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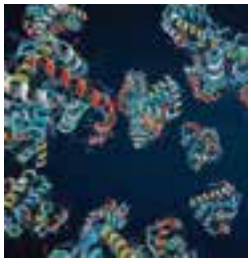

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Connecting Millions: stc Group's Commitment to Seamless Connectivity

In the heart of Saudi Arabia, the annual Hajj pilgrimage not only represents a time of deep spiritual reflection and communal worship, but also a period that demands exceptional connectivity to support the millions of Muslims who gather from around the world.

During the sacred days of Hajj, stc Group's role transcends the provision of network services, it becomes the lifeline that connects pilgrims with their loved ones and supports their spiritual journey. With the deployment of robust network infrastructure, stc Group has emerged as a cornerstone of the pilgrimage's success, enabling pilgrims to share their profound experiences in real-time with their families across the globe.

stc Group's Pioneering Connectivity: A Chronicle of Service Excellence During Hajj

stc Group's commitment to world-class communication services is reflected in its consistent delivery of high-quality services. Over the past five years, the Group's innovative solutions have not only enriched the pilgrims' experience but have also underscored Saudi Arabia's commitment to technological advancement.

The 2019 Hajj season marked a technological milestone for stc Group with the successful launch of its 5G network, providing pilgrims with unprecedented Wi-Fi access at key locations such as the Holy Mosque and surrounding camps. The impact was immediate and laudable, with Ookla recognizing stc as the "fastest mobile network" in Saudi Arabia. Over 761,000 customers, including a significant 251,000 international roamers, reaped the benefits of this enhanced connectivity. Despite a 39% increase in data traffic, stc Group maintained an impressive network success rate of over 99.7%.

The onset of the COVID-19 pandemic in 2020 presented unforeseen challenges, dramatically scaling down the Hajj to just 1,000 participants. stc Group swiftly adapted, supplying 4,765 critical communication devices to support government ministries and emergency services. The expansion of TETRA and push-to-talk services ensured that, despite the pandemic's constraints, communication remained immediate and reliable across essential locations.

Despite ongoing pandemic challenges in 2021, stc Group enhanced its digital services, leading to a 4% growth in digital transactions. Data traffic surged, especially during Eid al-Adha, with messaging and social media applications experiencing significant spikes in usage. The network adeptly managed a significant rise in data traffic, with substantial increases in international communications to countries such as Yemen, Sudan, and Egypt by over 990% at peak times.

With the return of one million pilgrims in 2022, stc's infrastructure underwent its first major post-pandemic test. The Group responded by expanding its network with additional communication towers and 1,942 Wi-Fi access points, significantly boosting coverage and capacity. In partnership with the Saudi Ministry of Health, stc Group launched the "Holodoctor" service, leveraging 5G for 3D video medical consultations. This innovation, alongside drone security, network monitoring, and AR services, marked a new era of tech-integrated pilgrimage support.

> As 2024 Hajj season approaches, stc Group is preparing to redefine communication for pilgrims with its innovative "Forgotten Telephone Booths" campaign

In 2023, stc solidified its position as the region's premier digital enabler by ensuring the readiness of the digital infrastructure in Makkah and the Grand Mosque. With over 1,000 5G network sites and 1,964 Wi-Fi access points, stc significantly enhanced the digital experience for pilgrims. The 2023 Hajj season recorded a 39% increase in international users and a 196% surge in 5G network usage. Furthermore, stc ensured emergency preparedness by deploying over 1,000 specialized team members and establishing 34 maintenance centres.

Forging Connections: The 2024 Mega Campaign

As 2024 Hajj season approaches, stc Group is preparing to redefine communication for pilgrims with its innovative "Forgotten Telephone Booths" campaign. These contemporary booths, blending a sense of nostalgia with modern day technology, will be strategically placed across Arafat 1, Arafat 2, Mina 4, and in the main tent, offering pilgrims not just faster and more reliable connectivity but also a comforting sense of familiarity. Pilgrims will be greeted by on-site promoters who will assist them in connecting with loved ones, limiting calls to 10 minutes to ensure broad access to all pilgrims.

Manasik and Miqat: Tailored Communication Services

"specialized by stc," the critical communications arm of stc Group, launched two bespoke services, Manasik and Miqat, developed to cater to the unique demands of the Hajj season. Manasik, leveraging an LTE network, provides pilgrims with instant, secure, and reliable communication, featuring push-to-talk, emergency calls, messaging, navigation, and international connectivity. Designed for scale, it ensures seamless communication for large events, supported by extensive coverage and customer support.

Miqat, on the other hand, offers a robust TETRA network for companies, ensuring continuous communication flow with features like full-duplex calls, group broadcasts, and emergency services. Both services prioritize security, reliability, and efficiency, becoming indispensable tools for maintaining seamless operations during the sacred pilgrimages of Hajj and Umrah.

Network Optimization: A Commitment to Excellence

stc Group is at the forefront of network optimization, employing AI and machine learning for a Self-Optimizing Network that autonomously boosts efficiency and capacity, particularly vital during the Hajj pilgrimage. This initiative has earned stc six Ookla Speedtest awards and involves enhancing data throughput, expanding 2G capacity, and refining transmission features to serve both real-time applications and legacy devices better. The group's proactive approach to 5G, including traffic management and advanced radio transmission, ensures high-quality, congestion-free service. stc's commitment to world-class communication services not only facilitates seamless Hajj experiences but also underscores its dedication to global connectivity and digital empowerment, setting the stage for continued success in 2024 and beyond.

Conclusion: stc Group's Enduring Legacy

As the custodian of connectivity during Hajj, stc Group's historical leadership in network services is a testament to its unwavering commitment to excellence. The Group's integration of state-of-the-art technology and personalized digital solutions significantly enhances the Hajj experience and exemplifies Saudi Arabia's dedication to technological innovation, reflecting the nation's aspirations for the future. As a beacon of digital enablement, stc Group continues to empower millions, year after year, transforming the Hajj experience into a journey that is as connected as it is sacred. TR

> stc Group's commitment to worldclass communication services is reflected in its consistent delivery of high-quality services

Khalid Murshed, Chief Technology and Information Officer (CTIO), e& UAE

e& UAE Sets New Network Benchmarks

Technological evolution, cloudification and changing customer behaviors has catalyzed a renaissance in connectivity, thus, providing new growth opportunities for the telecommunications sector.

Telcos can leverage these opportunities by introducing innovative products and business models, harnessing technology transformation, enhancing customer experience and driving digitization across their operating models.

e& UAE is strongly positioned to fully capitalize on upcoming growth opportunities with its solid customer base, strong leadership position across all sectors, technology superiority, wide-ranging product portfolio, digital incubating capabilities and talented team.

e& UAE's Pioneering Endeavors

Building on its competitive advantages, e& UAE defined its 2030 strategy with an aspirational vision, specific strategic goals and clear strategic pathways. This will enable e& UAE to capitalize on all opportunities and continue to maintain its leadership position across all areas.

In line with its overall vision, e& UAE has maintained this trajectory with global achievements, such as recently recording the world's fastest speed (30.5 Gbps) on its live 5G network, marking a significant milestone in its evolution towards 5G-Advanced.

This global achievement showcased the successful aggregation of multiple carriers across high-band and mid-band spectrums (1600 MHz in mmWave and 300 MHz in C-band), with network speeds reaching 30.5 Gbps).

This achievement underscores e& UAE's commitment to delivering unparalleled user experiences, ensuring seamless connectivity to meet the increasing demand for a broad spectrum of digital services.

Khalid Murshed, Chief Technology and Information Officer (CTIO) of e& UAE, said, "We are thrilled to announce e& UAE's achievement of the world's fastest 5G network speed. With this accomplishment, we are poised to unleash the boundless potential of 5G technology, empowering innovative

services and applications that will transform the fabric of society and the economy.

"Aligned with the UAE's ambitious digital agenda, e& UAE's continuous investment in its network and technologies underscores its commitment to delivering premium digital services. By adopting the latest 5G solutions, we are [not only] providing our customers with premium digital experiences today but also paving the way for the 6G era by 2030, in line with the UAE's recently unveiled 6G Roadmap by TDRA."

