cloud remain nascent, this article speculates on some of the key enablers and components of the meta cloud in the context of Africa.

Key Developments to Support the Meta Cloud in Africa

1. Cloud Services: Major cloud players like AWS, Microsoft Azure, and Google Cloud offer powerful and scalable services that can support African enterprises. While the only fully deployed cloud regions in Africa are located in South Africa, larger-scale deployment will likely soon take place across Nigeria, Kenya, Egypt, and Morocco, where hyperscaler local zones have already been deployed. Huawei, Oracle, Alibaba, and Akamai's initial deployments are also likely to grow across the continent, adding to the complexity of choice in public cloud solutions.

2. Connectivity Solutions: Reliable and high-speed internet connectivity is crucial for effective cloud operations. Investments in subsea cables and terrestrial networks are improving connectivity across the continent. For instance, the deployment of new submarine cables like 2Africa and Equiano has significantly increased the total rolled-out capacity, enhancing connectivity between Africa and other continents.

   Content Delivery Networks (CDNs) help reduce latency and improve the delivery of popular content, enhancing user experience and performance. Akamai and Cloudflare are examples of CDNs that have established a presence in Africa, providing faster and more reliable content delivery.

3. Data Centers: Over 700 MW of additional capacity has been announced to be live by 2030 to meet the rocketing demand from hyperscalers

and enterprises—more announcements will undoubtedly be made. Establishing data centers within African countries helps reduce latency, comply with data sovereignty laws, and improve service reliability. Edge data centers bring computing resources closer to end-users. South Africa, Nigeria, and Kenya are leading the way with significant investments in data center infrastructure from the likes of Teraco, OADC, Africa Data Centers, Vantage, and MDXi.

Key Tools to Consider in the Meta Cloud in Africa

1. Orchestration and Management Tools: Kubernetes, Terraform, and Ansible are popular tools for managing and orchestrating cloud services across multiple providers. These tools enable seamless integration and management of services, reducing complexity and improving efficiency, and will be important for realizing the meta cloud in Africa.

   Multi-Cloud Management Platforms enable seamless integration and management of services from different cloud providers, simplifying operations and reducing complexity. For example, Cloudify and RightScale (now part of Flexera) offer multi-cloud management solutions that could support African enterprises in managing their cloud environments.

2. Monitoring and Analytics: Solutions like Prometheus and Grafana help monitor the performance and health of cloud services. These tools provide real-time insights into system performance, enabling proactive management and optimization.

   Analytics platforms provide real-time insights, enabling proactive management and optimization of cloud resources. For example, Google Analytics and AWS CloudWatch offer real-time

data insights that help African enterprises make informed decisions.

3. Data Integration and Management: Tools like Apache Kafka and Talend facilitate data integration across different cloud environments. These tools ensure smooth data flow and integration, enabling better decision-making and operational efficiency.

   Ensuring data consistency and synchronization is vital for seamless operations and decision-making. African enterprises are increasingly adopting data synchronization solutions to ensure data integrity and reliability.

4. Cost Management: Solutions like CloudHealth and AWS Cost Explorer help track and optimize cloud spending, ensuring cost-efficiency. These tools provide detailed insights into cloud costs, enabling African enterprises to manage their budgets effectively.

5. DevOps and CI/CD Tools: Tools like Jenkins and GitLab CI/CD support continuous integration and deployment, enhancing development efficiency and agility. These tools enable African enterprises to streamline their development processes and deliver high-quality software faster.

The meta cloud presents a transformative opportunity for African enterprises, offering a way to manage multiple cloud environments effectively and efficiently, particularly as the cloud environment rapidly evolves across the continent. Developers need to familiarize themselves at an early stage with the evolving essential tools, infrastructure, and environment for the meta cloud in the near term. The meta cloud looks set to drive digital transformation, enhance operational efficiency, and unlock new growth opportunities across the continent. ∎

ITU Members Agree on AI and Metaverse Standards

Members of the International Telecommunication Union (ITU) have established new priorities for standards and capacity development, particularly focusing on artificial intelligence (AI) and the metaverse to support sustainable digital transformation.

New resolutions have been agreed upon, reinforcing the ITU's commitment to meeting the evolving needs of the digital landscape.

Seizo Onoe, Director of the ITU Telecommunication Standardization Bureau, stated, "ITU standards and capacity development must create the foundation for the digital future we want. My top priorities are impactful standards and the strong industry engagement and support to developing countries that create this impact."

AI and Metaverse Priorities

The eight new resolutions aim to support the implementation of AI and metaverse standards within developing countries. These new resolutions include:

- Implementing responsible, safe, and inclusive AI (including collaboration via the AI for Good platform)
- Creating trusted, inclusive, and interoperable metaverse applications
- Driving sustainable digital transformation across multiple industries and technologies
- Outlining technical requirements for digital public infrastructure
- Exploring communication technologies for vehicle-to-everything (V2X), intelligent transport systems, and autonomous driving
- Enabling caller location information to support emergency communications
- Preparing students and young professionals to become next-generation ITU standards experts
- Ensuring continual improvement and evolution to meet new policy objectives and market demand

Doreen Bogdan-Martin, the ITU's Secretary-General, emphasized the significance of a shared digital future, stating, "Together with the global standards community, ITU is committed to ensuring that our digital future is technically strong, with innovation, inclusion, and sustainability at its core."

Oman's New MSc Program Aims to Drive Digital Change

Oman's Ministry of Transport, Communications and Information Technology (MTCIT), through its Government Digital Transformation Program, Tahawul, has signed a cooperation agreement with the University of Technology and Applied Sciences.

This partnership will introduce a Master of Science (MSc) in Digital Transformation and Innovation program to encourage collaboration with academic institutions and equip individuals with essential skills in creativity and innovation, all in support of Tahawul's strategic objectives.

The agreement was signed by Dr. Ali bin Amer Al Shaidhani, Undersecretary for Communications and Information Technology at MTCIT and Dr. Said bin Hamad Al-Rubaie, President of the University of Technology and Applied Sciences.

MSc in Government Digital Transformation

This initiative seeks to harness the value of the MSc in Digital Transformation and Innovation, aligning with efforts to develop innovative, agile, and proactive government bodies. It supports the vision of Oman Vision 2040, which highlights the importance of fostering innovation and empowering national talent in the digital transformation space.

The agreement also ensures that the program aligns with the evolving needs of government digital transformation through regular curriculum reviews, project evaluations, research activities and student admissions.

H.E. Al Shaidhani emphasized that the agreement underscores the Ministry's dedication to collaborating with educational institutions to achieve long-term digital transformation. The aim is to equip national talents with the necessary skills to create innovative government services capable of addressing future challenges. He stressed that coordinating both academic and practical efforts is a key element in the successful execution of the digital transformation program, similarly falling in line with Oman Vision 2040.

Under the agreement, the Ministry will provide access to its databases of digital transformation plans, projects, and evaluation outcomes to enhance research and project work within the MSc program. Students will also have opportunities to present their research and projects at high-profile events such as COMEX, GITEX, LEAP, and other global conferences.

Furthermore, the Ministry will offer students consultations on digital transformation research, assist with surveys, and organize interviews. Workshops on change management and innovation will be integrated throughout the Master's program. Additionally, Master's students will be involved in discussions about improving government services through the Manjam Labs initiative.

Huawei Digital Transformation Innovation Contest (DTIC) Supports Telcos' Transition to "Techcos"

Building on the success of its inaugural event, Huawei hosted the second edition of the Digital Transformation Innovation Contest (DTIC) at the Operations Transformation Forum (OTF 2024) in Istanbul, Turkey. The initiative aims to facilitate knowledge- and experience-sharing among telecom carriers (telcos) to successfully inspire and accelerate their anticipated transition to "techcos."

In today's evolving digital era, carriers are actively working to transform from traditional telecommunications companies (telcos) into technology companies (techcos) to address the competitive challenges and rapidly changing landscape of the industry. This transformation is essential for driving sustainable business growth and ensuring long-term viability.

To successfully navigate this transition, carriers must implement significant operational changes that leverage advanced operational intelligence. By adopting intelligent systems, they can enhance operational efficiency, streamline processes, and reduce costs. Moreover, improved operational capabilities will lead to better customer experiences, fostering loyalty and satisfaction in an increasingly competitive market.

An agile business model is also crucial in this transformation, enabling carriers to quickly adapt to market demands and seize new revenue opportunities. Achieving this level of agility requires carriers to invest in a unified digital platform that integrates and analyzes multi-domain and cross-domain data. By harnessing the power of artificial intelligence (AI) and machine learning (ML), carriers can generate valuable insights and use cases that align with their strategic objectives. These investments will empower carriers to innovate, optimize service delivery, and

ultimately create a more responsive organization capable of thriving in the digital age.

With a broadened set of strategic objectives focused on five key competitive targets under the "RACING" framework (Revenue = ARPU Increase + Customer Development + Innovative Services + Net. Loss Reduction + Go/Churn Reduction), the contest initiative aims to support carriers in accelerating their transformation from telco to techco. The "RACING" framework highlighted five key benefits of technological transformation:

• ARPU Increase
• Customer Development
• Innovative Services
• Net Loss Reduction
• Go/Churn Reduction

Huawei's second DTIC received more than 50 applications from various telecom carriers in the Middle East and Central Asia (ME&CA) region, with the top 26 advancing to the final stage.

TDRA Discusses Private 5G with ICT Experts and Specialists

The Telecommunications and Digital Government Regulatory Authority (TDRA) organized a special workshop to explore the concept of private 5G networks at its head office in Abu Dhabi. The workshop was attended by a group of ICT experts and specialists alongside more than 100 participants from 40 different entities.

The workshop aimed to discuss the opportunities and challenges related to the deployment of private 5G networks in various sectors, with a focus on solutions and innovations offered by this technology. During the workshop, ideas and visions were shared between all parties involved to enhance the overall understanding of the private 5G

technology landscape and tap into its features and benefits in the industrial and service sectors of the United Arab Emirates (UAE).

Enhancing the Competitiveness of the National Economy
The workshop included presentations by representatives from operators, suppliers and government entities in the UAE. The representatives dissected current activities, future strategic directions and engaged in a roundtable session to discuss the challenges of deploying such networks. The relevant parties also analyzed the potential network's associated construction costs and technical requirements and outlined proposed solutions to facilitate widespread adoption.

In this context, Eng. Tariq Al Awadhi, Executive Director of the Spectrum Department at TDRA, said, "Organizing this workshop comes as part of our

ongoing efforts to support digital transformation in the State, and create a regulatory/organizational environment conducive to the adoption of advanced tech solutions. The private 5G technology is a great opportunity for the industrial and service sectors, and we are committed to providing the regulatory frameworks needed to ensure optimizing this technology in a manner that enhances competitiveness of our national economy."

The discussions addressed the unique benefits of private 5G networks, which provide high levels of privacy and security, ultrafast connection speeds, and lower latency, making them ideal for advanced industrial applications, like smart factories and supporting digital transformation. The workshop presented real-life application scenarios, such as the use of 5G networks at the Barakah Nuclear Power Plant (BNPP) and evaluated the potential of critical solutions within industrial tasks.

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The Future is No Longer Cloudy: How SMEs Are Capitalizing on Cloud Services

The demand for cloud services has immensely increased due to the rising adoption of cloud computing within small and medium-sized enterprises (SMEs), which are resorting to the technology to improve business operations.

As the world becomes more digitalized, SMEs have shifted their focus from manual work to applying cloud-based applications that will assist them in increasing flexibility, scalability, security, and efficiency in their businesses. With improved business solutions, they can seamlessly fulfill their digital transformation goals.

What Are Cloud Services?
Cloud services refer to infrastructure, platforms, or software hosted by third-party providers and are accessed over the internet. These services are typically offered on a subscription basis, with three primary models prevailing in the industry: infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS). Among

these, SaaS is often considered the most practical option for SMEs.

The use of cloud services is advantageous as it helps customers gain easy accessibility to cloud storage, computing power, and IT infrastructure. Depending on the subscription acquired, there could be a maintenance expense for regular software and hardware updates.

Large-scale businesses are receiving help from cloud platforms to build and use applications in their present software infrastructure. They are optimizing their strategy by consulting and offering integrated cloud-based services to determine which applications work best in the cloud and how to seamlessly integrate them with their existing infrastructure.

SaaS
With the ongoing shift toward cloud

adoption, particularly hybrid cloud, SMEs are gravitating toward SaaS solutions due to their limited need for resources and the simplicity these solutions offer to their infrastructure.

Reportedly, around 78% of small businesses have invested in SaaS, with accounting, content management systems (CMS), and customer relationship management (CRM) being the most widely-used SaaS applications.

According to Esam Mahmoud, SVP SMB, e& UAE, small and medium-sized businesses are indeed adopting CRM systems, AI-powered customer support solutions and feedback management tools to meet customer expectations and improve their experience.

Moreover, SMEs are utilizing cloud storage solutions such as Google

Drive or Dropbox to securely store and share documents and easily facilitate collaboration among remote teams. This not only enhances efficiency but also ensures data accessibility from anywhere, promoting seamless workflow continuity.

Furthermore, the adoption of cloud infrastructure services like Amazon Web Services (AWS) or Microsoft Azure enables SMEs to deploy and scale applications rapidly without upfront infrastructure investments. This flexibility empowers them to innovate more swiftly, respond to market changes dynamically, and compete effectively in their respective industries.

An example of this is the AWS AppFabric. It helps customers connect and manage some of the most popular SaaS applications and productivity suites in one location. These include Dropbox, Google Workspace, Microsoft 365, Webex by Cisco, Zendesk, and Zoom. Within the AWS Management Console, customers can select the list of applications their organization uses to connect to AppFabric. This automatically provides a standardized set of security and operational data for each connected app. This eliminates the need to build point-to-point integrations, manage those integrations, and analyze disparate security data.

Why do SMEs Utilize Cloud Technologies?

The primary factor that is boosting the growth of the cloud service market is cost-efficiency. SMEs, in particular, can save most of their annual operating expenses by opting to use cloud services.