The e& UAE Vision

As the demand for advanced network capabilities continues to surge, e& UAE is poised to revolutionize the landscape of connectivity in the UAE. This vision integrates state-of-the-art technologies and innovative services, including network slicing, private 5G network, RedCap, mobile VPN, and premium Fixed Wireless Access (FWA) leased lines, offering a superior experience for consumers, home, and enterprise customers alike.

e& UAE has also harnessed the power of AI to deliver seamless and personalized experiences to every customer. AI technologies will spearhead intelligent energy-saving and smart network planning initiatives, driving environmental responsibility and technological excellence to new heights.

This monumental achievement solidifies e& UAE's position as a trailblazer in the telecommunications industry, reaffirming its dedication to pushing the boundaries of innovation and delivering connectivity solutions for the digital era.

Similarly, its integral role in realizing the nation's connectivity ambitions is evident. With a strong commitment to digital innovation and interconnectivity, e& UAE consistently invests in and develops world-class infrastructure for 5G and fiber networks.

Thriving in the Digital Age

The UAE is recognized as the global leader in Fiber to the Home (FTTH) penetration. Since 2016, the country has maintained the top position with an impressive penetration rate of 99.3%, according to the latest annual report from the FTTH Council.

The report analyzed data from 20 countries that have exceeded 50% FTTH availability and compared global statistics on fiber optic network penetration. It placed the UAE above Singapore (97.1%), Hong Kong (95.3%), China (92.9%), and South Korea (91.5%). These rankings solidify the UAE's position as a global leader in high-speed fiber connectivity and underscores the vision of the nation's leadership: to prioritize next-generation digital infrastructure.

The UAE's proactive strategies and investments in fiber connectivity are a testament to both the nation's visionary leadership and its confidence to empower people to thrive in the digital age. This commitment has positioned the country as a benchmark for demonstrating how nations can empower communities through the implementation of world-class digital infrastructure.

As the world undergoes continuous redefinition driven by ever-growing connectivity needs and increasing data demands, e& UAE's focus remains squarely set on the future, bolstered by its efforts in innovating, developing, and deploying solutions that will take connectivity to new heights—from 5G to the networks of tomorrow. Through these efforts, it aims to support and propel the UAE's prominence in the global connectivity landscape.

Fiber's Role in the Digital Era

The evolution of FTTH has fueled the uptake of high-speed broadband, enabling businesses and individuals alike to yield substantial benefits. With its capacity to support higher data rates and readiness for future technological shifts, fiber optic cables play a critical role in the digital era.

Beyond boosting performance, fiber supports energy efficiency and sustainability goals and is critical in advancing hyperscalers, 5G-Advanced, data center connectivity, smart cities, and AI-driven initiatives.

e& UAE has been at the forefront of digital innovation through strategic investments in mobile and fiber networks. This robust strategy has paved the way for introducing cutting-edge services that address customers' evolving needs.

Recognized as a key player in the global connectivity arena, e& UAE achieved the prestigious title of 'Strongest Telecom Brand in the World' for 2024, bestowed by Brand Finance.

The company continues to push boundaries by launching 5 Gbps and 10 Gbps plans in the UAE. These new fiber-to-the-home (FTTH) plans offer a significant leap forward in internet speed, providing consumers with an unparalleled fiber optic experience. The telco also introduced Fiber-to-the-Yacht (FTTY) recently, seamlessly integrating e& UAE's advanced technology with pre-terminated fiber optic cables, bringing high-speed internet access directly to yachts. TR

> e& UAE recently recorded the world's fastest speed (30.5 Gbps) on its live 5G network – a significant push towards the evolution of 5G-Advanced

Atul Purohit, Head of Technology, Cloud & Network Services, EMEA

Nokia: Leveraging the Power of 5G to its Fullest Through APIs

In an exclusive interview with Telecom Review, Atul Purohit, Head of Technology, Cloud & Network Services, EMEA, delved into the intricacies of how APIs function within the framework of network monetization for operators, offering a comprehensive understanding of their operational dynamics and strategic significance. By elucidating the inner workings of APIs, Purohit provided valuable insights into how operators can leverage these tools to extract maximum value from their network assets.

Nokia has been a big supporter and a driving force behind the API economy with its 'Network as Code' offering. How does this transform the network into a truly programmable entity?
One of the key things that telcos are trying to do is embrace the worldwide adoption of 5G core technologies. The reason 5G is different from its previous generation is because it brings out the programmable persona of mobile networks, which means the third-party developers should be able to make use of the mobile networks from their applications directly.

One of the key questions that we keep getting from our customers is, 'How can we further monetize our 5G investments and assets?' This means that we need to do something as a vendor partner to help our telecom service providers monetize these network assets.

As such, we have created Network as Code. This is a classical, two-sided platform model wherein at one end of the platform, we integrate the mobile core of CSPs, and on the other end, we introduce APIs to a developers ecosystem; thus, enabling third party developers to leverage these APIs to create new and innovative applications.

In your opinion, taking the Middle East region into account, which APIs will be the most valuable in the long term? How does Nokia support this?
The Middle East region is diversified as different operators work in different environments. Some of the operators are still trying to incorporate 5G into the networks; some of the operators are quite advanced and they have already launched 5G services in support of government initiatives and international sports events.

If we now look at the value of APIs, Nokia has classified the network APIs into different buckets, such as Tier 1s, which are CPaaS-oriented to start with. This means that they make use of some basic value vectors from the underlying telco networks—such as SIM swap or number verification APIs—to help operators grow and monetize their network assets.

Looking at the value of APIs in medium- to long-term, high-value APIs like Quality of Service on Demand (QoD), or Network Slicing APIs, makes a lot of sense because the Middle East region has different use cases across various industries, such as oil and gas, ports, etc…which are inherently ripe for high value applications. This means they can leverage the power of 5G to its fullest potential and start making use of capabilities like quality of service on demand and network slicing.

How will Nokia continue to address the risks and rewards of emerging commercial models with regards to the API economy?
If you look at the API economy, it's not a very new concept; it has been ongoing for the last 10 to 15 years. Back in 2015, CPaaS providers started exploring APIs and started with API monetization.

Historically, the model has been based on a cost-to-price based abstraction mechanism. This means that on one end of the platform, there are cost-based negotiations that occur between service providers, and on the other end, enhanced value is created for developers within the third party ecosystem.

Utilizing Nokia's 'Network as Code' perspective, we want the service providers to be value-based partners; we want to pioneer a fair revenue-share agreement with operators. As we generate more value from the APIs, we want the third-party ecosystem and developers to equally participate in similar high-value transactions. Ultimately, we are cultivating a partnership-based commercial model, where revenue sharing with operators is our strategic & long-term goal.

What API-specific initiatives will Nokia be implementing or continuing in 2024 to drive greater adoption of API-exposure?
If we look at the API standardization, specifically considering Network as Code, the forums that we are following & contributing are GSMA Open Gateway and Linux Foundation Networking Camara API standardization initiatives.

This kick-started early last year and is continuing its momentum into 2024 and beyond. There is already a sizeable backlog when it comes to APIs that Camara is trying to churn out from a standardization perspective. Nokia aims to participate in the Camara forum and endeavors to contribute standardization APIs within the network slicing sector and broader API definitions.

If you look at 2024 from an API perspective, it's going to be a year of scale. Thus, we are looking at contributing to the forum and promoting world-wide API adoption, particularly in standardizing third-party ecosystem and developer exposure. TR

Utilizing Nokia's 'Network as Code' perspective, we want the service providers to be value-based partners; we want to pioneer a fair revenue-share agreement with operators

Evolving Automation Requirements for Advanced Communications Networks

As next-generation 5G and satellite networks increase in operations complexity, CSPs can leverage automation technology and best practices, including AIOps and E2E service orchestration, to monetize cutting-edge services and maintain the highest levels of customer experience.

The next generation of telecom technology is revolutionizing the way we live, work and think. With faster transmission speeds, higher bandwidth and reduced latency, advanced communications networks such as 5G and the rapidly growing satellite communications sector offer nearly limitless possibilities. However, this also exponentially increases the complexity of network operations, partner ecosystems and service delivery, resulting in the need for a new way of approaching traditional manual processes.

Communications service providers (CSPs) cannot just flip a switch to upgrade their networks and support rapid provisioning and scaling to dynamically adapt to fluctuating demands. The challenge of increasingly complex networks is further compounded by high-performance network needs, with both B2C and B2B customers requiring on-demand services anytime, anywhere. In addition, CSPs will want to identify ways to monetize their significant investments within the network to fully realize the business benefits.

The Operations Environment of the Future

In order to fully realize the potential and practical benefits of modern networks, the operations environment of the future must meet three major criteria:

- **It Must Be Cloud Native:** Container-based microservices create a loosely coupled architecture with modular components to break down and simplify the complexity of legacy frameworks. Along with open APIs and DevOps, cloud-native architecture provides near instantaneous scalability, deployment and redeployment to any cloud platform, resulting in optimized flexibility, upgrades and partner ecosystems.
- **It Must React in Real Time:** 5G networks and satellites will need to provide simultaneous responses and support for millions of devices running billions of applications and services. Each device, application and service will have different needs at different times, making low latency a necessity for progress. A network that cannot automatically and rapidly scale and adjust to accommodate these needs will defeat the entire purpose of automation by wasting a staggering number of resources.
- **It Must Support Intent-Based Orchestration:** Intent-based orchestration uses preconfigured service models, policy and context with closed-loop control to automate the entire service and network slice life cycle. Closed-loop service management can establish effective intent-based orchestration; it uses AI/ML and analytics to monitor, manage and optimize everything from design to assurance for smooth operations within complex networks.

E2E Orchestration: Catalyst for Network Automation

By breaking away from the traditional monolithic approach, CSPs can ensure their operations environments are equipped to handle the rapidly changing demands of these dynamic networks. The 'divide-and-conquer' strategy evident in domain orchestration offers one way forward. It separates networks into self-sufficient operational domains, such as core, RAN, transport and multi-access edge computing (MEC), creating smaller and more manageable network sections, as well as the ability to address specific and sudden demands.

However, in the complex multivendor and hybrid world of 5G, a network is only as good as its slowest segment.

CSPs should consider implementing E2E service orchestration, which automates network design, provisioning, full life cycle management and E2E optimization. Its open API-based architecture ensures flexible programming and seamless partner integration, while its closed-loop AI/analytics capabilities enable intelligent resource management and service deployment without human intervention.

CSPs looking to invest in E2E orchestration solutions should keep a few key aspects in mind:

- **Consider AI/ML-Driven, Intent-Based Automation Solutions:** Operators should look for intent-based automation with advanced analytics capability. This will help create closed-looped, zero-touch service management with proactive assurance and advanced capacity planning capability.
- **Make Sure the Automation Solution is Future-Proof:** Key capabilities of intelligent intent-based automation will depend on how seamlessly it can manage E2E 5G operations automation. This entails managing core and RAN, which can be proprietary or Open RAN-based. The solution should also have proven interoperability and support cloud-based networking.
- **Real-Time Active Resource Inventory is Also a Must-Have**: Dynamic on-demand networks need real-time inventory capability. Hence, CSPs should verify if federated active inventory for a single network view with capabilities for massive data intake and processing is a feature. Active resource inventory should be able to provide real-time visibility for all logical networks, resources and infrastructure while serving as a consistent and accurate source of data for the entire BSS/OSS and enterprise application ecosystem.
- **Enable Partner-Based Business Models:** In order to fully embrace partner-based business models, automation solutions should be able to provide rapid onboarding of partners across multivertical industry segments. This will help operators reduce time- and cost-to-market with pre-configured packages, standard support, DevSecOps automation and pre-onboarded partners. It will also help operators gain or maintain leadership in the digital ecosystem through strong strategic partnerships and evergreen products.

Leveraging AI for Automated Operations

Once the foundation of digital transformation is built, the intricacies of automation and AI to ensure seamless connectivity and buoy customer experience becomes self-evident, and the combination of OSS with AI/analytics will lead to significant advancements in the areas of service lifecycle management and service assurance. As service providers continue to evolve from telcos to techcos and take advantage of E2E service management, artificial intelligence for IT operations (AIOps) is an essential component.

By applying automation and AI technologies to the service operations layer, significant advancements can be achieved in a number of key areas that will benefit telecom service providers:

- **Use AI Automation for Assurance:** In an increasingly saturated market, customer experience is the battleground for differentiating service. When basic performance measures such as speed and coverage are similar, customer experience will make CSPs stand out. Combining AI, operational tools and observability enables service providers to create several AIOps use cases that ultimately improve customer experience, which leads to better retention and longer customer lifetime value. Common use cases include problem detection, impact analysis, root-cause analysis and service optimization.
- **Communicate Proactively with Customers:** Most customers only contact customer service when they have a problem. Problem detection means that a huge percentage of issues can be detected and resolved before the customer is even aware. Root cause analysis accelerates fault resolution, meaning that downtime is minimized, and intent-based service optimization allows the operator to prioritize services based on their importance to the subscriber.
- **Improve Operational Performance Through GenAI:** While AI-driven assurance enables a substantially better customer experience, Generative AI (GenAI) will further improve operational performance by augmenting AI with innovative content creation and natural language interactions. From assisting technicians in the field to creating service designs, or correlating alarms across domains, it will bring a further degree of automation and efficiency.

GenAI will also provide an important trust function for AI-automated operations by explaining (in natural language) every step of the AI analysis and proposed resolution. This level of explanation will help operations experts gain confidence in the technology to further accelerate its adoption across the business and continue the connectivity evolution.

This technology can also be used to improve network performance as AIOps holds the ability to monitor, collate, analyze, assess impact, and implement changes to the network without manual intervention, thereby improving overall performance, preventing the escalation of minor issues and reducing the duration of any outages. This ability to understand and mitigate future issues makes AIOps a key component of the digital future.

5G and satellite networks deliver an entirely new class of powerful technological capabilities and innovative business models. However, these advances come with the price of vastly greater complexity and scale, and require an updated approach to automation to capitalize on these investments and offer new services. CSPs that take the time to reinvent their operations environment now will reap the benefits of streamlined networks and differentiated services in the future. TR

By Ari Banerjee, Senior Vice President, Strategy, Netcracker Technology

Sofrecom: Do Mobile Operators Have the Right Set of Solutions to Address Mobile Private Networks?

Mobile private networks (MPNs) are emerging as a complex toolbox for service providers. Their solution design combines a high set of variables including customer perception, functional requirements, financial benefits and technical capabilities.

Nevertheless, according to analyst, Analysis Mason, this market is expected to reach USD 9 billion in 2028, which represents one of the few growth areas in a flattish wireless market within developed countries. Let's take a look on this intricate matrix and see how it can be turned into an opportunity.

The disruption of the telecom supply, accelerated by virtualization and the advent of 5G Standalone (5G SA), has opened a wide range of possibilities for services to enterprises. A large set of business verticals are set to benefit from mobile private networks. Let's consider some examples below:

- **Port Authorities:** MPNs are used to secure and optimize material handling on a wide area (to connect cranes, trucks, and shipping containers), streamlining operations through improved tracking and automation.
- **Manufacturing (connectivity of machines, robots, and sensors):** MPNs are used to facilitate real-time monitoring and automation while

keeping data on premises for better security and performances.
- **Stadiums and Convention Centers:** MPNs are used to offer enhanced experiences for attendees, including high-density Wi-Fi, and location-based services.

Each one of these use cases has a completely different requirement in terms of security, performance, and coverage, ranging from mission-critical implementations in manufacturing to add-on services in the case of venues. Demand may combine several characteristics such as 'push-to-talk' functionalities for workers and low-powered WAN for sensors in the same industrial campus, like a refinery.

On the supply side, there are major different solution paths; a fully dedicated integrated solution on one hand and an operated solution based on slicing on the other hand, which can be hybridized with customized pieces. Let's have a look at some drivers:

1. **Regulation**: Only a few countries (20+) allow enterprises to purchase licenses directly from the regulator (mainly in Europe). This drives the supply side in other countries towards Mobile Network Operators (MNO) and operating solutions.

2. **Customer Approach:** Some enterprises prefer capital ownership and will favor private solutions as they consider telecom infrastructure as a critical investment, similar to their manufacturing facilities.