SMEs commonly view the cloud as a way to optimize localized operations. In a strategic collaboration with Huawei, Omantel is constructing the National Cloud, which will provide cutting-edge technology, global expertise, robust data security measures, and localized data hosting capabilities. Omantel will be able to extend hosting benefits to the entire Sultanate, including SMEs.

This could be helpful as SMEs often direct their IT budgets toward cloud services that are both cost-effective and efficient. By selecting affordable, yet dependable, options, SMEs aim to streamline operations and reduce overhead. SMEs' primary focus is on quick deployment and immediate savings, which helps them stay agile in a rapidly changing market.

Whether it be managing seasonal peaks in traffic or accommodating business expansion, the cloud provides the flexibility SMEs need to stay agile and responsive. Features like encryption, identity and access management, and automated backup and recovery also provide SMEs with robust security capabilities, safeguarding their data and reducing potential risks.

According to a report commissioned by Amazon Web Services (AWS) in partnership with the Dubai Chamber of Digital Economy, the hyperscale cloud sector could generate USD 17 billion in economic benefits for the UAE between 2022 and 2030, while also creating 133,000 jobs for SMEs and startups.

To support the digitization, growth, and expansion of UAE-based SMEs in local and international markets, the Ministry of Economy (MoE) and Amazon Web Services launched the AWS Connected Community initiative last year.

Earlier this year, Orange Middle East & Africa (OMEA) and Microsoft collaborated to support 15,000 businesses in the MEA region throughout 2024. Aiming to reach one million SMEs, both companies will provide access to technology, tools and support to accelerate adoption.

Saudi Arabia's Vision 2030 aims for SMEs to contribute 35% of the country's GDP by 2030, and technology plays a critical role in achieving this. With this in mind, in November 2023, Google unveiled a new cloud region in Dammam, Saudi Arabia, enhancing access to a wide array of services such as cloud computing and storage to data analytics and artificial intelligence (AI). The cloud region specifically targets SMEs and startups.

AI for SMEs

Alongside cloud integration, entrepreneurs are increasingly incorporating AI into their businesses. The UAE is globally recognized for its active role in establishing itself as a global hub for AI, alongside its thriving SME sector.

That being said, AI adoption will remain a powerful force in the national economy, with some forecasts expecting close to 14% of Emirati GDP to stem from AI by 2030.

Through cloud services, the drive for digital entrepreneurship and AI-based innovation and business models across the public and private sectors can be accelerated. Using cloud-enabled analytics and other advancements provided by hyperscalers, such as AI and ML, organizations can improve decision making processes, leading to increased agility, responsiveness, and reduced costs.

As part of its mission to bolster the regional economy through the empowerment of SMEs and startups, du partnered with DIFC Innovation Hub to launch the 'du Business Entrepreneurship Programme.' Among other benefits, participants will gain access to the Dubai AI Campus—a nurturing ecosystem that fosters AI businesses and cultivates top talent at the forefront of AI innovation.

A Smarter, Cloud-Native Future

Choosing the right cloud provider, prioritizing data security, and addressing organizational resistance are crucial steps in ensuring a seamless transition to the cloud. The combination of AI, generative AI and cloud are driving new services and applications for SMEs.

Telecom operators, among other industry players and service providers, are repositioning the cloud for scalability, cost-efficiency, faster service deployment, and better data management to meet growing demand and drive innovation within SMEs.

While we are yet to witness significant results from this cloud transition, they are likely to emerge soon as technology integration progresses, making SMEs increasingly valuable in the market. ⊞

Street-Smart Cities:
Balancing Innovation with Privacy and Security

Have you ever been to a smart city? This urban area is known to leverage digital technology, especially Internet of Things (IoT), artificial intelligence (AI), and big data, to improve city operations, manage resources more efficiently, and make cities more livable.

Pioneering an interconnected environment, real-time monitoring and management of urban infrastructure are at the core of smart cities, with security and privacy requiring careful attention and foresight. During the last decade, the Middle East has been the home of the most forward-thinking smart city projects and programs.

One such region is the UAE, which is steadily paving the way for a digital-first future, driven by artificial intelligence and automation. Other prominent examples include Lusail in Qatar as well as NEOM and Al-Khobar in Saudi Arabia.

By leveraging the power of innovation while maintaining the principles of privacy and individual freedom, urban environments are intended to not only be safe and secure, but also respectful of the fundamental rights of all citizens.

The traditional models of urban development are no longer adept at addressing challenges effectively, forcing governments and other stakeholders to actively find and implement new ways to shift towards more innovative and sustainable solutions.
The evolution of smart cities has been catalyzed by technology, particularly ICT, which acts as the backbone that supports a complex network of services and systems within the urban area.

As the number of installed smart systems increases, security and privacy have become a top priority and an important feature that should not be overlooked.

Building Trust, Ensuring Privacy
Developing smart cities are predicted to enhance citizens' standard of living, encourage sustainable growth, and bolster the efficiency of city functions. Smart cities depend upon stakeholder trust to function. Without stakeholder trust, or with loss of trust, stakeholders will not support smart services and smart cities lose value.

When citizens don't trust the technology or the organizations behind it, several negative consequences occur, such as lower utilization rate, increased costs, reputational damage, and social inequality. Thus, promoting trust is vital and can be achieved through transparent decision-making, open communication, and active public engagement in rollout.

In a detailed paper, the Cybersecurity & Infrastructure Security Agency (CISA) highlighted that to achieve broad trust in a smart city system, key characteristics such as security, reliability, resilience, privacy, compliance, and well-being, must be adhered to.

Security is commonly defined by three essential components: confidentiality, integrity, and availability. In the IT world, this triad is known as CIA. Conversely, in Operational Technology (OT), it is referred to as AIC, highlighting the greater emphasis on availability in OT compared to the confidentiality focus in IT.

In a smart city context, reliability will reduce unexpected downtime and diminish the impact of planned downtime. In anticipation of potential failure, a smart city should have an early detection mechanism, and to mitigate the damage, response and recovery mechanisms should also be on standby.

Smart city systems must meet various compliance requirements, which can differ based on the acquiring, funding, or operating entity. Even within a single city government, departments may have distinct requirements.

Beyond this, wellbeing is the characteristic most directly related to trust in the system as a whole. If citizens' wellbeing is addressed and supported, then citizens are given the impression that the system and its stakeholders are aware of, and considering, their interests. This, in turn, can help improve trust in other elements of the system, including faith in, and support of, further implementation.

There are key principles that can help address privacy concerns associated with smart cities, which include human-centric approaches to smart city design and implementation; transparency for city residents; privacy by design; anonymization and deidentification; data minimization and purpose specification; trusted data sharing; and cybersecurity resilience.

Research indicates that individuals are more trusting and likely to engage with systems that implement robust data protection measures. Hence, trust among citizens can be fostered by ensuring secure storage, ethical usage, and adherence to the intended purposes for collected data.

Additionally, empowering residents to control their data is vital for privacy. They should know what data is being collected, how it's being used, and have the option to opt out.

Can Citizen Data be Secured?

A report by the Information Technology and Innovation Foundation (ITIF) explored how smart city leaders can balance societal benefits with privacy concerns. It emphasized that proper data security in smart cities begins with securing IoT devices, which function as the 'nervous system' of the smart city.

Ranging from home automation systems to traffic sensors, these devices collect, share, and analyze data in real time. Maintaining privacy involves not only safeguarding the collected sensitive data but also controlling who has access to it and ensuring its secure transmission and storage.

Moreover, a zero-trust security model, enhanced by AI, can greatly improve a smart city's cybersecurity profile. AI will continuously monitor network and user behavior to detect anomalies, limiting potential cyberattack damage by restricting attackers' access to only a small portion of the network.

Even GCC countries recorded high costs from cyber incidents, averaging almost USD 7 million. With this in mind, GCC countries have significantly increased their investments to strengthen their cyber-resilience as most of the smart city objectives that stem from national programs require a cyber-secured technology infrastructure and platform to function effectively.

The constant stream of information, while instrumental in advancing urban efficiency, results in a detailed digital footprint of each resident's life, thereby containing vast amounts of confidential information that should be protected at all costs.

As the new urban model becomes more prevalent, it's necessary to strike a balance between leveraging data for operational efficiency and safeguarding the city's inhabitants. There is a need for thoughtful policy-making, robust data governance and forward-thinking design in smart city projects to ensure that citizen data is not unethically exposed.

According to Kearney, data protection regulations in the Middle East rely on broad legal principles instead of data-specific legislation. This approach fails to address the complexities of the vast data collected by smart city systems, making it difficult for organizations to use this data effectively and securely, thereby hindering the development of data-driven smart city services.

Moving forward, smart cities can redefine urban systems by unleashing the power of the data they generate and integrating AI applications within smart-city services. However, it is crucial to address the security concerns associated with these promising technologies, including but not limited to, manipulated training data and deepfake techniques.

A converged security approach dismantles silos and fosters collaboration among various business teams, all working toward a unified goal: ensuring a secure cyber and physical environment for citizens.

Digitalizing Urban Environments

Urbanization drives innovation through the digital enhancement of critical infrastructure and urban assets. This is evident in the advanced network and data technologies that provide cities with transformative operational insights.

A big factor affecting this transformation is the adoption of artificial intelligence and big data. These technologies are revolutionizing urban management by analyzing data from city sensors through which AI optimizes traffic flow, predicts utility demands, and enhances public safety by identifying high-risk areas.

In May 2024, in an effort to facilitate smart city development and enable easy access for network providers, the Telecommunications and Digital Government Regulatory Authority (TDRA) released the third edition of the Telecommunications Network Box Specification Manual. This guide supports the design of infrastructure for urban projects, focusing on fiber-optic networks, and ensuring that new buildings and areas are equipped for high-speed connectivity.

Another key contributor to digitalizing urban environments is cloud computing. This provides robust data processing and storage for smart cities, efficiently managing data from IoT devices and AI applications.

For example, AWS partners utilize AWS Cloud to create innovative solutions for challenges such as energy use, traffic management, and sustainability. In this way, AWS supports public sector innovations and enhances citizen services through its qualified partners.

World Cities Day

On October 31, 2024, World Cities Day will focus on the theme "Youth Leading Climate and Local Action for Cities," highlighting how young people are advocating for bold climate actions and turning ambitious ideas into tangible achievements.

Given that urban areas are projected to house 70% of the global population by 2050, with a significant portion being youth, engaging young people in urban decision-making is crucial. Their creativity and commitment can drive sustainable development and help cities address environment-focused challenges effectively. **TR**

Are AI-Driven SOCs the Future of Cyber Defense?

A fully autonomous, AI-powered security operations center (SOC) will require many years of development before it is ready for market entry, however, the current wave of AI capabilities are undeniably impacting how security operations work.

Due to greater exposure to cyber threats, security remains a challenge for organizations across industries, especially those within the critical infrastructure sectors. A security operations center (SOC) plays a pivotal role in safeguarding these organizations against evolving threats.

Among the key components of SOC operations are Security Information and Event Management (SIEM) systems which provide the necessary tools and capabilities for comprehensive security monitoring, threat detection and analysis, incident response, and compliance management.

Along with this, it is essential to integrate CIEM with SIEM to enhance visibility and response capabilities through integrated security monitoring.

What Are SOCs?

Security operations centers (SOCs) are at the forefront of modern defense, alongside security engineers and analysts as well as threat-hunters, all of whom engage in an ongoing battle to detect, analyze, and mitigate potential breaches.

With the influx of alerts, coupled with repetitive tasks, and around-the-clock operations, security teams are under great pressure to function with the highest proficiency. Multinational organizations may eventually depend on a global security operations center

(GSOC) to stay on top of worldwide security threats and coordinate detection and response among several local SOCs.

For example, through its three SOCs around the world, Huawei Cloud defends against massive attacks with ease, with over 70% of security incidents cleared in one minute and over 99% of incidents cleared in five minutes. With technologies like AI pushing the boundaries of business design and redefining business models, Huawei Cloud's SecMaster leverages a full-stack cloud native security system based on a single SOC and seven layers of defense.

Having said that, the importance of a strong SOC cannot be overstated as it

helps businesses, governments, and other organizations stay ahead of a dynamic cyberthreat landscape.

In the cyber-warfare niche, both attackers and defenders are developing new tactics and utilizing new technologies. However, by leveraging its knowledge of cybersecurity environments as well as its understanding of internal weaknesses and business priorities, a SOC helps organizations develop security roadmaps that protect them and align with the business' long-term business strategy.

In one business use case, B-Yond deployed its innovative Continuous Assurance (CA) solution to transform the SOC operations of Ooredoo Qatar. The CA solution utilizes advanced analytics, artificial intelligence (AI) and machine learning (ML) to monitor Ooredoo's network health and customer experience in real-time.

By implementing B-Yond's Continuous Assurance solution, Ooredoo Qatar successfully transformed its SOC operations, demonstrating a 30% increase in both Mean Time to Detect (MTTD) and Mean Time to Resolve (MTTR) metrics, resulting in higher customer satisfaction scores, reduced manual processes and decreased network downtime costs.

Additionally, a combined security portfolio delivers a complete security solution for threat prevention, detection, investigation, and response (TDIR), which is what Cisco XDR and Splunk Enterprise Security bring to the table. Utilizing a complete SOC platform that is purpose-built for the AI-driven future, Cisco and Splunk will meet customers at their current stage in their SecOps journey and evolve with them as their needs change.

AI-Driven Insights for SOCs
Various AI technologies are driving advancements within SOC environments today, including deep learning algorithms, large language models (LLMs), chatbot interfaces, and automation tools. Among these, one of the most effective uses of AI in security operations is generating text-based explanations and summaries of incidents and investigations.

Going back to the goal of an AI-powered SOC, one of the priorities is to proactively collect, process, and analyze internal and external intelligence data to lead intelligent threat analysis. According to global use cases, LLMs are great at generating text summaries from training data, making it an innovative and useful tool for SOCs.

With this in mind, AI-driven insights are a revolutionary development in SOC and cybersecurity defense as insights leverage advanced AI technologies to refine vast amounts of security data into proactive threat intelligence, empowering security analysts to prioritize and respond to threats more effectively, and enhancing overall SOC efficiency and resilience.

Furthermore, AI-driven insights help SOCs by reducing alert fatigue, consolidating vast volumes of security alerts into actionable insights, and easing the burden on analysts. They improve threat prioritization by analyzing data from various sources, such as DNS activity and user behavior, to dynamically rank threats and provide swift resolution recommendations.

In line with this, Nokia is working with generative AI (GenAI) to assist security engineers in managing the complexity of resolving security incidents while also mastering telecommunications networks. The vendor is utilizing telecom-and-security-trained LLMs to understand all the dynamics of the environment and assist in speeding up and automating the resolution actions.

AI-driven insights can also seamlessly integrate with existing security tools such as SIEM, SOAR, and XDR platforms, allowing organizations to enhance their current cybersecurity infrastructure without the need for a complete overhaul.

AI Limitations
While generative AI capabilities are indeed impressive, they remain limited and solely rely on the data training them. These systems do not truly understand the concepts they process; instead, they generate text that mirrors their training sets, which can create an illusion of intelligence. Some have aptly described this as "glorified autocomplete."

Hence, expectations that LLMs will soon detect unknown cyberattacks are likely misguided due to inherent limitations in AI technology. Unknown attacks, by definition, fall outside the scope of current detection systems. Cybersecurity experts note that savvy attackers continuously learn how detection mechanisms operate and craft new attack methods to evade them.

Attackers innovate on multiple fronts, often bypassing where detection capabilities are focused. Because of this, there must be a clear distinction in security operations between areas requiring consistent, measurable processes and areas where cybersecurity experts must intervene to counter unforeseen threats.

Given this reality, training AI to recognize completely unknown patterns is incredibly challenging, and until this moment, has not been proven to be effective. Like humans, AI still struggles to differentiate between real threats and false positives amid vast amounts of data.

AI Will Not Replace People
What is the key to an effective SOC? It is the highly skilled staff working inside it and continuously improving over time. Telecom Review agrees with security experts that organizations shouldn't rely only on technology to protect their systems. Instead, it's crucial to evaluate how AI can enhance and complement existing SOCs.

Moving forward, the success of AI will be defined by the automation and integration of security controls, along with training SOC personnel to use accurate data and develop more efficient processes. **TR**

World Usability Day 2024: ICT's Role in Designing for a Better World

Highlighting the efforts being implemented globally to create a more accessible and sustainable society, the World Usability Day 2024's theme is focusing on "Designing for a Better World."

The convergence of technology and usability in the ICT sector has been a significant driver of innovation, leading to more user-friendly solutions.

Here are some of the technologies and initiatives within the ICT sector that are committed to promoting usability, sustainability, and inclusivity within society:

Usability
Tech companies and ICT industry players are utilizing technology to simplify interactions with customers and transform their business operations seamlessly. Given that technology and usability work in parallel, making technology more intuitive for users of all ages and technical abilities is a must to ensure customer satisfaction and loyalty.

It is important to provide a customized and personalized telecom customer experience (CX) across all customer touchpoints. AI-driven chatbots, among other tools, play a key role in automating customer service, streamlining operations, and reducing response times, which further enhances the overall customer experience.

Built with security and privacy in mind, AWS users can access Amazon Q, an AI-powered chatbot that aids employees in searching for answers, solving problems, generating content and selecting data-powered actions.

During its transition from a traditional telecom operator to a tech-driven enterprise, e& UAE modernized and enhanced its systems so that it could handle direct customer interactions. This upgrade enhanced the digital experience with a seamless and intuitive user interface, which is essential in today's digital era.

AI-driven enhancements also align perfectly with Mobily's strategic focus on ensuring that every technological advancement translates into tangible benefits for its users.

In a Deloitte Digital and Adobe survey, 65% of respondents expressed a desire to access government information and services via multiple channels, underscoring AI's potential role in significantly enhancing the citizen experience when integrated effectively. This is being addressed actively in the UAE.

In an effort to upgrade the infrastructure and systems required to ensure streamlined services that cater to people's needs, the UAE Government has launched the U-Ask platform, an AI-powered chatbot, and the UAE Design System 2.0 (DLS 2.0), to streamline navigation and enhance the accessibility of vital information and services on government websites.

From a technical perspective, digital twin technology (DTT) is gaining momentum due to its ability to speed up product development lifecycles, thus, making development more cost effective, and creating result-oriented new business models. Digital twins simulate real-world environments for urban planners, making complex data more understandable and actionable, enhancing usability in the decision-making process for telecom networks, and developing smarter cities.

5G has also paved the way for the rise of augmented reality (AR), and these

technological leaps are reshaping the way in which we live and interact with the world. The transformational potential of these technologies is taking connectivity and immersive experiences to new heights.

Sustainability

The United Nations has raised concerns about the environmental toll of the digital economy, noting that massive data centers are consuming enormous amounts of water and energy.

The environmental impact is becoming severe, despite the influence of digitalization on global economic growth. In line with this, the ICT industry recognizes the importance of cutting its carbon footprint.

According to a BCG report, many major telcos have committed to reducing the energy required per unit of traffic by around 70% by the end of the decade. This effort could cut up to 15% of global emissions by 2030, contributing significantly to the overall emissions reductions needed to meet global sustainability goals.

Sustainable strategies that can mitigate this growing environmental burden, reduce energy bills and contribute to decarbonization ambitions, could include intelligent solutions such as IoT smart meters, big data energy management and deep-sleep-mode antennas.

One sustainability advocate is Sofrecom which helps transform linear business models into circular models by advocating for a responsible purchasing policy that challenges suppliers to integrate a lifecycle analysis of equipment from manufacturing to waste management.

Additionally, Nokia's Virtual Power Plant (VPP) is an incredible innovation that will help customers monetize the energy stored in their backup batteries while also reducing carbon emissions. Overall, Nokia provides simplified, autonomous and secured networks; energy-efficient solutions on the data side; and modular solutions that reduce the site footprint with

highly advanced dual-band and triple-band AirScale radios and baseband systems.

Apart from network infrastructure, e-waste is also a major concern that should be addressed wisely. By 2030, the annual e-waste production could reach 75 million metric tons, and with this accumulation in the environment, it could be highly detrimental to the soil, air, water and living organisms.

Huawei expressed that the regional shift to a circular economy, which replaces virgin resource usage in manufacturing with recycling, repair and remanufacturing practices, alleviates the need to consume new raw materials and help reduce carbon emissions while creating new green jobs for the region's workforce.

Zain KSA and Ertiqa also aim to boost investment in the electronic waste management industry by recycling over 5,000 electronic devices.

In a three-year partnership, Ericsson's global "Take-Back Program" will be explored further to support e& and drive responsible disposal and recycling of e-waste across the Group's network.

In the Middle East region, experts believe that a promising path forward involves a reliance on clean energy and a novel approach to constructing energy-efficient data centers. The world's largest solar-powered data center utilizes advanced solar energy and storage technologies, AI systems, and sustainable practices. It is also located at Dubai's Mohammed bin Rashid Al Maktoum Solar Park, the biggest single-site solar park globally.

In Saudi Arabia, ambitious giga-projects like The Red Sea Project and NEOM serve as prime examples of embodying net-zero credentials and integrating digital infrastructure, renewable energy sources, and innovative waste management systems on a grand scale.

Inclusivity

Various aspects contribute to ensuring an inclusive world. Inclusivity in design

involves creating solutions that cater to the diverse needs and abilities of all individuals. By embracing inclusivity, we ensure that everyone, regardless of their background, age, or physical ability, can access and benefit from technology and services, ultimately contributing to a more equitable, ergonomic, and connected world.

In terms of fintech, e& Money, du Pay, and walletii, are leveraging technology to create inclusive and accessible financial solutions. These user-friendly mobile wallets are designed to upgrade and simplify financial transactions for consumers and merchants, equipping people with simple financial accessibility.

Nokia sees the digital divide as a chance to provide accessible, sustainable, and transparent high-quality broadband services. By partnering with firms like fibertime in Africa, Nokia underscores the importance of delivering sustainable, top-tier solutions to effectively close the digital gap.

Huawei's TECH4ALL, a long-term digital inclusion initiative and action plan, aims to address major global challenges by focusing on four domains to make a difference: education, environmental protection, health care and rural development. In collaboration with its partners, the company developed different types of programs for remote communities and vulnerable groups, such as people with disabilities, children and unemployed youth, women and the elderly.

The UAE's 2025 Action Plan highlights the nation's commitment to an inclusive future through technological advancements, citizen welfare, and cultural enrichment.

While in Kuwait, Zain actively integrates diversity, equity, and inclusion (DEI) into its operations. Their WE ABLE initiative focuses on disability inclusion by creating accessible products and services and they support local youth with digital literacy programs and internships, nurturing the community's most dynamic segment. ⊞
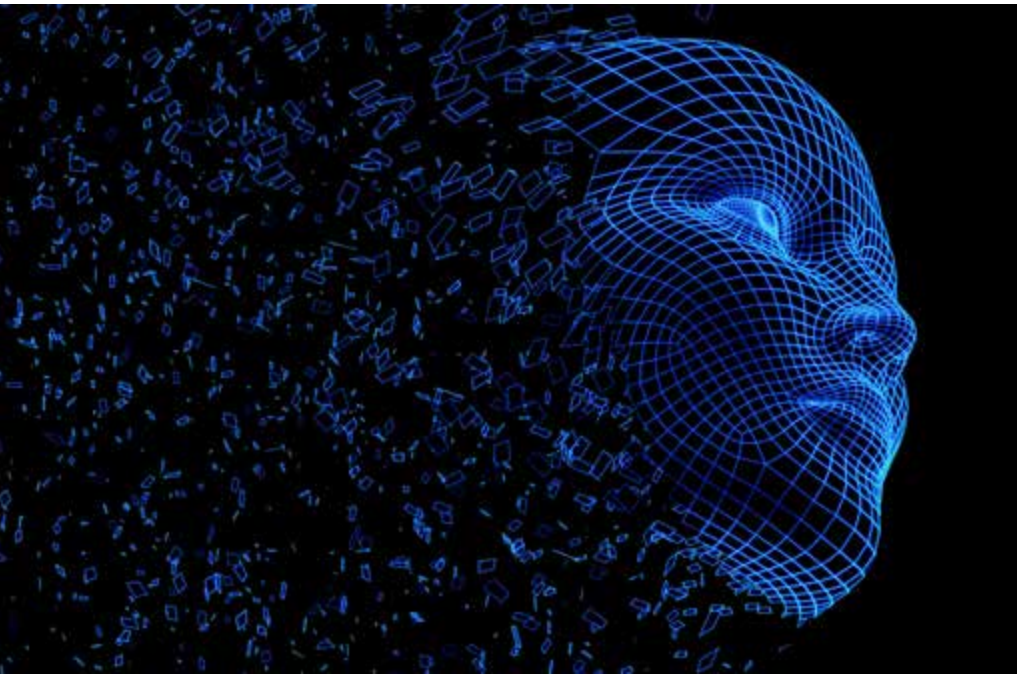
Deep Tech: A New Chapter in the Innovation Story

Deep tech has the power to change the way we produce material, the way we eat, and the way we heal by fusing science, engineering and design thinking, opine researchers and scientists experimenting with this powerful technology.

Deep tech (a shortened version of deep technology) incorporates technologies like robotics, synthetic biology, nanomaterial, blockchain, quantum computing, artificial intelligence (AI) and others, and blends them with engineering and design science to address fundamental issues that have been left unresolved for decades. Imagine having a vaccine ready within a month during a global pandemic like COVID-19, or generating precise insights on climate change by leveraging the power of deep tech. These scenarios highlight the transformative potential of advanced technology in tackling the world's most pressing challenges.

We are witnessing a significant increase in venture capital investors who are shifting their focus from software to deep tech, enticed by the prospect of solving the biggest challenges facing the world while remaining profitable.

In essence, deep tech supports startups and companies that are aiming to bring about transformative and disruptive change across industries as opposed to the small or cumulative changes enabled by shallow tech—a simple technological advancement whereby a business is moved from a non-digital business model to a digital one.

A popular example of a deep-tech backed company is tech magnate Elon Musk's Starlink which aims to provide global mobile broadband and "rebuild the internet in space" as part of its operations. With 6,350 Starlink satellites in orbit as of August 2024, the company has encountered concerns from astronomers regarding the satellites' interference with universe observations as well as concerns from spaceflight safety experts who fear collision hazards in the Earth's orbit.

Moreover, the amount of metal burning up in Earth's atmosphere as old satellites are deorbited, triggering unpredictable climate changes, is also raising red flags. For a company to survive amidst these practical challenges, the innovation provided by deep tech will be invaluable.

What's in it for Telcos Adopting Deep Tech?

In a 2023 report, BCG stated that deep tech claims a stable 20% share of venture capital funding, up from about 10% a decade ago. In 2019 alone, there were more than 5000 deep-tech ventures backed by a USD 50 billion investment. As the global economy's need for best practices in sustainable and energy-efficient operations grows, the biggest innovations are not only unlikely to come from a single technology but also from the convergence of multiple technologies that remove barriers or resolve long-standing compromises.

The telecom industry forms an important and pivotal catalyst for the development of the deep tech ecosystem. From providing seamless connectivity and interoperability of emerging technologies to fostering ICT talents, the industry's role only prevails in the greater scheme of things. Almost every business sector is likely to benefit from the possibilities offered by deep tech. Analysts predict that economies with a high share of world-leading deep tech companies stand at an advantageous position in an increasingly digital-first landscape.

Vodafone has integrated AI into its network management systems, reducing downtime and enhancing the quality of service. Their AI-driven predictive maintenance tool helps anticipate and address potential network issues before they impact customers.

Nokia has partnered with Google Cloud, AWS, and Microsoft to deliver cloud-based 5G solutions, marking a significant step toward enabling more flexible, scalable, and efficient 5G networks.