3. **Security:** It is possible to dedicate a slice to a customer. Its immediate benefit resides in the enhanced security, which allows the implementation of customized policies. Moreover, stricter security requirements, such as keeping all customer data on premise, can lead to the implementation of mobile edge computing resources. Ultimately, security is a stand-alone solution, but it is technically not mandatory.
4. **Performance:** Tailored Quality of Service (QoS) is not provided by the slice itself (which is just an isolation) but can be attached to it. At the end of the day, a better network behavior will require specific assets—dedicated spectrum, and additional radio equipment. A customer-dedicated slice is not required but can ease the delivery of the solution.

5. **Coverage Requirements Drive Choice:** MNOs, which cover wide areas, will be well positioned for a transportation use case (public transportation like a bus, private truck fleet, etc), but less relevant for a remote area poorly served where a new infrastructure needs to be set up (like a mine).

For an established mobile operator, these challenges can be turned into a competitive advantage, capitalizing on the credentials in mobile operations and long-term partnerships with B2B customers.

Mobile private network sales will require a change in the way MNOs are approaching their clients. Instead of picking up a Service Provider Portfolio, the first step would be to gather customer context, in a consultative selling approach:

- **Business Consulting:** Evaluation of potential solutions should consider not only technical criteria, such as security requirements, but also alignment with customer objectives, which could include factors like pay-back periods
- **Technical Consulting:** Assistance with vendor selection, contracts, project planning, license granting, and terminal compatibility
- **Technical Delivery:** Site surveys, integration within existing IT, cloud and cybersecurity

For an MNO this means several Copernican revolutions:

- **Do not Favor Systematically Shared Solutions:** Even if they are technically sound, do not favor systematically shared solutions because other considerations can drive customers' choices.
- **Partner with Potential Competitors**: Traditional hardware vendors like Nokia provide both shared and dedicated solutions. Integrators that have the capabilities to deploy complex projects can become subcontractors, expanding the operational capabilities of MNOs.
- **Consider New Vendors:** It's worth noting that Alternate Network Providers (such as Affirmed Networks, HPE/Athonet, etc.) are estimated to acquire in this earlier phase the largest share in MPN deployments.
- **Understand the Market:** A successful deployment of a private network requires a deep understanding of market strategies, product specifications, and the technical sense of engineering expertise when it comes to network design and integration.

MNOs are in an ideal position to take advantage of the private networks market since they possess all the ingredients of the recipe. Nevertheless, they will have to transform the way they sell and operate solutions. TR

By David Erlich, Director of Business Consulting, Sofrecom

Mobile private network sales will require a change in the way MNOs are approaching their clients

Wireless Radio Technology Evolution Towards 5G-A

As 4G mobile traffic continues to surge and the deployment of 5G wireless networks accelerates, the industry has widely acknowledged multi-antenna and beamforming technologies as the evolutionary path towards 5G-A.

Multi-antenna technology will help increase signal transmission speed and reliability, thereby improving user experience, network capacity, and coverage. The beamforming controls the phase and amplitude of the antenna array, focusing the signal toward the UEs (User Equipment) for transmission. This also improves the signal's transmission speed and coverage area and reduces power consumption and interference.

These two technologies are interdependent and gradually converge; more antenna ports enable beamforming to be more focused and accurate, thereby obtaining higher gains. The 3GPP protocol also continues to develop and evolve in two directions. The corresponding technical standards are discussed and formulated to meet the requirements of network development more efficiently.

The RAN industry's practice proves that the main trend prevalent in the implementation of multi-antenna and beamforming technologies is 2TRx→4TRx→8TRx→Massive MIMO (from 32TRx on), which also aligns with 3GPP protocol evolution.

During the 4G-Advanced era, 4T4R became the widely accepted network standard by global operators. In the case of higher capacity and demand scenarios, it continues to move towards 8T8R and Massive MIMO as the next phase of capacity evolution solutions.

In 2016, the industry's first FDD 32T32R Massive MIMO solution was released, and in 2020, the first FDD native 8T8R RRU was released. Notably, Huawei was the first ICT vendor to release these solutions, with other vendors like Ericsson following suit and releasing corresponding products.

"Both FDD Massive MIMO and native 8T8R support 4G only, 5G only, and dynamic spectrum sharing between 4G and 5G. FDD Beamforming is also available over the native 8T8R/32T32R radio," said a telecommunication manufacture spokesman. FDD beamforming technology won the award for the Best Mobile Technology Breakthrough at Mobile World Congress (MWC) 2023, indicating that the suitability and need for multi-antenna and beamforming technologies are recognized in the industry.

In conjunction with the aforementioned trend, some other evolution attempts were also made. One relevant evolution includes unified radio (6TRx, 12TRx). It's important to know that it is not a 'Real' 6T6R or 12T12R radio; in fact, it combines three 2T2R or 4T4R radios into one shell. Considering that each site could have one box instead of three, some believe it could save the OpEx of the RAN network, especially the rental cost of the towers. However, after some testing, operators realized it brought new challenges.

Operators who tried 6TRx or 12TRx also shared their opinions. For example, due to the high complexity of the installation, a single radio was too large and heavy, and a crane may be required during site installation. It also had high power supply requirements, with a single radio requiring an additional voltage booster module.

The performance also deteriorated because three radios are combined into one. This radio can only be deployed close to one sector's antenna, and additional feeders must be used to connect the antennas of the other two sectors. As a result, coverage reduced by 20% across the other sectors due to extra cable loss.

Lastly, it had low reliability. If a single radio failed; the entire site was affected. If any component is damaged, it is necessary to replace the entire radio, causing a significantly higher failure rate. Furthermore, not only is there a high operating cost but evolution is also difficult, as operators cannot flexibly expand capacity by sector. Even if only one sector has capacity expansion requirements, all three sectors must be expanded due to the unified design.

Consequently, the unified radio technical evolution path is not well-recognized by the industry, and few commercial deployments have been observed. Additionally, as more and more spectrums are used in wireless networks, multi-band radio (E.g. dual-band, tri-band) has emerged as another evolutionary trend. Operators prefer to deploy one radio in the low-band (e.g., 700MHz/850MHz) and another in the middle-band (e.g., AWS/PCS, 1.8/2.1GHz). This was one of the main concerns behind this evolution.

Normally, in the low-band, it evolves to 4T4R for coverage, while in the middle-band, it is more common to evolve to 8T8R or 32T32R for capacity. To ensure the flexibility of evolution, it's important to separate the RRU from the low-band and middle-band.

Given these observations, it is evident that multi-antenna, beamforming, and multi-band are the top 3 radio technologies catalyzing 5G-A. TR

> Huawei was the first ICT vendor to release the industry's first FDD 32T32R Massive MIMO and the FDD native 8T8R RRU solutions