Deutsche Telekom is exploring blockchain for automating roaming services. Their blockchain solution allows operators to track transactions more securely and efficiently, potentially reducing costs and fraud.

South Korea's SK Telecom is leading in quantum security by deploying Quantum Key Distribution (QKD) technology. This project is designed to protect sensitive communications on 5G networks, ensuring ultra-secure data transmission.

Telefónica has developed its UNICA platform, a virtualized cloud-based network infrastructure. By utilizing AI, automation, and virtualization, Telefónica is transforming its network to be more flexible and cost-efficient while delivering better services to customers.

Saving Biodiversity

In recent news, climate researchers have warned about the high concentration of powerful greenhouse gas (GHG) methane in the atmosphere, threatening efforts made by countries to meet their climate targets, such as those established in the Paris Agreement.

For example, the Northern Lights project—a collaboration between Equinor, Shell, and TotalEnergies—is a full-scale CCS project in Europe aiming to capture and store CO2 from industrial sources. This project uses deep-tech innovations to transport CO2 to storage sites under the North Sea, mitigating emissions from hard-to-abate industries.

Methane is considered the second-most abundant greenhouse gas produced by human activity after

carbon dioxide, with agriculture, energy production and organic waste in landfills listed as the other major sources. In the first 20 years, its impact on the atmosphere has been about 80 times more powerful than that of carbon dioxide even though it breaks down more quickly than CO2.

However, despite efforts to cut methane emissions, atmospheric concentrations of the gas are still rising. Deep-tech climate solutions are helping decarbonize some of the world's dirtiest industries. Interestingly, nuclear fusion is deemed a hot topic in the deep-tech domain. ICT support for these initiatives opens up a greater scope for the telecom industry.

Data Management

With the advent of AI and ML, data has become the new treasure trove for economies and businesses both great and small. Sustainable data management practices that incorporate green solutions for data storage, security and energy efficiency will only become more complex as the volume of data generation explodes.

Moreover, in the rush for data mining, the implications of "dirty data" can be damaging. Thus, collaboration between industry specialists and tech experts has become mandatory to ensure that clean and trustworthy data is generated to maximize investments. Deep tech-supported, robust data management strategies will eventually become the norm.

The Rise of Industry 5.0

Countries like China and the US, among others, have already started replacing human workers with humanoid robots, highlighting the transition to next-level smart manufacturing.

In January, Goldman Sachs forecasted that the annual global market for humanoid robots would reach USD 38 billion by 2035, boasting nearly 1.4 million shipments for consumer and industrial applications. It estimated that the cost of the materials required to build

them had fallen to about USD 150,000 each in 2023, excluding research and development (R&D) costs.

These developments are the beginning of new markets for deep-tech-enabled startups to explore. Telco solutions must align with this global trend sooner rather than later.

Mobility Changes

Mobility is one area where ICT solutions have increasingly been incorporated as the advent of IoT and high-end sensing technologies come to fruition, giving way to autonomous driving.

However, in Germany's ARENA2036 campus—one of the largest research platforms for mobility in the world—researchers and scientists are "integrating the vehicle not just as a means for transportation but also a space to use to live in."

The trend of using cars for more than just driving—like holding video conferences, playing video games, and even turning them into mobile karaoke bars—is gradually gaining momentum. The ultimate experience would be to enter a car and be immersed in numerous digital worlds. This calls for various levels of network technologies that telcos can offer to companies during the production of automobiles in the assembly line or a separate network for navigating between vehicles on the road.

Moreover, deep tech could enable vehicles to operate without automated guides or robotic lines equipped with advanced CPUs and sensors. This represents a new realm where technologies such as 5G-Advanced and 6G will have a major role to play.

In Conclusion

In light of today's competitive and digitally enabled global market, high-risk venture capital funding will likely go to companies that are focusing on solving critical, large-scale problems and leveraging a combination of maturing digital technologies and emerging physical technologies—the essence of deep tech innovation. Telcos would do well to get involved early in this innovation journey and pave the efficient pathway to digital greatness. **TR**

e& Group's Q3 Highlights Record Growth and Global Ambitions

e& announced its Q3 2024 consolidated financial results, reporting consolidated revenue of AED 14.4 billion, growing 10% year-over-year (YoY) in constant currency, while consolidated revenues for the first nine months of year 2024 reached AED 42.7 billion, growing 9% YoY, reflecting continued growth across most verticals.

e& completed an important milestone by acquiring a controlling stake (50% plus one economic share) in PPF Telecom, consequently enhancing the group's portfolio diversification while facilitating the growth of its digital services across its enterprise solutions, fintech, and media and entertainment sectors. This diversification will allow it to pursue its strategic ambition of transitioning to a global technology player.

Notably, e&'s total subscriber base witnessed a YoY increase of 6%, reaching 177.3 million, while the total number of e& UAE subscribers reached 14.7 million, representing a YoY growth of 5%.

Commenting on the company's strong momentum within the first nine months of 2024, Hatem Dowidar, Group Chief Executive Officer, e&, said, "We scaled up e&'s telecom footprint to 20 countries, bringing our overall reach to 38 markets. This growth, coupled with our solid performance in both local and international markets, drove our consolidated net profit to reach AED 8.5 billion, growing 10% during the first nine months. Furthermore, consolidated EBITDA reached AED 19.4 billion, resulting in EBITDA margin of 45%, while our telecom EBITDA margin remained resilient at 49%."

Following the completed acquisition of a controlling stake in PPF Telecom Group, e& Group marks its "first operational foothold in Europe," and by combining its expertise with PPF Telecom's strong local presence, e& is "well-positioned to drive digital transformation and empower societies across this region," added Dowidar.

"e& remains dedicated to championing the UAE's leadership vision as the country continues to advance its digital agenda as a role model of digitalization. Our investment in cutting-edge infrastructure and strategic partnerships will ensure that we continue to deliver futuristic solutions and digital services that drive sustainable progress and transformation," concluded Dowidar.

Zain KSA's Impressive Q3: 33% Net Profit Surge, 5G Expansion, and ESG Leadership

Zain KSA has announced its financial results for the first nine months of 2024, achieving a total revenue of SAR 7.7 billion, indicating a 4.5% year-on-year (YoY) growth. Net profit over the period amounted to SAR 322 million, indicating a 33% increase compared to the corresponding 2023 period, excluding its tower sales earnings.

This financial performance reflects Zain KSA's strategic focus on enhancing customer experience and expanding future technologies and 5G. The company saw significant growth in revenue as a result of its enterprise sector and the widespread adoption of its Yaqoot digital service. In addition, it continued to see higher returns on its investments (ROI) in adjacent markets, particularly within the fintech sector via its fincancial serivecs platform, Tamam.

"We are committed to maintaining our strong financial performance by aligning operational efficiency with strategic investment plans and effective governance under a clear strategy. This approach ensures continuous development and innovation, actively contributing to the advancement of the national telecom sector and fulfilling the aspirations of our astute leadership to build a digital knowledge-based economy that promotes well-being for all," commented Acting CEO of Zain KSA, Eng. Saad bin Abdulrahman Al-Sadhan.

During the third quarter of this year, Zain KSA focused on creating an innovative, sustainable world while making a positive impact both locally and globally, aligning with its sustainable development goals (SDGs) and community empowerment. Zain KSA's corporate sustainability report demonstrated how the Saudi-based telco's sustainability strategy aligns with overall operations and showcased the tangible impact achieved, all of which falls in line with Saudi Vision 2030's sustainability goals.

The company also strengthened its commitment to empowering all segments of society by announcing a strategic partnership with the Ministry of Human Resources and Social Development. Through this initiative, Zain KSA will provide training and development programs for individuals with disabilities, along with tailored job opportunities.

Zain KSA has recently advanced its ranking on the MSCI Environmental, Social, and Governance (ESG) Index, achieving an upgraded rating of 'AA,' up from last year's 'A' rating. This achievement places the company in the 'Leader' category in terms of ESG practices, ranking it among the 179 telecommunications companies featured on this global index.

Historic Highs for du During Q3 2024: Stellar Growth, Record Profits, and AI-Driven Innovation

du announced its financial results for the third quarter of 2024, boasting a stellar top line growth of 9.1%, revenues of AED 3.6 billion, and robust EBITDA growth of 16.9% to AED 1.7 billion.

Moreover, its Q3 EBITDA margin of 48.3% marks the highest since its inception while its Q3 net profit of AED 719 million represents its highest quarterly net profit in the last three years, surging by 42.7%. CapEx was also normalized with a capital intensity of 12.2% during the first nine months of the year.

This very strong financial performance is the result of sustained commercial momentum, consistent strategy execution and efficient cost management.

Commenting on the Q3 developments and performance, Fahad Al Hassawi, CEO, said, "In the third quarter, we continued to execute our strategy of strengthening our core connectivity business whilst selectively expanding beyond the core to position ourselves as a leading integrated digital services enabler."

du's mobile service revenues increased by 7% YoY to AED 1,633 million, primarily driven by strong growth in the postpaid segment and an increase in mobile ARPU, thanks to high-value products and the success of its customer value management (CVM) strategy.

Additionally, du's fixed service revenues rose by 7.9% reaching AED 1,013 million, driven by the continued success of its Home Wireless product, enterprise broadband plans and the expansion of its fixed network into underserved areas.

Within its "Other" revenues segment, there has also been a 14.1% surge to AED 944 million, driven by the strong performance of its wholesale business and high equipment sales following the successful launch of the iPhone 16. du's ICT business also contributed significantly to this performance, due to its growth in cloud and managed services as well as consistent results from its data center operations.

Based on the company's latest financial statement, CapEx reached AED 511 million, moderating from its peak levels as the bulk of du's investments in 5G have been achieved. "We will continue extending our 5G coverage, focusing on densification and indoor coverage, as well as deploying fiber in new and existing developments and implementing the transformation of our IT and infrastructure to increase efficiency and offer the best-in class customer experience," its Q3 earnings release mentioned.

Ooredoo Group Powers Ahead in Q3 2024: 10% Profit Surge and 50M Customer Base

Ooredoo Group delivered a robust performance during the third quarter of 2024, displaying growth across most key financial metrics.

The Group's revenue increased by 2% YoY to QAR 17.7 billion, driven by strong operational performance in Iraq, Algeria, Kuwait, Tunisia, and the Maldives.

The increase in revenue across the Group demonstrates a positive return on its investments while ensuring excellence in customer service. The combination of fixed asset investments, the introduction of new and innovative products and improved customer satisfaction across its markets has supported the Group's bottom line and delivered sustained growth.

Commenting on the results, HE Sheikh Faisal Bin Thani Al Thani, Chairman of Ooredoo, said, "The Group continues to reap the benefits of the initiatives undertaken over recent years to transform our operational model, focusing on high-value assets and achieving high-quality growth across the markets that we operate in."

The reported net profit increased by 10% YoY to reach QAR 2.9 billion. Due to the company's focused efforts on profitability, EBITDA growth rose by +4% YoY to QAR 7.7 billion along with a 1pp improvement in the EBITDA margin, reaching 44%.

In terms of capital expenditure (CapEx), there has been a 22% increase to QAR 1.9 billion, primarily due to increased investments in Iraq, Kuwait, Oman, Algeria, Tunisia, and Qatar.

Notably, the Group's customer base reached 50.7 million customers during the first nine months of 2024.

"As we strategically evolve into a leading digital infrastructure provider serving the region, we will continue to prioritize efficiency and value creation, employing a flexible, dynamic and forward-thinking approach to power Ooredoo's future growth," concluded Al Thani.

stc Group Drives Saudi Arabia's Digital Future, Delivering Highest-Ever Q3 Results

stc Group announced its financial results for the third quarter of 2024, achieving both its highest nine-month revenues and revenues to date. The company's revenue increased by 3.92% YoY, reaching SAR 56.627 billion while net profit for the period reached 11.233 billion, reflecting an increase of 11.9%.

Additionally, stc subsidiaries' revenue grew by 11%, contributing to the Group's record-breaking performance that exceeded market analysts' estimates.

Based on the approval of stc Group's General Assembly to sell a 51% stake in Telecommunication Towers Company (TAWAL) to the Public Investment Fund, the comparative figures for the previous periods were reclassified as discontinued operations in the interim condensed consolidated financial statements as of September 30, 2024. The material capital gain will be recognized after obtaining the necessary regulatory approvals and completing the transaction procedures.

Commitment to Enabling Digital Transformation
Olayan Alwetaid, stc Group's CEO, said, "stc Group is well positioned to continue its growth journey and maintain its leadership as the top digital enabler in the region. These outstanding results are a testament to the effective execution of the Group's strategy, which focuses on enhancing investment in infrastructure, growth in new technology sectors, and the activation of its efficiency program."

stc Group has continued its commitment to enabling digital transformation in various vital sectors in Saudi Arabia by investing in digital infrastructure such as 5G, fiber optics, and data centers. The Group continues to invest in advanced technologies like cloud computing, IoT, and fintech, while enhancing its cybersecurity capabilities.

stc also continued to strengthen its national strategic partnerships through mega projects in the Kingdom such as NEOM, Diriyah, New Murabba and the Red Sea. This reinforces the Group's commitment to enabling the realization of national objectives and continues to solidify its position as a key player in the global digital economy.

Mobily's Q3 2024: Growth Across All Streams, 58.2% Net Income Increase

Etihad Etisalat Company (Mobily), a leading Saudi Arabian telecommunications services provider, has announced its financial results for Q3 2024, demonstrating continued strategic achievements and sustained growth.

Due to its outstanding operational and financial performance, Mobily has achieved a remarkable growth in net income for the first nine months of 2024.

Q3 Financial Highlights
According to its published earnings release, the telco's revenue increased by 9.3% YoY to SAR 4,499 million, fueled by growth across all of the company's revenue streams. Additionally, Mobily's mobile subscribers increased to 11.7 million—9.8 million prepaid subscribers, and 1.9 million postpaid subscribers—while its FTTH subscribers reached 0.283 million.

Mobily's net income during Q3 2024 impressively surged by 58.2% YoY, reaching SAR 829 million, reflecting revenue growth, as well as a higher EBITDA (15.4%) and EBITDA margin (41%). The gross and operational profits of the company also experienced double-digit growth compared to last year's third quarter: SAR 2,566 million (10.7%) and SAR 960 million (48.7%), respectively.

During the current period, Mobily managed to reduce its debt portfolio by SAR 2.1 billion while also reducing its financing expenses by 9.2%. The company's CapEx reached SAR 471 million in Q3 2024, demonstrating a CapEx/revenue ratio of 8%.

These results reflect the company's successful ongoing investments in network development, 5G network expansion, Internet of Things (IoT) infrastructure, data centers, and submarine cables

Q3 Performance Highlights
Mobily achieved remarkable milestones during Q3 2024. These include the following:

- Obtained the local content certificate for the fifth consecutive year for supporting local content initiatives to strengthen the national economy
- Recognized for implementing best practices in terms of business continuity and resilience
- Signed a hosting agreement with Red Bull Mobile to monetize its existing infrastructure; tapping into a new customer segment, developing innovative solutions, and enhancing the digital economy
- Contributed to the development of the sports sector in the Kingdom via an agreement with MBC Media Solutions (MMS) to sponsor the live broadcast of the Saudi Pro League of Roshn

Human-AI Symbiosis: Strides Taken in Brain-Computer Interface Research

The pace of innovation in the digital realm is rapidly increasing, and so is the need and demand for powerful communication networks to match the dynamic hub of activity. Consequently, global telecom companies are coming together to leverage their network capabilities to cater to a wider, interconnected, global digital landscape.

The question in today's digital environment isn't whether change will happen, but when, as technological advancements now take place in a matter of days or weeks. Noticing these rapid developments, the MIT Sloan School of Management has identified four key values that are essential for today's evolving digital culture. These values include:

- **Speed:** Moving fast and experimenting rather than waiting to have all the answers before acting.
- **Impact:** Focusing on changing the world; not just making money.
- **Openness:** Engaging broadly with people who have the right insights and sharing information with others rather than hoarding it.
- **Autonomy:** Having the freedom to work within broad guidelines, rather than controlling action through formal authorization processes.

Symbiotic Synergy

Amidst these technological revolutions, driven by the aforementioned set of values, the development of Brain-Computer Interface (BCI) research is garnering significant interest in the tech industry. Brought to the spotlight by Elon Musk's Neuralink project, the proponents of this technology believe that, one day, paralyzed people will be able to move their limbs and visually impaired people will be able to see.

In essence, BCIs are devices that process brain activity and send signals to external software, allowing a user to control devices with their thoughts. Additionally, rehabilitation services could also adopt BCIs to accelerate recovery from injuries.

While this is a promising development in the medical field, technology enthusiasts are already envisioning how BCI research could be integrated into everyday activities. However, the full range of future BCI applications still requires further exploration.

Companies experimenting with the technology note that to make it a ubiquitous tool, the devices must be comfortable, intuitive, and reliable so that people can use them without being conscious of using them—somewhat like using a mouse or keyboard to interact with a computer. Interestingly, a recent report estimated that the global BCI market was worth USD 1.74 billion in 2022 and is expected to surge to USD 6.2 billion by 2030, growing at a compound annual growth rate of 17.5%.

BCI technology is presenting exciting opportunities across industries, particularly in how businesses engage with customers through intelligent automation and data-driven platforms. Companies like Neurable and NextMind are pioneering consumer BCIs that allow users to control devices and

digital interfaces with their thoughts, making customer experiences more intuitive and immersive. EMOTIV's neurofeedback tools are helping businesses enhance employee productivity and well-being by monitoring cognitive states like focus and relaxation. Meanwhile, Meta's acquisition of CTRL-labs highlights the push towards developing wearable BCIs, such as wristbands that detect brain signals to control digital commands. Together, these innovations signal a future where BCI technology seamlessly integrates with the digital economy, transforming both customer engagement and business operations.

Pioneering BCI
According to the World Economic Forum, the United States boasts 44% advancement in the domain, mostly backed by the U.S. Defense Advanced Research Projects Agency's (DARPA) million-dollar investments.

The U.S. DARPA has launched multiple initiatives, including the Next-Generation Nonsurgical Neurotechnology (N3) program, which is developing non-invasive BCIs to enable brain-machine communication for military service members. This program includes collaborations with Battelle and Carnegie Mellon University. The goal is to create neural interfaces that allow for precise communication with the brain without the need for surgical implants, aiming for applications that extend beyond military use.

Additionally, the Neural Engineering System Design (NESD) program focuses on restoring vision and hearing to injured service members through advanced BCIs. The U.S. Army's Combat Capabilities Development Command (DEVCOM) is also exploring BCI technologies for future military environments, including wearable exoskeletons and brain-to-brain communication.

Globally, China is rapidly advancing BCI research under the China Brain Project, which aligns its goals with military and civilian applications through a strategy known as military-civil fusion. China is leveraging BCIs for workforce monitoring and enhancing AI with human-machine collaboration.

Other countries, such as Germany, the Netherlands, and France, are also expanding their BCI research efforts, and emerging economies like India, Brazil, and South Africa are joining the space, with growing investment in neurotechnology development.

High-Bandwidth Communication
Many of the companies experimenting with BCI want to expand the use of implanted devices beyond cursor control and motor control to encompass vision and higher-bandwidth communication. For example, operating computer applications only by thought.

The ultimate goal in this scenario would be to develop a system that can interpret or translate the signals coming from the brain with a far greater level of accuracy to enable humans to communicate with computers and other electronic devices in a way that is seemingly straight out of a sci-fi film.

Several projects are pushing the boundaries of BCI technology beyond basic cursor and motor control. Notable examples include Neuralink, which aims to enable thought-controlled computer applications and cognitive enhancements; Synchron, which is developing brain implants for communication with digital devices; Kernel, which is focusing on non-invasive BCIs for cognitive and sensory improvements and Paradromics, which is working on high-bandwidth interfaces for complex interactions. Despite these advancements, experts believe that achieving fully integrated, thought-based control of computer applications and enhanced vision remains several decades away due to ongoing technological and safety challenges.

Ongoing studies show that BCI technology has the potential to transform numerous fields of study, including healthcare, smart environments, neuromarketing and advertising, neuro-ergonomics, security, education, games and entertainment, and so on.

Research is underway at several institutions exploring the use of BCIs for various applications. At the University of Pittsburgh, BCIs are being studied for stroke rehabilitation; UCLA is investigating how BCIs can control smart home systems; and Neuro-Insight is examining how brainwave data can provide insights for neuromarketing. MIT Media Lab is exploring BCIs for enhancing workplace efficiency, while Carnegie Mellon University is focusing on BCI-based authentication systems for security. Stanford University is investigating adaptive learning systems using BCIs, and the University of Tokyo is developing BCI-controlled gaming interfaces for immersive experiences.

Conducive Environment
In the UAE, the advancement in the digital economy and emerging technology applications is making groundbreaking strides. The commercial and economic potential of technologies such as AI, AR/VR, blockchain and their role in supporting sustainable development is actively being discussed through global ICT events and industry initiatives. It is only a matter of time before BCI will factor prominently in these discussions as a tool to empower digital economies and drive innovation in public and private sectors, generating interest from venture capitalist funding.

Aside from the timeframe, BCI holds tremendous opportunities across all aspects of industries and businesses, according to analysts. Engaging with customers through platforms that are driven by intelligent automation and data science will be the norm in the digital economy of the future.

Despite the bright prospects, the stark challenges surrounding BCI implementation include reliable connectivity, data input, security, design, robustness, low energy consumption and energy harvesting. The ability to quickly respond to rapidly changing realities and customer expectations shaped by BCI will be a decisive factor for the triumph of the ICT industry as a whole. **TR**
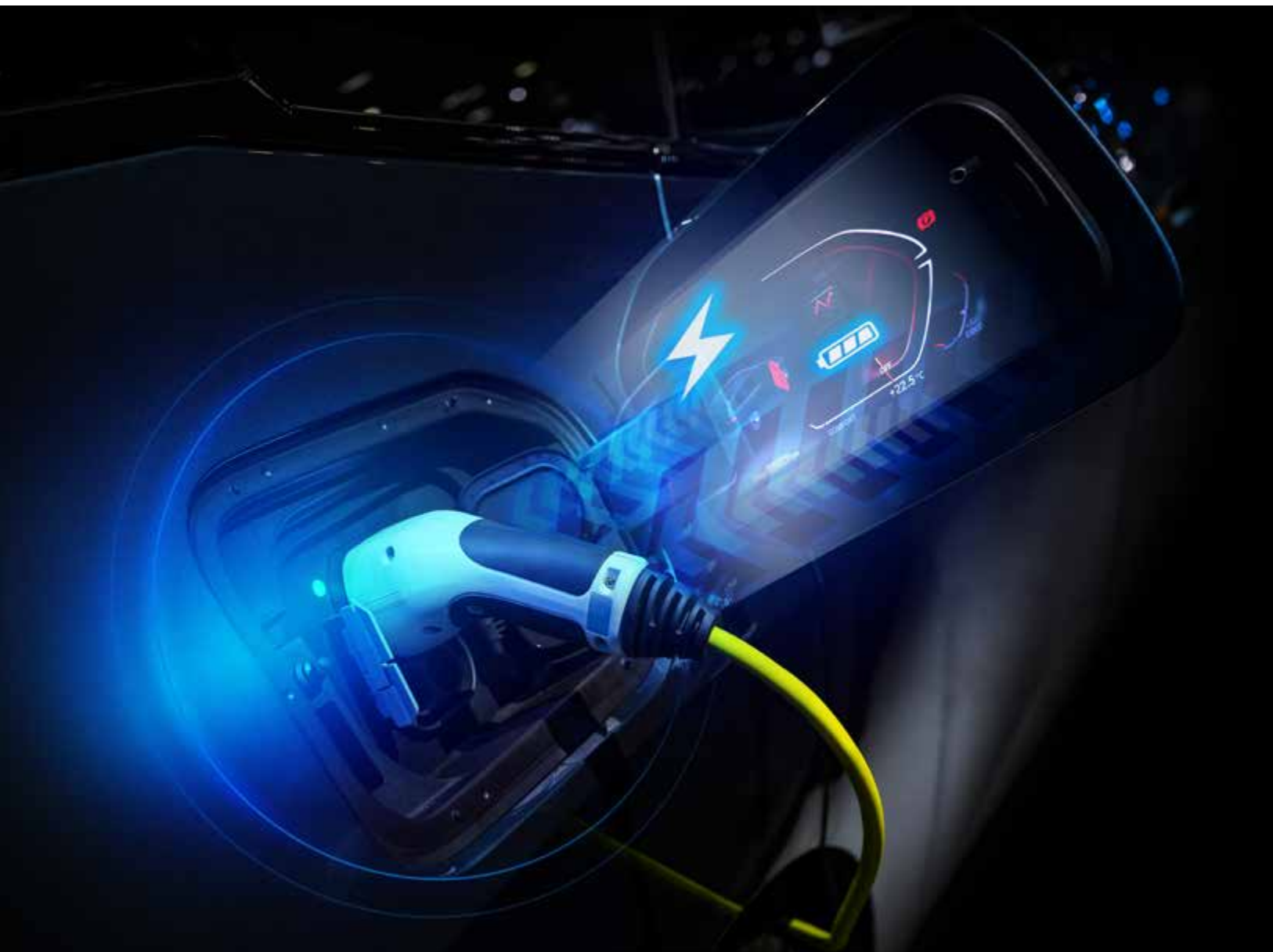
Can the Middle East Achieve its Ambitious EV Goals by 2030?

The Middle East is spearheading a transformative approach to 21st-century transportation, blending luxury, technology, and environmental impact. This collaborative effort among automakers, governments, businesses, and consumers aims to forge a sustainable future driven by electric vehicles (EVs).

Deloitte forecasts significant growth for the Middle-East EV market, projecting it to exceed USD 7 billion by 2028. This surge reflects a global trend towards cleaner mobility, bolstered by government incentives, stricter emissions standards, and heightened environmental consciousness.

Why Choose EVs?

According to the International Energy Agency (IEA), in the Middle East region, Jordan leads in electric car adoption, supported by favorable import duties, closely followed by the UAE. Arthur D. Little's 2023 Global Electric Mobility Readiness Index also ranked the UAE and Qatar among the top 10, demonstrating their dedication to e-mobility despite operational, financial and technological challenges.

Moreover, Middle-Eastern consumers favor EVs due to their futuristic designs, advanced mechanics, and cutting-edge digital features.

Acknowledging local preferences for sophistication in vehicles, manufacturers are innovating by integrating top-tier technology with artisanal craftsmanship. This approach ensures luxurious interiors, premium materials, and state-of-the-art infotainment systems, delivering an unparalleled driving and passenger experience.

Highlighting the environmental benefits is crucial to promoting EV adoption. With zero emissions, EVs contribute significantly to reducing air pollution and enhancing air quality. They also consume less energy than traditional vehicles, making strides in reducing greenhouse gas (GHG) emissions and combating climate change.

As global awareness of achieving Net Zero emissions by 2050 grows, the appeal and adoption of EVs continues to rise, marking a pivotal shift towards sustainable mobility in the Middle East and beyond.

A Key Component: EV Charging Infrastructure

In the Middle East, governments are actively developing a comprehensive network of charging stations to enhance the accessibility and convenience of EVs for drivers.

With this in mind, a robust charging infrastructure is indeed crucial for the widespread adoption of EVs.

For instance, by 2025, the Saudi Electric Vehicle Charging Infrastructure Development Initiative (SEVCIDI) and the Dubai Electricity and Water Authority (DEWA) will establish 50,000 and 1,000 charging stations in Saudi Arabia and Dubai, respectively.

Dubai has also implemented the Clean Energy Strategy 2050 and the Green Mobility Strategy 2030, which includes the EV Green Charger initiative, led by DEWA, which aims to expand the EV charging network and promote the use of electric and hybrid vehicles across the city.