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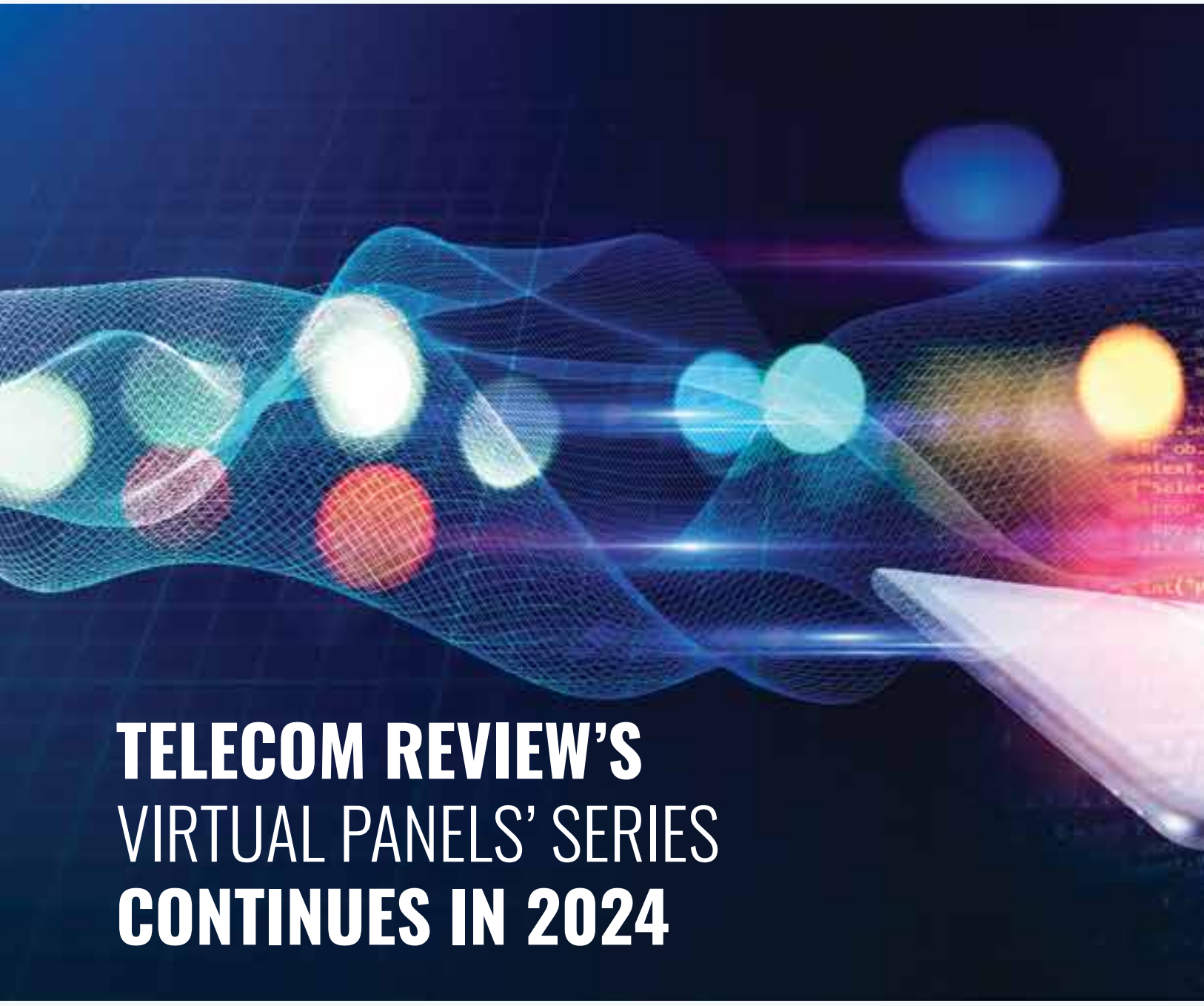

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The Evolution of the ICT Market: How Can AI Help on Leveraging Profitability and Transformation?

The ICT market is undergoing significant upheaval. Traditional products such as connectivity, voice services, integration, and managed services are experiencing declining margins. This shift is largely due to the convergence of the telecom and ICT sectors, with major players like GAFAM leading the charge. These products risk becoming commodities and losing their distinctiveness in the market.

Moreover, the industry is not stable yet, as evidenced by major shifts such as the transition from copper to fiber, digitalization, and the move from on-premises to cloud computing. These changes are complicated by the presence of legacy components, making the transformation challenging. To maintain a competitive edge and ensure high-quality service, factors such as customer experience, understanding of the client's business, and proximity are becoming increasingly important.

ICT players are thus faced with a complex equation: they need to regain profitability to create value and invest, while maintaining quality service

without resorting to price cuts. This is crucial to avoid disintermediation and loss of client access, which are essential for future revenue opportunities.

Artificial intelligence (AI), when utilized effectively, offers a solution to control costs while enhancing service quality. However, AI must be applied judiciously, with clear use cases, to avoid disappointment.

ICT companies can benefit from AI in multiple areas of the organization. These include, but are not limited to:

- Customer Service (AI chatbots, virtual assistants, ticket generation and routing, intent prediction, call summaries, response generation, etc.)
- Sales (lead qualification, proposal and quote generation, personalized sales pitches, etc.),
- Marketing (content generation, generation of personalized marketing campaigns, etc.)
- Product (feedback analysis, product documentation, etc.)
- Customer (customer needs detection, cross sell and up-sell strategies, etc.),
- Field Services (virtual assistants, resolution guide creation, issue detection, etc.)

By leveraging AI in such focused areas, ICT players can enhance operational efficiencies, improve customer experiences, and drive revenue growth while navigating the industry's complex landscape.

At PMP Strategy, AI serves both clients and employees based on three pillars: a blend of business issue understanding and strategy, with a thorough knowledge of available technical solutions; tangible results achieved in short cycles (2-to-4-week cycles from need/feedback to Proof of Concept); and specific B2B use cases that are transferable to large corporations and SMEs.

On average, the use of AI in customer services by ICT players demonstrates gains in the 5% to 20% range within the call duration and increased customer satisfaction sectors. Our experience with a U.S. Fortune 50 company demonstrated AI benefits in use cases such as:

- Predicting customer call topics and searching in the knowledge base to help care agents to identify the client's issues and corresponding solutions. Before the AI solution, call center agents sometimes spent tens of minutes per messaging conversation with customers, struggling to understand issues and manually locate information across different systems.
- Real-time conversation analysis to swiftly meet customer demands, enhancing both customer and agent satisfaction.
- Automatic call transcription and summarization, helping care agents to record key call information in their CRM solution. Thus, helping to increase both the accuracy and completion rate of post-call tasks while reducing the time required for them.

Such solutions evolved from initial tests with small teams to deployments at scale from 100+ to up to 10,000+ agents and provided estimated productivity gains of 5-10% across 10s of millions of conversations.

While such use cases are becoming common in B2C markets, they are far from being widely adopted in B2B, despite the potential technology available that could significantly support ICT players in regaining margins.

Many ICT companies are preparing for AI and assessing how it will impact their industry, products, processes, workforce, tools, ecosystems, etc. To embrace change, they are preparing for it.

PMP Strategy emphasizes the importance of innovation and strategic use of technology for this kind of transformation. We believe that by leveraging AI in thoughtful and strategic ways, ICT companies can navigate the challenges of the current market landscape, ensuring sustainable growth and competitive advantage. Our B2B TMT team and AI Lab are dedicated to supporting businesses through this journey, providing insights, strategies, and technologies tailored to meet their unique needs and those of the ICT sector. TR

By Pierre Le Corre, Associate Partner, PMP Strategy; Gregorie Clayes, Managing Director, PMP Strategy Seattle; Chrystelle Briantais, Partner, PMP Strategy

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Saudi Tech Oasis: Harnessing Tech for the Environment

What steps must we take to protect our environment? All eyes are on Saudi Arabia for World Environment Day 2024, where the focus will be on the critical need for global investments in conserving nature, restoring lands, and pursuing sustainability.

"Now is the time to act on commitments to prevent, halt and reverse ecosystem degradation," said Elizabeth Maruma Mrema, Deputy Executive Director of UNEP, during the WED 2024 global campaign launch at a Saudi Environment Week event in Riyadh. "We are the first generation to now fully understand the immense threats to the land—and might be the last one with a chance to reverse the course of destruction. Our priority now must be on restoring ecosystems; on replanting our forests; on rewetting our marshes; on reviving our soils."

Without intervention, 95% of the Earth's land could face degradation within the next three decades, posing severe threats to both humanity and the planet. To counter this looming crisis, nations worldwide have pledged to restore one billion hectares of land, with the goal of safeguarding 30% of land and sea for nature and revitalizing 30% of the planet's degraded ecosystems. Aligned with the 2030 Agenda for sustainability and resilience, World Environment Day 2024 will galvanize climate action by garnering support for ecosystem restoration.

Impact of Digitalization in Environmental Goals

Embracing digital technologies will continue to play a crucial role in advancing environmental agendas and achieving a more resilient and sustainable future for our planet.

Eng. Wael Adli Ahmed Bushah, Director-General, Environmental Awareness and Capabilities Enhancement, Ministry of Environment, Water, and Agriculture (MEWA) emphasized that "technology and digitalization can provide several smart solutions toward more sustainable cities and green communities." Digital platforms offer unparalleled opportunities to enhance the effectiveness of environmental awareness and education programs. By reaching a diverse audience across different locations, backgrounds, and age groups, these platforms enable wider dissemination of information and engagement with environmental issues.

Furthermore, the rapid digitalization in the Kingdom will "put the sustainability initiatives on a fast track which will speed up the environmental achievements towards a circular economy," noted Eng. Bushah. Technologies will play a pivotal role in enhancing land restoration efforts, effectively combating desertification and bolstering food security. These advancements aim to cultivate a "resilient community" capable of withstanding environmental challenges and ensuring sustainable livelihoods.