To meet the rising demand for EV charging infrastructure and facilitate the shift to electric mobility, ADNOC and TAQA have also set an ambitious goal to install 70,000 EV charging points in Abu Dhabi by 2030.

Additionally, e& has launched the 'Charge&Go' network, anticipating an annual EV demand growth of 30% from 2022 to 2028.

On the other hand, Oman has mandated that all fuel stations across the sultanate must include EV charging stations as part of its green mobility initiative. The Gulf nation is actively advancing its green agenda in transportation, with plans to more than double the number of charging stations to 300 by 2025.

Similarly, Saudi Arabia's Electric Vehicle Infrastructure Company (EVIQ) is set to install over 5,000 chargers across the country, operating more than 1,000 stations by 2030.

In July 2024, Jordan celebrated the inauguration of its first fully electric vehicle charging station. To further support the EV industry in Jordan, Huawei and Kawar Energy have announced a partnership to install Huawei's advanced superchargers at Manaseer gas stations across the kingdom over the next two years.

The GCC Community Embraces EVs

The momentum behind the EV landscape is expanding across the GCC. Since the COVID-19 era, there has been positive traction in terms of investments and initiatives within the electrification sector. This closely aligns with long-term sustainability targets.

- **UAE**

According to the Dubai Water and Electricity Authority (DEWA), there were around 26,000 electric vehicles in Dubai by the end of December 2023. PwC estimates that across the UAE, EVs will have a market share of 25% (~110,500 vehicles) by 2035.

By 2050, the UAE Ministry of Energy and Infrastructure (MoEI) plans to ensure that 50% of all cars are electric. This ambitious prospect is supported by Dubai's own goal of having 42,000 EVs on its roads by 2030.

The adoption of electric vehicles (EVs) is pivotal to the UAE's transition to a low-carbon economy. As part of the UAE Energy Strategy 2050, the nation is combining renewable and nuclear energy sources to achieve carbon neutrality by mid-century.

At present, 20% of federal government vehicles have been converted to EVs, with targets set for at least 30% of public sector vehicles and 10% of all vehicles on the road to be electric or hybrid by 2030.

- **Oman**

By reducing pollution from the transport sector, which significantly accounts for greenhouse gas emissions, the country has been moving towards achieving carbon neutrality by 2050.

To achieve this, the Ministry of Transport, Communications and

Information Technology (MTCIT) is incentivizing EV manufacturing in the Duqm Special Economic Zone and has installed charging points across Oman.

Included in this roadmap is the introduction of an estimated 22,000 electric vehicles by 2030, up from a few hundred currently. Oman's first electric public bus will also hit the roads soon.

According to MTCIT Minister, Eng. Saeed bin Hamoud bin Saeed Al Mawali, a combination of technological advancements and efficient charging infrastructure will help drive the uptake of EVs in Oman going forward.

The first 'Made in Oman' electric SUV, May ALIVE 1, is set to roll out in late 2024 and is expected to attract strong interest, aligning with global EV demand.

• **Qatar**

Making progress in its plan to make all public transportation electric by 2030, Qatar's Ministry of Transport (MoT) has ensured that over 70% of public buses in the country are now electric. MoT has now set its sights on curating a fully electric fleet by 2030. Qatar also aims to transform 35% of all traditional cars to electric-centricity in the same time frame.

Hamad Ali Al Marri, Director of the Land Transport Licensing Department at MoT, said that the electric buses are supported by an integrated infrastructure that achieves multiple benefits; the most important of which is saving energy and fuel consumption, thus, improving the quality of life.

The MoT has also chalked out plans to test services for electric air taxis and delivery planes in early 2025. Hence, experts forecast that EV sales could make up 20% of the total auto market in Qatar by 2032.

• **Jordan**

Jordan stands as a true pioneer in electric mobility within the region, witnessing a remarkable surge in EV

adoption over the years. In this GCC country, EVs made up 66.5% of all car sales in Q1 2024.

As of August 2024, Jordan has over 120,000 electric vehicles on its roads, as announced by the Vice Chairman of the Free Zones Investors Authority. The Bus Rapid Transit (BRT) system will also add 15 e-buses by end of the year.

Tax exemptions on import and registration have fueled the growth, with 34,902 EVs cleared between January and November 2023, a 140% increase from the previous year.

The surge in EV sales in Jordan is a result of smart policies and forward-thinking incentives. These include the free customs tax for the first five years and the introduction of the Time of Use (TOU) electricity tariff. Since its launch in July 2024, this innovative scheme has made charging an EV at home more affordable during off-peak hours.

• **Saudi**

According to recent data by AlixPartners, seven out of 10 Saudi

residents (71%) revealed that they are most likely to purchase a battery-electric vehicle (BEV). If the trajectory remains on track, by 2030, 30% of all cars in Riyadh will be electric.

Saudi Arabia's Public Investment Fund (PIF), with assets of USD 700 billion, aims to produce 500,000 electric vehicles annually by 2030. To achieve this, the Kingdom has established strategic partnerships with major international companies, solidifying its position as a key player in the global EV industry.

This commitment extends beyond production to fostering an environment that encourages innovation in the EV sector. A major step in these efforts is the launch of CEER, Saudi Arabia's first local EV brand and original equipment manufacturer (OEM), a joint venture between PIF and Foxconn.

Saudi Arabia's concerted efforts to develop a thriving EV industry support two major Vision 2030 goals: promoting economic diversification and spurring global business expansion. **TR**

The Future of Hyperconnected Ecosystems

The race for technological supremacy is gaining momentum. Western superpowers have, thus far, reportedly funneled over USD 81 billion into developing next-generation semiconductors that can process AI applications to counter China's tech ambitions.

In a globalized world, when one government adopts a successful approach, others often follow suit, implementing and expanding these global best practices. It's no surprise, then, that government technology is expected to become the largest software market globally, projected to exceed USD 1 trillion by 2028, according to the World Economic Forum.

The Rise of Interconnection Highways
International communication has become the norm in today's economy. Subsea cable deployments and data center and internet exchange developments are on the upswing. In recent news, Amazon Web Services (AWS) announced plans to invest GBP 8 billion (USD 10.45 billion) over the next five years to build and operate data centers in the UK alone.

To ensure the efficient operation of data centers, a Global AI Infrastructure Investment Partnership (GAIIP) has been set up to invest USD 100 billion in new and expanded data centers to meet the growing demand for computing power. The investment will also be used to develop energy infrastructure to create new sources of power for these facilities.

Similarly, telecom operators, mobile operators, corporations, governments, content providers, and research labs all rely on submarine cables to exchange data around the world. As per TeleGeography, as of June 2024, there were over 600 active (and planned) submarine cables. Due to the constant change in new cables entering service and older cables being decommissioned, the exact number of active cables is difficult to ascertain.

Moreover, APIs (Application Programming Interfaces) are increasingly being considered the pillar of the economic paradigm (known as the API economy), enabled by both terrestrial and non-terrestrial connectivity. APIs are being used to integrate various network capabilities (functions and applications) across layers to deploy, manage and efficiently operate networks. Their utility has evolved to provide unprecedented connections and data exchange for a wide range of applications, independent of their platforms, data formats, or underlying technology.

For example, Nokia is pushing the boundaries of 5G with APIs, focusing on improving network automation and enabling real-time data exchange to support smart city applications and IoT devices.

Similarly, Ericsson is enhancing network capabilities by utilizing APIs to streamline access for developers and businesses, enabling them to integrate various services more effectively. This API strategy aligns with the broader global movement toward scaling network APIs, as seen in a telecom consortium's goal to implement scalable network APIs by 2025.

All stakeholders are dabbling with the emerging opportunities and risks and collaboratively pioneering solutions to jointly address strategic priorities. The integration of emerging technologies such as 5G, AI, blockchain, VR, AR, quantum computing, brain-computer interfaces, and biotech is driving

significant advancements across various sectors, including healthcare, finance, retail, and industry.

These interconnected technologies are transforming the digital landscape, unlocking new opportunities for innovation and efficiency. For example, in healthcare, AI and biotech are revolutionizing diagnostics and treatment options, while blockchain is enhancing data security. In finance, 5G and quantum computing is improving transaction speed and encryption, paving the way for smarter and faster digital services, all leading to boundless possibilities.

Feedback on Technological Advancement

It's a good time to reflect on the impact of these technological advancements from a global perspective. Despite the significant advancements brought about by digital transformation and the adoption of innovative technologies across sectors like healthcare and finance, challenges such as regional conflicts and geopolitical tensions continue to persist. For instance, while countries such as the UAE and Saudi Arabia have made significant strides in developing smart cities and enhancing digital infrastructures, ongoing geopolitical tensions in the region—such as conflicts in Syria and Yemen—have hindered broader, region-wide technological advancements.

These issues are impacting global stability, making it difficult for economies to fully benefit from these technological strides. Geopolitical divides influence trade, data security, supply chain disruptions, and the global market, often causing setbacks in international collaboration and technological adoption. As a result, while we see progress in many areas, these ongoing conflicts remind us that technological solutions alone cannot resolve deep-seated geopolitical challenges.

In addition to technological and economic challenges, global issues such as nuclear threats, climate change, inequality, injustice, discrimination, racism, poverty, and hunger remain significant barriers to achieving sustainable development goals (SDGs).

The negative effects of digitalization are also crippling businesses through various cybersecurity threats. Recently, a mobile application known as Ghost was busted by Australian police due to the presence of nefarious activities. Ghost—an app like WhatsApp—was used by criminals to facilitate drug deals and plan assassinations. Law enforcement authorities have struggled to tackle encrypted apps operating on hidden criminal networks hosted in "hidden servers" across the globe. The coordinator of the operation—Europol—maintained that the app had several thousand users worldwide with around 1,000 messages being exchanged each day.

The topic of AI is central to this conversation, especially with the rise of generative AI (GenAI). We are now in an era where generative AI, driven by large language models (LLMs), plays a crucial role in tasks such as data analysis and pattern recognition. However, these models remain vulnerable to "blind spots," as they rely on both open and classified data sets that can lead to inaccuracies, biases, or incomplete outputs.

Notably, it is the development of 'transformative artificial intelligence' (TAI) that could lead to entirely new technological hazards, opine experts. TAI, based on reinforcement learning, may enhance our ability to perceive, reason, and act in the world, leading to radical changes in societal domains.

Fundamentally, the key problem with TAI is value misalignment; as objectives cannot be hard-coded, TAI is difficult to align perfectly with human values. TAI is broadly defined as the development of machines capable of developing human-level performance with the potential to bring about irreversible changes in welfare and wealth systems. However, there is no consensus as to when we will see human-level performance by AI as some believe it could be a few years away and some say it could be decades away. Since technological forecasts have historically been inaccurate for obvious reasons, the only remedy in such instances of uncertainty is to be prepared and aware of its impact.

The Importance of a Forward-Looking Vision

UN studies have found that current governance frameworks are inadequate to effectively address existential risks, particularly those arising from technological advancements. These structures are not "fit-for-purpose" in managing the complexities and challenges posed by rapidly evolving technologies, leaving gaps in the ability to mitigate threats on a global scale. Hence, in an increasingly cross-border network communication ecosystem, it becomes imperative that individual countries take full ownership of global risks by strengthening governance structures to be reactive rather than proactive, focusing not only on specific risks but also on the broader existential risks.

Coinciding with the UN Summit of the Future, which will be held this month in New York, a recent report by the Dubai Future Foundation (DFF) entitled "The Future of Progress" highlighted the need for a new global measurement of national success that goes beyond the traditional concept of gross domestic product (GDP) as adopted some 80 years ago.

It maintains that "swift advances in technology and the emergence of global imperatives such as climate change and social development needs have exposed limitations in GDP as a measure of prosperity." In addition, the need to maintain a utopian perspective of technological progress rather than a dystopian perspective plagued by existential threats is vital for the future generation as well as the ICT industry as a whole.

It is in the industry's best interest to support the United Nations Summit of the Future in achieving its five sustainable development goals. These goals encompass financing; peace and security; science, technology, and innovation; youth and future generations; and the transformation of global governance. The future of the interconnected ecosystem should be firmly grounded upon these pillars and guided by the ethics of technology. **TR**

Making Intelligence Ubiquitous: F5.5G, All-Optical 10 Gbps and Premium Transmission Network

Looking back on the history of the optical industry, we can clearly see that service changes are the driving force behind its innovation and development and the continuous upgrade of optical technology is accelerating service development.

Since 2009, due to the rapid popularization of video services, fiber has become increasingly popular, and copper has declined in home networks. 100 Mbps FTTH optical access has become a necessity for home broadband, driving OTN transmission networks from 10G to 100G.

Around 2018, as 4K HD video, short video, and smart home services grew rapidly, users were willing to pay for better Wi-Fi and wired networks. This drove the upgrade of home broadband to Gbps and the fast growth of home networking services.

Premium enterprise private lines made OTN transmission networks more than just customer bearer networks; it also made them service networks. To date, the number of global gigabit users has exceeded 200 million, the number of FTTR users has exceeded 20 million, OTN transmission networks have been upgraded to 400G on a large scale, and the extension of all-optical nodes from OTN transmission networks to network edges has gradually become the norm among global operators.

Looking to the next decade, the most important change in the ICT industry will be intelligence. According to predictions from related organizations, the compound annual growth rate (CAGR) of global intelligence-related investment will reach 26.9%, and intelligence will be leveraged by enterprises, households, and individuals.

Additionally, leading internet enterprises will compete to implement AI foundational models; government agencies and financial institutions will deploy intelligence in their activities, including in disaster prediction, public security, financial risk control, and marketing; and vertical industries, such as the manufacturing and electric power industries, will also begin to explore AI applications.

At the individual level, intelligent services such as robots, AI assistants, cloud esports, cloud computers, and smart homes will provide novel interactive experiences in the realms of entertainment and life, while traditional living spaces will become smarter.

In the intelligent era, the optical industry will be faced with the challenge of enabling people to utilize intelligence as easily and freely as electricity. We believe that an F5.5G, all-optical 10 Gbps and premium transmission capability target network must be built to do so. The 10 Gbps intelligent access network provides ubiquitous and ultra-broadband 10 Gbps bandwidth, enabling users to experience intelligent services anytime, anywhere. The premium transmission network provides high-quality connections to address computing requirements and satisfies the high-quality connection requirements of distributed data center architectures.

Nokia Projects Massive 5G Growth in the MEA Region

By 2029, 5G network subscriptions are set to reach 519 million, representing 23% of all mobile connections, according to Nokia's latest study.

The Finnish telecommunications vendor predicts that 5G network technology will drive 48% of the total data traffic.

Mikko Lavanti, Senior Vice President of Mobile Networks at Nokia, underscored the relentless growth of 5G, stating, "The adoption of 5G is increasingly important for countries across the MEA to meet the rising demand for data services."

GCC Leading the 5G Growth
The Gulf Cooperation Council (GCC) region is expected to be at the forefront of 5G's rapid expansion, with 90% of mobile subscriptions predicted to be on 5G networks within the next five years.

The region's growth is largely attributed to the significant contribution and support of Saudi abia and the United Arab Emirates in 5G investments and infrastructure development to accelerate the adoption of the latest advancements in connectivity.

5G in FWA Solutions
The 5G network is also expected to drive the rapid adoption of Fixed Wireless Access (FWA) technology, surging to 38% by 2029, a substantial increase from its previous 11% record.

Commenting on the significance of 5G in monetization, Lavanti said, "This transition accelerates digital transformation while allowing communications service providers (CSPs) to unlock new revenue opportunities. Nokia's services empower CSPs to maximize the potential of their networks, delivering advanced connectivity solutions critical for the region's development."

Nokia's forecast of the 5G surge reflects the global efforts in developing, deploying, and adopting modern innovations to enhance the overall user experience, drive business growth, and accelerate digital transformation.

NEC, Cisco Unveil Private 5G Solution for Enterprise Customers

NEC Corporation, a leader in IT and network technologies integration, and Cisco, a global network and security solutions provider, recently launched a groundbreaking private 5G solution for enterprise customers.

The strategic partnership merges NEC's expertise in wireless networks and systems integration with Cisco's 5G Standalone (5G SA) Core and Cloud Control Centre technologies.

Moreover, NEC's validated radio network and systems integration services enable the innovative solution to be market-ready.

Hideyuki Ogata, Senior Executive Professional, Global Network Division at NEC, stated, "The needs for modernized architecture in 5G have steadily enhanced our partnership with Cisco, leading us to this next level."

Advancing Enterprise Connectivity
The new cutting-edge solution, launching in Europe and the Middle East, will play a vital role in implementing, maintaining, and supporting private 5G networks for enterprise customers. This support will be offered directly or through partnerships with global service providers.

NEC has established a demonstration facility and lab where customers can evaluate the end-to-end solution and validate it for various use cases.

This move aims to support digital transformation in enterprises and advance business operations in industries, including logistics, warehousing, event venues, airport management, and operation.

"The industry-leading solutions from Cisco and our ecosystem partners, combined with our world-class network integration capabilities, enable us to deliver compelling solutions to multiple operators and verticals across the world," Ogata added.

Masum Mir, Cisco's Senior Vice President and General Manager for Provider Mobility, emphasized the need for both NEC and Cisco's combined strengths to deliver cutting-edge private 5G solutions to enterprises worldwide. "Together with NEC, we are creating a powerful force to drive digital transformation and innovation across multiple sectors, and support the critical changes needed in networking infrastructure to carry the internet into the next decade," he said.

Netcracker: Leveraging AI to Accelerate Global Innovation

Andrew Feinberg, Chairman and Chief Executive Officer of Netcracker Technology, a leading provider of digital and cloud transformation services for telecom operators, delivered a keynote on 'Harnessing the Power of Artificial Intelligence (AI) to Benefit Society' at GITEX GLOBAL 2024.

The keynote underscored Netcracker's innovative use of AI in mitigating data chaos and delivering positive transformation across various industries.

Netcracker provides innovative solutions to various sectors, handling vast amounts of heterogeneous data. By utilizing AI training algorithms, the company delivers ultra-personalized recommendations.

In relation to the telecom sector, Feinberg highlighted how Netcracker delivers the right service, to the right customer, at the right time. The result? Customized customer journeys and dynamic bandwidth allocation for Internet of Things (IoT) devices.

Leveraging AI in Healthcare
Feinberg highlighted how BostonGene—a biotechnology company specializing in advanced computational biology, where he serves as the President and CEO—is leveraging AI in healthcare.

Utilizing AI-powered solutions for accelerating precision oncology and advancing patient care, BostonGene personalizes each treatment for every cancer patient and accelerates drug development. In addition, the biotech company personalizes cancer therapies by examining the patient's unique biology, immune system, and tumor features, enabling pharmaceutical companies to uncover the causes of cancers and identify new drug targets.

This innovative solution can predict the type of treatment best suited for each patient, saving time, reducing costs, and cutting down trial-and-error efforts, marking a significant reduction in cancer's economic impact, which is expected to reach over a trillion dollars every year.

Combining detailed AI analysis and data integration, this technology identifies each cancer's vulnerabilities, revolutionizing precision medicine in healthcare.

Furthermore, a 'digital profile' is established, representing individuality which provides precise diagnosis and treatment recommendations.

Feinberg emphasized that processing petabytes is only possible with sophisticated AI technology, making it crucial in saving lives.

Ericsson Q3 2024: 'A Period of Laser-Focus on Execution of Strategic Plan'

Ericsson revealed that is has returned to profitability in the third quarter as a big contract with U.S. carrier, AT&T, boosted the Swedish telecommunications giant's share price.

There has also been increasing customer momentum in programmable networks that deliver differentiated performance, supported by the joint venture (JV) announced between twelve of the world's largest telecom operators.

Ericsson posted a net profit of SEK 3.9 billion (USD 374 million) in the quarter after a loss of SEK 30.5 billion over the same period last year. Last year's loss was reportedly due to a write-down on the value of its purchase of U.S. cloud-based communications operator, Vonage.

Additionally, Ericsson posted an overall sales revenue of SEK 61.8 billion in the third quarter, down 4% from last year.

Both profit and sales revenue were slightly higher than forecasts by analysts surveyed by Bloomberg.

"Our Q3 results demonstrate our progress, with strong gross margin expansion and free cash flow, benefiting from our commercial discipline and operational efficiency actions," noted Börje Ekholm, Ericsson President and CEO.

"While the market development is ultimately in the hands of our customers, we are working to deliver operational excellence regardless of market conditions," he continued.

Ericsson's sales in its 'Networks' segment are expected to stabilize year-over-year during Q4, driven by continued good growth in North America. However, further near-term sales pressure in the 'Enterprise' segment is anticipated as the telco shifts its focus to more "profitable segments."

"We launched a new private 5G enterprise product portfolio in Q3 to support performance improvement, which remains a key priority," pointed out Ekholm.

In the MEA region, stc Group and Ericsson achieved a groundbreaking milestone during Q3 2024 by deploying the world's first implementation of Automated Radio Resource Partitioning (RRP) on a 5G standalone (5G SA) network slice.

Moreover, Ericsson announced a plan to deploy its cutting-edge artificial intelligence and machine learning (AI/ML) solutions to significantly reduce energy consumption across Umniah's network operations in Jordan.

Strategic Leadership Transition at MYCOM OSI

MYCOM OSI has announced the appointment of Charles Bligh as its new Chief Executive Officer (CEO), succeeding Andrew Coll, who will transition to the role of Chairman of the Board.

Charles Bligh, the new CEO of MYCOM OSI, is a seasoned senior leader and brings over 30 years of experience within senior leadership roles in the IT and telecoms industry globally. He has led multiple global teams at IBM for over 20 years across the IT services, software and technology niches.

"I am excited to take on the role of CEO at MYCOM OSI, a global software company with innovation at its core for over 25 years. As mobile and fixed CSPs face increasing pressure to reduce operational costs, improve customer experience while introducing new services, delivering value with our advanced automation, analytics and AI software will continue to be MYCOM OSI's mission. I look forward to leading the company as we invest in our industry-leading software to significantly grow the business," commented Bligh.

Previously, he also served as the main Board Director and COO of the UK service provider, TalkTalk, where he was responsible for the teams supporting the consumer, B2B and wholesale customer avenues. Bligh also managed the IT/network operations.

At MYCOM OSI, Bligh will spearhead innovative strategies to deliver growth and empower CSPs to excel in an intense, competitive market.

Over the last five years, Andrew Coll has successfully led MYCOM OSI's heavy investment in a new SaaS platform, as well as its launch of a range of AI, GenAI and automation applications and solutions tailored to support large CSP networks. This positions the business favorably as it enters its next phase of innovation and growth.

"We are a leading and award-winning independent provider of SaaS applications to CSPs globally. I am confident that under Charles' leadership, MYCOM OSI will continue to drive innovation, focus on delivering exceptional customer value and building deep customer partnerships for the future," Coll expressed.

Insulating Telco Partnerships

Global digital transformation is sweeping across public and private organizations, both of which are leveraging emerging technologies such as 5G, cloud, edge computing, AI/ML and automation, among others, to transform their operations. Therefore, telcos must consider a range of factors, ensuring they align with their growth strategies, before signing the dotted lines.

"I believe that service providers are in a unique position to drive the transformation in their own infrastructure, as well as be an enabler and a catalyst for [the] private and public sector," notes Zayan Sadek, Regional Director, MEA Service Provider, Cisco Systems.

Carefully constructed service level agreements (SLAs) and KPIs in telecom expense management are crucial. While SLAs clearly define responsibilities, metrics, and expectations between customers and vendors, KPIs are the metrics that customers and service providers agree upon to measure the vendors' deliverables. These agreements ultimately become binding contracts between CSPs and vendors and are continuously impacted by impulsive demand, inflation, interest rate hikes, supply chain disruptions and currency fluctuations. Operators need to manage contract agreements and liaise with various parties like suppliers, customers, property lessors, agencies, and more to generate maximum business value from their technology investments. The importance of a well-rounded contract cannot be overlooked when striving for success in new-market environments brought about by today's digital and intelligent transformation.

In a dynamic and volatile economic environment, maintaining stable partner policies, fostering healthy and mutually beneficial relationships and ensuring that partners gain real benefits is extremely important. In a recent GlobalData report, deal activity in the Middle East and Africa fell 10.4% in the first eight months of 2024 amid challenging economic conditions. Meanwhile, North America recorded an 18.9% YoY decline, while Europe, the Asia Pacific and South and Central America reported a fall of 16.2%, 8.1% and 27.3%, respectively. Overall, global deal activity fell 15% year-on-year (YoY) to 32,050 deals and the volume of mergers and acquisitions (M&A) fell 9.5% YoY.

However, given the recent lowering of interest rates by the US Federal Reserve after two years, an increase in economic activities is expected as lower interest rates boost cheaper borrowings, potentially encouraging more investment into riskier asset classes, including startups.

Mutual Value Creation

To form a successful and fruitful partnership, mutual value creation plays an important role. To achieve this, both parties must engage in discussions that clarify the areas of value creation to foster digital resiliency and innovative strategies.

For example, e& and du—the two major network operators in UAE—offer TV and broadband services in the UAE by bundling TV, internet, mobile and landline services in addition to their core network connectivity business. By pushing the boundaries of technology, e& and du aim to empower millions of people with innovative solutions and support the UAE's well-defined vision for digital transformation.

In such pursuits, performance-based, revenue-sharing models can benefit both parties involved. In addition, exploring joint investment opportunities can foster mutual interest in the success of specific projects that can strengthen the bond. For instance, evision—the media and entertainment streaming arm of e& life—solidified its entertainment offerings by signing multi-year deals with major studios including Sony Pictures Television and Amazon MGM, bringing the latest blockbusters, renowned classics, and family favorites from both cinema and television to the STARZPLAY, eLife and Switch TV platforms.

Similarly, du partnered with Arabic streaming platform, Shahid, to broaden access to a diverse array of content for home and mobile customers, resulting in a mutually viable growth environment.

Ooredoo, a leading telecom operator in Qatar, partnered with beIN Media Group to offer exclusive sports and entertainment content to its customers.

Zain, a telecom company operating in several Middle Eastern and African markets, teamed up with streaming platform iflix to offer customers access to a vast library of TV shows, movies, and original content.

Omantel partnered with OSN, a regional entertainment network, to provide customers with access to OSN's extensive lineup of international and Arabic content via Omantel's platforms.

Moreover, Juniper Research predicts that revenue generated by operators from roaming IoT devices will double over the years to reach USD 2.2 billion in 2029.

Operators in both host and foreign countries can become mutual beneficiaries of international mobile roaming services by partnering with specialized solution providers to enable use cases requiring enhanced connectivity to deliver "mission-critical" services.

Willingness to Continually Reassess

By regularly reviewing KPIs, financial performance, and SLAs, partners can keep the relationship on track. Agreeing on operational flexibility to allow for scaling up or down as market conditions change must be underscored. Commenting on the importance of operational flexibility in 2022, Red Hat's Sales Director for Telco and Service Providers, Ayhem Alzaaim, said, "One of the key messages this year is around flexibility."

He further explained that "Over the coming two to three years, much of the telco industry growth areas will be coming through partnerships with enterprises and other sectors. Telcos and service providers must ready themselves through their digital transformation programs to ensure that they have the capability and the technology to support their business and address that requirement." Fast-forward to 2024, and Alzaaim's analysis remains spot on and just as relevant.

Companies' willingness to make changes in their respective modus operandi must be based on the principle of shared benefits.

Telecom companies are under constant pressure and scrutiny when it comes

to managing the data privacy of customers, especially considering the increase in cybersecurity breaches. Partner companies must be flexible in complying with the evolving and volatile data privacy policies of different governments in tandem with the overarching General Data Privacy Regulation (GDPR) Regulation, which governs the existing global standard.