Through the use of digital technologies such as artificial intelligence (AI), big data analytics, Internet of Things (IoT), and remote sensing, environmental monitoring, analysis, and decision-making processes have become more efficient and effective.

Digital platforms are also known to facilitate communication and collaboration among stakeholders, including government agencies, NGOs, scientists, and local communities, fostering greater transparency, engagement, and participation in environmental initiatives.

Through innovative ICT solutions, Saudi Arabia has orchestrated a symphony of data-driven conservation efforts. These include satellites, which are like vigilant sentinels in the sky and will be utilized for Earth observation monitoring techniques. These technologies will monitor the effects of the Saudi Green Initiative, particularly focusing on its ambitious plan to plant 10 billion trees in the coming years. Additionally, they will oversee the health of coral reefs in the Red Sea and facilitate swift decision-making regarding the optimal placement of solar panels.

Moreover, advanced irrigation systems, driven by AI algorithms, play a crucial role in facilitating reforestation efforts and promoting biodiversity. These systems utilize smart sensors scattered throughout the landscape to monitor water usage and meticulously optimize resource allocation with surgical precision.

Contributing to the digitalization journey, telecom players have also become more vocal in their initiatives toward sustainability. For one, Ericsson and Saudi Arabian IoT digital solutions provider, iot squared, have collaborated to offer the Ericsson Connected Recycling (ECR) platform as a software-as-a-service (SaaS) in Saudi Arabia to increase awareness of the importance of waste management and contribute to shaping a more sustainable future in the country.

"Embracing digital technologies will continue to play a crucial role in advancing environmental agendas and achieving a more resilient and sustainable future for our planet"

Ericsson believes that it is key to safeguard the world's natural resources by turning waste into recycled raw materials rather than putting them in landfills or burning them. In line with this, they will offer ECR in Saudi Arabia for several waste streams, with an initial launch to address municipal solid waste (MSW).

Through innovation and collaboration, a new era of sustainability has dawned, echoing across the sands and inspiring nations to follow Saudi Arabia's trail in safeguarding our planet for generations to come.

World's First Zero-Emission 5G Network

Telecom networks serve as lifelines, connecting remote conservation outposts with global expertise, enabling real-time collaboration in the face of environmental challenges.

One of the most notable examples of a project that harnesses innovation for sustainability is the zero-carbon 5G network at The Red Sea. This success story highlights Zain KSA's ground-breaking collaboration with the multi-project developer, Red Sea Global (RSG).

According to Eng. Sultan AlHadlag, Vice President of Marketing & Business Development, Zain KSA, the company designed the network following extensive studies of the Red Sea's environmental ecosystem. "Surveys documented the area's biodiversity to minimize the impact on indigenous species, avoid disturbing the natural habitats, and ensure the protection of the region's rich ecosystems and natural landscapes below the sea and on land."

The 5G network, powered entirely by renewable energy via over 760,000 solar panels, emits zero greenhouse gases. For long-term sustainability, Zain KSA has integrated green solutions throughout the project with its partners to minimize energy consumption.

In fact, Zain KSA's zero-carbon 5G network at The Red Sea boasts a purposeful tower design and state-of-the-art 3D printing was utilized to mitigate visual disruption, ensuring that the structures seamlessly blend into the golden landscape. AlHadlag pointed out that the towers were designed to be shared with other operators, optimizing future resource utilization by minimizing the need for more hardware and manpower deployments, and more importantly, saving more land.

"Essentially, the green network project models a set of pioneering sustainable connectivity solutions that can be deployed to build more green networks worldwide. This embodies Zain KSA's commitment to enhancing people's lives and well-being and harnessing innovation for a brighter tomorrow," AlHadlag concluded.

The innovative and eco-friendly 5G project aligns with the Saudi Vision 2030 goals and the Saudi Green Initiative, while also championing the UN Sustainable Development Goals of 'Climate Action' and 'Life on Land.' This project advocates for the sustainable management of terrestrial ecosystems, demonstrating a commitment to environmental stewardship and technological advancement.

Environmental Awareness

Environmental awareness throughout the Kingdom is a crucial part of the national environmental strategy to create a sustainable and responsible society. Eng. Bushah noted that the Ministry's environmental awareness initiative was launched on June 5, 2022, coinciding with World Environment Day, making it a significant and memorable occasion for the initiative.

"Since then, the awareness initiative organized several campaigns, events, workshops, and webinars where thousands of people engaged to learn more about the environmental challenges and how to protect the environment. Moreover, the awareness campaign on social media achieved millions of reaches, engagements and impressions," the MEWA Director General explained.

In line with its commitment to raising awareness, the Kingdom has implemented a set of initiatives under its National Environment Strategy. These include adopting the new Environmental Law, launching the National Environmental Awareness Program, and establishing five environmental centers to conserve Saudi Arabia's natural resources. Additionally, the Kingdom has introduced the National Environment Week to further promote environmental conservation efforts.

During the first quarter of 2024, the Kingdom officially announced that March 27 will be celebrated as Saudi Green Initiative Day to raise awareness and highlight the positive impact of collective environmental efforts across the country. TR

One of the most notable examples of a project that harnesses innovation for sustainability is the zero-carbon 5G network at The Red Sea

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center3 Completes Acquisition of CMC Networks

center3, a wholly owned subsidiary of the stc Group, has officially announced that it has completed the acquisition of CMC Networks Mauritius (100%) and CMC Networks South Africa (49%). CMC is a global service provider offering market-leading networking solutions across Africa and the Middle East.

CMC Networks operates across more than 110 service locations with a cost-effective, scalable, and resilient data communications network. It boasts the largest pan-African network, servicing 51 out of 54 countries in Africa and 12 countries in the Middle East, as well as regional hubs in key interconnect locations across Europe, the Americas, and the Asia Pacific.

The acquisition aligns with center3's strategic vision for growth and expansion in the Middle East and African markets. It represents a significant step in the company's journey as it seeks to extend its market presence and enhance its offerings in this dynamic and rapidly growing region.

Furthermore, CMC Networks is being acquired from the Carlyle Sub-Saharan Africa Fund (CSSAF). In 2020, the CSSAF team formed a separate private equity firm, Alterra Capital Partners (Alterra), which continues to advise CSSAF's investments, including CMC Networks.

Empowering Urban Development: TDRA's Updated Telecom Network Manual Sets New Standards

The Telecommunications and Digital Government Regulatory Authority (TDRA) recently issued the third edition of the Telecommunications Network Box Specification Manual for buildings, which sets out the technical specifications and standards adopted for the design of internal and external networks in new buildings and areas.

The manual aids in the design of infrastructure for urban projects, especially in the field of fiber-optic network deployment, and sets standards that ensure all new buildings and areas are equipped with physical infrastructure that is capable of hosting high-speed networks as well as access points that network providers can easily interface with.

H.E. Eng. Mohammed Al Ramsi, TDRA's Deputy Director General of the Telecommunications Sector, emphasized the importance of updating the manual due to its significant impact on telecommunications infrastructure development across the country. This update is expected to enhance the overall quality of life, particularly benefiting immediate users.

He outlined that, "The release of the updated Building Telecommunications Network Specification Manual marks a qualitative addition to the regulatory procedures of the telecommunications sector, thus, helping drive the transition towards smart cities of green and environmentally-friendly buildings. This, in turn, fosters [the] UAE's leadership in several indicators relating to infrastructure, foremost of which is FTTH, in which the UAE has been ranked first globally over the past eight years."

Positive Impact of the Manual

The updated Building Telecommunications Network Specification Manual is an important reference for the employment and deployment of technology in new buildings and projects, directly affecting the prompt and quality access to services by subscribers. It outlines the essential conditions for designing telecommunications infrastructure, including security specifications, scalability, technological compatibility, and system integration. These guidelines ensure that infrastructure efficiently meets these requirements, providing residents and users with the best possible connectivity experience.

Spotlight on Oman's Digital Journey: A Telecom Review Exclusive

Oman presents a distinct narrative as its telecommunications sector, traditionally focused on connectivity, plays a significant role in shaping the country's digital landscape. Across the Middle East, telcos are spearheading digital transformations, modernizing processes, systems, and infrastructure.