In Kuwait, the Communications and Information Technology Regulatory Authority (CITRA) has drafted the country's first comprehensive data privacy protection regulation, while Saudi Arabia has also made significant strides with the implementation of a comprehensive personal data protection system, following the issuance of Royal Decree No. (M/19) and subsequent amendments to Royal Decree (M/148). Additionally, the Dubai International Financial Centre (DIFC) enacted the MEASA region's first AI personal data regulation, further solidifying the commitment to data protection in the digital age.

Eye on the Future
Telecom companies are not well known for their management of sustainability agendas. The EY Global Climate Risk Disclosure Barometer noted that 43% of telecom and technology companies have not yet disclosed a specific Net Zero, transition or decarbonization strategy.

Telecom companies will need to focus on ESG performance, particularly in areas like implementing green technologies, improving waste management and reduction, helping to bridge the digital divide, and addressing ethical considerations in technology. These efforts will be crucial for attracting long-term investments.

According to an EY Sustainable Valuation study, 53% of telecom executives identified the existence of multiple, competing climate change initiatives, rather than a unified strategy, as the biggest obstacle to achieving sustainability goals. Telecom companies must do their best to associate with partners who

will support their sustainability goals holistically.

Additionally, emerging technologies are rapidly gaining traction and disrupting existing market trends, as well as developing multi-operator connectivity platforms for the IoT market, AI-driven automation of 5G deployments, and blockchain-based 5G networks. Telecom services providers need to carefully align their R&D strategies with equipment makers, software companies, and cloud providers to come up with differentiated service offerings through resilient agreements.

Leadership at the Helm
Disputes between two parties arise due to sheer miscommunication and create friction in long-term partnerships. Ensuring alignment in strategic objectives and company culture warrants strong communication channels to resolve issues proactively and maintain a cooperative relationship.

A good communicator who can set clear and realistic expectations and deliverables, including contracts, schedules, budget, and resource details amongst stakeholders is crucial. The company must implement a clear chain of command for reporting and authorization to ensure accuracy and accountability.

A striking example of this practice can be seen in Zain Kuwait's recent appointment of Nawaf Al-Gharabally as its new CEO, where his leadership strategy will focus on building upon the company's strong foundations.

In addition, a firm grasp of the dynamics of emerging technologies and the supply chain ecosystem will provide an advantage in drafting practical outcomes and expectations for the parties involved.

Studies show that enterprises are more open to buying from telcos with ecosystem awareness and capabilities. Ambiguous communication relating to return on investment (ROI), traditional growth methods, and cybersecurity concerns will become the greatest drawbacks for telcos if left unaddressed.

In Conclusion
For all the opportunities that come with digital transformation, enormous challenges arise side by side, including competitive, regulatory, financial, environmental, as well as technological challenges. Collaboration with the right partners is key to overcoming all these obstacles, however, above all, a trusted and transparent understanding based on mutual equitability will go a long way in harnessing the promising technological future. **TR**

China Launches Pilot for Foreign-Owned Data Centers

The Chinese government has launched a pilot project allowing foreign investors to operate data centers within the country.

The Ministry of Industry and Information Technology's initiative will establish specific zones where foreign-owned facilities can offer digital infrastructure services to local companies.

Jin Zhuanglong, the Minister of Industry and Information Technology, noted that the pilot program represents a new phase in China's efforts to open up the telecommunications sector.

Previously, foreign investors faced restrictions on owning and operating data centers in China, with local regulations limiting ownership to domestic companies. Foreign firms were only allowed to participate through joint ventures with local partners, with ownership capped at 50% in any consortium.

The project will permit foreign investors to invest in value-added telecom services within four specified regions: Beijing, Shanghai, Hainan, and Shenzhen. Businesses in these designated areas can operate as wholly-owned ventures, providing data and transaction processing services.

Wang Zhiqin, Deputy Director of the China Academy of Information and Communications Technology, stated that the pilot program aims to enhance the integration of digital technologies across various sectors nationwide.

The project is part of China's broader efforts to open up its services sector, including establishing free trade zones like the 120-square-kilometer Lin-gang Special Area.

Broadband Race: U.S. States with the Biggest Gains and Gaps

Many U.S. states have struggled to make broadband service available to 100% of their residents, mainly because service providers are focused on providing it to areas where it's most profitable.

Using Ookla's Speedtest Intelligence® data, the U.S. states that are currently delivering the minimum standard for fixed broadband speeds have been identified.

As mandated by the FCC, the minimum standard for fixed broadband is a100 Mbps download speed and a 20 Mbps upload speed.

Well-Performing U.S. States
According to Ookla's H1 2024 findings, Connecticut, North Dakota, Delaware and six other states are the top performing states, with the highest percentage of Speedtest users that meet the FCC's minimum standard for fixed broadband speeds.

In Connecticut, 65.8% of Speedtest users now meet the minimum broadband standard set by the FCC. However, this figure highlights the ongoing need for improvement across states.

Over the first half of 2023 to the first half of 2024, New Mexico, Arizona, and Minnesota experienced the most significant increase in Speedtest users meeting the FCC's minimum broadband speeds.

New Mexico leads the rest of the states with its gains in broadband over the past year, demonstrating a 50% increase in the percentage of its population with access to the FCC's minimum broadband speeds. Arizona also saw a 45% jump, driven by the continuous fiber deployments in the area.

NTRA and CPA Unite for Enhanced Telecom Protection

The National Telecom Regulatory Authority (NTRA) and the Consumer Protection Agency (CPA) have entered a cooperation protocol aimed to enhance the protection of telecom users' rights. This agreement establishes frameworks for coordination and collaboration in this area and facilitates the exchange of information on topics of mutual interest.

This initiative is part of broader efforts to promote collaboration among organizations committed to safeguarding user rights and improving service efficiency in Egypt's telecom market. The goal is to create a comprehensive system for automating complaint processing, ensuring timely responses, enhancing transparency, and supporting digital transformation, all while striving to provide a user experience that meets global standards.

As part of this cooperation, a joint digital platform will be launched for complaints related to telecom services. This platform will feature an automated system to streamline the exchange of complaint data, maintain a database of complaints received by the CPA, and provide a digital interface for submitting complaints. The aim is to simplify and expedite the resolution of user complaints.

The protocol also outlines a framework for addressing practices that may compromise the protection of telecom users' rights. This includes developing an action plan to educate users about their rights and responsibilities in the telecom sector, fostering a culture of governance and development, and forming a joint executive committee to oversee the implementation of shared responsibilities and establish effective mechanisms and procedures.

Zambia Enforces ICT Regulations to Curb Cybercrime and Restore Confidence

The Zambian government has officially signed the Information and Communication Technology Association of Zambia (ICTAZ) Statutory Instrument Act of 2018. This legislation establishes general regulations and professional ethics aimed at bringing greater structure and accountability to the ICT sector.

Felix Mutati, the Minister of Technology and Science, emphasized that this move is intended to "restore order and sanity" in a sector increasingly affected by cybercrimes and imposters. He expressed optimism that the statutory instrument (SI) would help eliminate disruptive elements within the industry and rebuild public trust. "I'm hopeful this SI will eliminate industry trolls and restore public confidence," the minister noted, reaffirming the government's commitment to reestablishing order, a key factor in fostering economic growth.

Percy Chinyama, National Coordinator of SMART Zambia Institute, underscored the significance of registering all ICT professionals. He also raised concerns about the growing negativity on social media, where insults and impunity have become widespread. "The culture displayed on social media does not reflect who we are as a people. We can no longer ignore this, as it reflects poorly on our country," Chinyama remarked, calling for a cultural shift in online behavior.

Japanese Tech Giants Collaborate on Beyond 5G/6G Innovations

NTT Corporation, KDDI Corporation, KDDI Research, Inc., Fujitsu Limited, NEC Corporation, and Rakuten Mobile, Inc. have been selected by the National Institute of Information and Communications Technology (NICT) in Japan to conduct new research into innovations beyond 5G and 6G.

This research is part of a strategic program focused on social implementation and overseas expansion for the Innovative ICT Fund Projects for Beyond 5G/6G. The goal of this research is to develop technology that allows users to utilize multiple cloud data centers simultaneously and switch connection destinations flexibly.

This technology will also ensure fault tolerance and service quality through cooperation with the All-Photonics Networks (APN) of multiple providers. Additionally, a small APN node will be developed to enable APN deployment at rural data centers and small- to medium-sized sites.

APNs: Meeting Capacity and Processing Demands

In the era beyond 5G/6G, there will be a need for increased information processing and transmission capacity. APNs are becoming more important to meet these demands and provide lower power consumption for carbon neutrality.

Discussions on providing APNs widely to society have been ongoing, leading to the need for technology that can connect multiple sites simultaneously and collaborate among providers. To address these needs, NICT solicited proposals for the Beyond 5G/6G Fund Project, to which NTT, KDDI, Fujitsu, NEC, and Rakuten Mobile submitted joint proposals. These companies were selected to implement the program and will focus on developing APNs that can cooperate among providers, ensure fault tolerance, and enable flexible connection switching.

Mexico Is the Second Most Cyber-Attacked Country in Latin America

Mexico has secured the 42nd position in the Global Cybersecurity Index (NCSI) and stands as the second most cyber-attacked country in Latin America.

This region is experiencing a high incidence of phishing scams primarily targeting users engaged in commercial transactions.

According to a study by Trend Micro, phishing threats are on the rise in Latin America, driven by banking trojans like Mekotio, BBTok, and Grandoreiro.

These malware variants are designed to steal confidential banking credentials, facilitating unauthorized transactions through sophisticated tactics that deceive victims by simulating legitimate communications about fake speeding fines or criminal complaints, prompting victims to act quickly and click on dangerous links without proper prior analysis.

"Cybercriminals behind banking malware are reported to use embedded links in emails that direct recipients to fake commercial websites where they are invited to download files containing malware. The introduction of trojans in malicious PDF and ZIP files downloaded onto target machines remains an effective way to infect victims," noted Sergio Navarro, IQSEC's Director of Pre-Sales.

Vulnerable Sectors

According to the same report, the most vulnerable companies to these attacks are in the manufacturing sector, accounting for 26% of attacks, followed by retail at 18%, and the technology and financial sectors with 16% and 8% of attacks respectively.

Bangladesh Fines Grameenphone, Robi, and Banglalink for SMS Violations

Bangladesh's telecom regulator has reportedly imposed fines on mobile operators Grameenphone, Robi Axiata (Robi), and Banglalink for violating promotional SMS regulations, despite the companies arguing that these rules are overly restrictive and impractical.

The Bangladesh Telecommunication Regulatory Commission (BTRC) has imposed a BDT 15 lakh fine on Grameenphone, Robi, and Banglalink for violating industry regulations, with each operator required to pay BDT 5 lakh for exceeding the limit of three promotional SMSs per day, a breach of a directive issued last year regarding data and related packages.

The decision to penalize Grameenphone, Robi, and Banglalink comes after months of disputes between the BTRC and the operators regarding promotional SMS regulations.

The BTRC contends that exceeding three promotional SMSs daily can mentally harass customers and tarnishes the regulator's reputation. In contrast, the operators argue that sending more than three SMSs is essential, as the delivery rate is below 70% due to issues such as handset limitations and inactive SIM cards. They emphasize that exceeding this limit is crucial for effective communication with customers about new products, services, and AI-driven personalized offers.

The BTRC first warned Grameenphone in late October last year, requesting an explanation in April for the need to send more than three SMSs per day. In its response, Grameenphone noted that the average SMS delivery rate per customer is around 68% due to system limitations and handset issues, with the rate dropping to as low as 30% for churned or inactive customers. Therefore, to ensure that at least three SMSs are successfully delivered, the operator explained that it must send more than three.

The BTRC similarly cautioned Banglalink last year and sought an explanation in May. The operator acknowledged the technical challenges but emphasized that it had implemented measures to limit daily promotional SMS distribution.

Europe's Smart Home Market to Reach 42% Penetration by 2028

The European smart home market is on a steady growth trajectory, with the number of smart homes reaching 65.5 million by the end of 2023, representing 28% of households, according to a new research report by IoT analyst firm, Berg Insight.

Although still behind North America in terms of penetration and market maturity, Europe is rapidly catching up. By 2028, the number of smart homes in Europe will reach 101.2 million, achieving a market penetration of nearly 42%.

This growth is driven by increasing consumer demand for smart home products such as thermostats, security systems, lighting solutions, and entertainment devices.

Market Overview: Growth Projections and Revenue

In 2023, 218.2 million smart home systems were used across the EU27+3 countries, including 28.9 million multifunction or whole-home systems and 189.3-million-point solutions. With overlaps accounted for, this translates to 65.5 million smart homes. The market is expected to grow at a compound annual growth rate (CAGR) of 9.1% over the next five years. Additionally, market revenues reached EUR 36.2 billion (USD 39.1 billion) in 2023, and are forecast to grow at a 12.5% CAGR, reaching EUR 65.0 billion (USD 70.3 billion) by 2028.

EC Launches EUR 1.4 Billion Deep-Tech Initiative

The European Commission (EC) is intensifying efforts to foster innovation among deep-tech startups with the launch of a EUR 1.4 billion funding initiative, which will also engage external investors and ecosystem participants.

This funding announcement follows the introduction of a new agenda, which aims to connect European startups with technology investors.

In its statement, the EC outlined plans to allocate this funding in 2025 via the European Innovation Council (EIC), a division focused on maximizing the economic potential of startups.

EIC 2025 Work Program
The new funding initiatives form part of the EIC 2025 work program, which the European Commission (EC) adopted on the 29th of October, 2024. The EUR 1.4 billion in funding will be divided into four main schemes, each offering access to extensive business acceleration services, connecting startups with top experts, corporate partners, investors, and ecosystem participants.

The EC noted that the 2025 work program signifies an investment increase of nearly EUR 200 million compared to this year's budget.

Iliana Ivanova, the European Commissioner for Innovation, Research, Culture, Education, and Youth, remarked that the European Innovation Council has become a significant force in the EU's support for breakthrough innovation.

Ivanova also mentioned that, in 2025, the initiative would enhance EU deep tech with additional resources totaling EUR 1.4 billion from Horizon Europe, the EU's research and innovation program.

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Telecom Review Leaders' Summit

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