Telecom Review recently held a virtual panel entitled "Spotlight on Oman's Digital Journey," which was moderated by Dr. Abdullah S. Al-Balushi, Technology Consulting Partner, Ernst and Young (EY) with the participation of:

- Quique Vivas, CCO, Ooredoo Oman
- Shadli Al Abdulsalam, CEO, FRiENDi Mobile Oman
- Nicolas Blixell, VP and Head of Ericsson GCC
- Aneth Guerra, COO, Vodafone Oman

After an introduction and welcome note by Christine Ziadeh, Director of Content for Media and Events at Telecom Review Group, the panelists shed light on the digital transformation of telcos, as well as their deployed use cases and enablers, further elaborating on notable success stories across the region.

Telcos in Oman Embrace Digital Transformation

Shadli Al Abdulsalam, CEO of FRiENDi Mobile Oman, said that telcos have undergone changes, notably highlighting that "where we are today versus where we were before" has been transformational. In general, digital transformation has resulted in reduced costs and personalized services, proven to be beneficial in targeting customers.

Due to the digital transformation process of moving customers from analog to digital, "it is essential for us to grow, not only in revenue, but to have a value-based centric model," explained Abdulsalam. This process includes helping customers from the access (onboarding) stage to the utilization of the services.

Adding her view to the discussion, Aneth Guerra, COO at Vodafone Oman, noted that for them, "digitalization is a path for opportunities and options, which is why it's important." This has a two-folded impact on the company: operations and customer experience. The introduction of automation and AI is important in many different areas of Vodafone Oman, resulting in efficiencies, fault detection, and energy savings.

"This is not an easy path by any means," stated Guerra. "Generally, what operators will do is they are going to do it by pieces—upfront to backend, or isolate areas—in starting the digitalization process."

As a digital-born company, the Vodafone App serves as an "everything" portal and it allows Vodafone to see its customer from a different perspective. In a competitive environment, the key factor is the kind of customer experience you provide, from onboarding to their overall interactions with your company.

Yet, Guerra emphasized that "being born digital" does not mean that everything Vodafone does is exclusively digital. "We are adapting to different market segments, [which are evolving] at their own pace, and we will continue in the journey of getting more and more digitalized."

Nicolas Blixell, VP and Head of Ericsson GCC, explained that Ericsson is working closely with operators in Oman to lay down 5G networks, which aligns with the digitalization goals of Oman Vision 2040. Ericsson has had a presence in Oman for over 50 years, and Blixell emphasized that implementing high-speed, low-latency network capabilities requires industry-wide collaboration. As a leading vendor, they work across the world and share the best practices in Oman. "The technology is ready but it will take time," added Blixell.

According to Blixell, what is quite unique in Oman is the massive adoption of fixed wireless access (FWA). Over the last three years, one operator has delivered 92% of home broadband via 5G FWA, demonstrating the country's strong enthusiasm for this technology. He reiterated this point by stating that, "Oman is a 5G country."

Quique Vivas, CCO of Ooredoo Oman, agreed that the level of digitalization and customer onboarding (personalization) within Oman makes it a "mature market." Although, he believes that there are still various areas that require improvement. "The focus should be on investing in infrastructure, maximizing the CapEx, and utilizing the networks."

Vivas reiterated that Oman has "a clear vision and [the] right ambition of being the digital hub in the Gulf," and to achieve this, they need to make sure that the "investments, strategies, and competitive dynamics" are operating in a favorable environment.

Overcoming Challenges in Digital Inclusion and Cybersecurity

In terms of challenges, the FRiENDi Mobile Oman CEO highlighted the sectoral importance of digital inclusion. In their target segment, the users tend to be "price-sensitive," hence, they must actively "educate the customers on how to use services and how to navigate the online space." The online app they launched two years ago is a testimony to this effort.

Being in the market for the past 15 years as a telco, FRiENDi understands that emerging in different markets and verticals is a must, and being part of Beyond ONE's digital community plays a huge role in bridging this gap. He emphasized that trust and education must be particularly nurtured in this respect.

Vodafone Oman's COO, Aneth Guerra, emphasized that on the path to digitalization, "the number one item you need to check is your cybersecurity and security posture." She explained that opening the digital door introduces new threats, requiring a different approach to protection than before.

Moreover, she highlighted that it is important to build security by design to ensure that you have the security levels that are required. However, Guerra stressed that "last-mile cybersecurity"—the people—is absolutely crucial. She pointed out that nearly 80% of issues arise from employees not following instructions and other related situations.

"Digitalization is not only a machine kind of thing; it is a human process, and we play a big part in it. We are digitalizing, but we are also becoming far more responsible in a greater world where we need to protect ourselves," she highlighted.

Empowering Oman's Telco Future: 5G Ventures, Customer-Centricity, and Security Strategies

For Ericsson, Oman is an important country to operate in as it has internationally competitive operators. In 5G deployment, return on investment (ROI) and customer retention are anticipated due to the technology's appeal. Combined with value-added services beyond mobile broadband, the "catch-up effect" highlights the need to capture the market by developing more use cases for enterprises, which are experiencing double-digit growth in demand.

In order to achieve cost efficiency in the industry, Blixell unveiled that USD 6 billion is being invested in R&D annually. "The name of the game is to have economies of scale to justify our customers' business case; we believe we are competitive in that area."

To go to the next step, Blixell referenced the establishment of Ericsson's Center of Excellence (CoE) for Omani skills development. He spoke about a notable agritech-based use case powered by 5G that aims to enhance food production in a sustainable way. These education efforts and mentorship programs are instrumental in disseminating digital knowledge throughout the country.

The Ooredoo Oman CCO concurred, stating that telcos are being referred to as "disruptors" as they continue to "put customers at the center, addressing touchpoints in different channels (both digitally and offline)."

In contrast, Vivas believes that "telcos have an even more important role, not in catching up, but in leading." This includes developing the next use cases and infrastructure that will take Oman to the next level. He acknowledges the country's maturity in 5G FWA adoption, noting a trend towards transitioning to SD-WAN and establishing platforms for B2B2C. This trajectory is poised to elevate the digital society to unprecedented levels.

Chiming in, the panel moderator, Dr. Abdullah S. Al-Balushi, emphasized the pivotal role of a collaborating alliance in fostering innovation and progress within the industry. Such alliances facilitate knowledge-sharing, resource pooling, and collective problem-solving, ultimately driving the advancement of common goals and initiatives.

To succeed, Al Abdulsalam indicated that telcos must focus on "how to grow and monetize our [their] base" by finding out what kind of services should be provided to customers, especially given the potential global market penetration rate of 140%. In FRiENDi's case, shifting to a value-centric model and applying predictive modeling has been beneficial. FRiENDi uses profiling tools to analyze and profile customers, and personalize its services, "not only focusing on providing telco services but also providing services in other verticals such as fintech, education, health, etc."

Guerra underscored the significance of endpoint protection within their strategic framework, emphasizing a holistic approach fortified by policies and frameworks like The Financial Consumer Protection Policy. With Vodafone Oman's complete digitalization, mirroring the country's vision, she highlighted the necessity of public-private partnerships to surmount expansion challenges.

For instance, at COMEX, the unveiling of the best app exemplified government support for entities, particularly in aiding SMEs. "This facilitation from the government has been absolutely pivotal in creating the conditions to the results that you see today in Oman," stated Guerra.

Projecting Vodafone's cybersecurity posture, Guerra said, "From an end-point protection, we are fundamentally able to take care of everything and it offers visibility over everything happening on our server."

Guerra elaborated on a specific use case within Vodafone Oman involving decoys, enabling them to simulate scenarios to deter potential threats. She emphasized,

"We are protecting ourselves and our customers. The more of these technologies we implement, the better we assess the risks." Their comprehensive approach extends to overseeing servers, laptops, and soon, even mobile phones, ensuring thorough vigilance across all fronts. She referred to the Vodafone application as a ubiquitous tool for all things digital.

"Having this kind of technologies have been quite important in protecting not only ourselves, but, by default, protecting our customers," said Guerra.

"We are also participating in a number of forums and collaborations on the cybersecurity front along with the advancement in emerging technologies, including AI and automation," she concluded.

Leveraging Partners to Accelerate Digital Transformation and Oman's Vision 2040

Discussing the environment of partnership between telecoms with the third parties in Oman, the conversation explored the expectations and challenges revolving around the importance of accelerators and partnership.

Al Abdulsalam highlighted the competitive telco market environment, emphasizing the industry's fundamental need to expand its customer base. He underscored the importance of leveraging technologies and collaborating with third parties to transition from a client-based model to a value-centric one.

Al Abdulsalam outlined the significant role of key players like BeyondOne and the influence of markets such as KSA and LATAM, which collectively create a digital ecosystem fostering synergy. Addressing the challenge of achieving Vision 2024 entails considering middle-class wages and education levels when developing product offerings. He emphasized the necessity of digital inclusion with a people-centric mindset. He emphasized their mission to establish a digital aggregator, with the telco serving as the foundation, supported by multiple verticals to cultivate a digital community. The overarching idea is to create a central hub and seamlessly integrate it into various markets.

"It's an ongoing process; we're learning as we go, but it's essential for us to collaborate with critical third-party partners in the market with the capabilities and specializations to allow us to move into growth areas and monetize our base," he added.

Blixell pointed out that a global company like Ericsson, with its presence in 180 countries, is inspired by what happens in the rest of the world and places itself in a position to see how it can similarly implement its observations.

He said that the partnership in Oman is open and professional. "What gets discussed upon; is what gets implemented and executed."

He mentioned that Ericsson's big fintech contracts in Africa could be brought to Oman to add value to operators. Similarly, he said more value could be added through the health and agricultural sectors as well as through smart factories using 5G technology. He also noted a proof-of-concept (PoC) project with Google to accelerate efficient cloud-based operations, which would be a country-first for Oman.

"Oman will be the first country to showcase this [cloud-based operations] as it is at the forefront of technology and the country is listening closely to what can be done to implementing it."

He further emphasized the potential benefits of a portal app-like structure for operators, citing companies like Porsche and Tesla as examples of those leveraging 5G technology. He underscored the importance of adhering to Vision 2040 as essential for the industry's future success. "Oman Vision 2040 is as important as a guiding star for Oman. It shows the involvement of the government in setting the path for the nation."

Agreeing with Blixell's point of view, Guerra said, "The government of Oman has taken a holistic approach to this, and this is absolutely important because they have created the framework, policies and conditions for digital environments to flourish. Vodafone Oman is already a result of the Vision 2040 as a third operator in the country with a 100 percent digital outlook."

The discussion continued by highlighting the acceleration of digital ambitions to achieve sustainable growth in Oman, emphasizing the pivotal role of Information and Communication Technology (ICT) in alignment with the frameworks of Vision 2040. This entails leveraging ICT as a strategic enabler to propel economic development, enhance social progress, and foster innovation in line with the long-term goals outlined in Vision 2040.

"FRiENDi Mobile Oman is partnering with various industry players to establish and leverage their services to help us build our verticals and integrate our services which are aligned with the Vision 2040 framework," added Al Abdulsalam.

Adding to this, Quique emphasized that despite the hype surrounding emerging technologies, the telco industry must prioritize understanding and meeting customer needs. He highlighted the shift in customer interaction methods and stressed the importance of redefining go-to-market strategies accordingly. This adaptability is crucial for staying relevant and competitive in a rapidly evolving digital landscape.

Looking Ahead

As a wrap-up of the discussion, the panel shifted its narrative towards the future of the digital transformation journey in Oman.

Blixell shared his opinion that the next step of the journey entails fully exploring the capabilities of 5G, including enhanced mobile broadband, FWA, mission-critical networks, and IoT applications enabled by ultra-low latency.

Guerra seconded this perspective, emphasizing the need for the development of 5G and IoT use cases at a larger scale to continue the digitalization journey of Oman.

Al Abdulsalam underscored the importance of transitioning to a value-based centric model, while Vivas echoed the significance of innovating use cases and comprehending how to monetize verticals enabled by 5G. TR

5G Standalone: New Ways to Operate and Automate Networks

Is the industry ready to ride the wave of innovation with the arrival of 5G standalone (SA) networks? It's not just an evolution; it's a revolution in mobile communication, set to unleash the true power of 5G technology worldwide.

Recent studies indicate that the Europe, Middle East, and Africa (EMEA) regions are spearheading extensive 5G core testing efforts, gearing up for the anticipated rollout of 5G SA networks in 2024. Emerging technologies such as IoT, cloud computing, and drones have begun to demonstrate their transformative power, yet they will rely on the robust nationwide 5G SA infrastructure for massive adoption. Recognizing this need, telcos are intensifying their focus on experimenting with and deploying 5G SA networks.

The envisioned benefits of 5G SA technologies are manifold, facilitated by a novel cloud-based, virtualized, microservices-based core

infrastructure. These advantages include enhanced connectivity with reduced latency, multi-device support, and network customization. Crucially, this technological advancement will unlock new revenue streams and service opportunities tailored to the needs of enterprise, industrial, and governmental customers.

Despite initial hurdles, including technical complexities and macroeconomic uncertainties, the 5G SA landscape is rapidly evolving. According to GSA, as of January 2024, 121 operators across 55 countries and territories are actively investing in public 5G SA networks, either through trials or full-scale deployments. This represents a substantial proportion (21%) of the operators engaged in various stages of 5G investment globally.

Looking ahead, industry experts anticipate a resurgence in growth from 2024 to 2025 as 5G standalone networks transition from testing to commercial viability. Beyond mere performance enhancements, this transition is expected to unlock tangible value propositions. Fueled by automation and the extensive adoption of 5G core technology, 2024 is on track to be the year when 5G fully realizes its potential.

Defining SA

As a technological framework, non-standalone 5G (5G NSA) relies on existing LTE networking infrastructure, while its standalone counterpart (5G SA) operates solely on 5G cells for signaling and data transmission, embodying the epitome of true 5G. Its foundation is rooted in a 5G packet core architecture.

To fully realize its potential impact on a global scale, operators worldwide have pioneered the deployment of 5G standalone networks, aiming to seize emerging opportunities. Conceptually, 5G SA offers a more streamlined approach at a systemic level and functions on a service-based architecture to deliver cellular connectivity. Significantly, it has the capability to be virtually divided into distinct segments, each customized to meet various service needs from start to finish.

Aligned with the latest 3GPP standards, the deployment of 5G standalone networks, combined with emerging technologies like cloud computing, network slicing, edge computing, and AI, will unlock a myriad of innovative applications and solutions across various sectors such as manufacturing, healthcare, energy, autonomous vehicles, gaming, and public safety.

In the same way, 5G SA enables Voice over New Radio (VoNR), empowering users to partake in high-definition video calls and seamlessly access bandwidth-intensive services on their mobile. On top of that, the enhanced connectivity offered by Fixed Wireless Access (FWA) presents significant advantages, particularly for small and medium-sized enterprises (SMEs).

> Recent studies indicate that the EMEA regions are spearheading extensive 5G core testing efforts, gearing up for the anticipated rollout of 5G SA networks in 2024

Three Paths Toward 5G SA Implementation

Ericsson outlines three distinct deployment phases crucial for achieving the complete 5G standalone experience. It's imperative to strategize the timing and approach for each phase based on an operator's business objectives, network requirements, and technological readiness.

The initial phase involves service providers implementing the 5G NSA architecture as an interim solution en route to full 5G SA architecture. This strategy allows for the rapid activation of 5G services while also keeping LTE as a backup option.

In the second phase, service providers opt for a more direct migration path, transitioning from LTE radio access and evolved packet core (EPC) networks directly to full 5G SA architecture.

Lastly, the third pathway pertains to service providers and enterprises initiating cellular network deployments for the first time, such as public greenfield deployments or private deployments, where dedicated 5G networks are chosen as the primary infrastructure solution.

Emerging Trends in 5G SA Network Development

The transition to fully-fledged 5G standalone (SA) networks has been a formidable journey, but 2024 is set to be the year of acceleration. Mobile operators recognize that unlocking advanced use cases hinges on the deployment of 5G SA cores, prompting a surge in global investments.

Reports tracking the progress of 5G SA have highlighted several trends to monitor in the current year:

1. **Telco Digital Transformation**: 5G SA is emerging as a primary catalyst for telco digital transformation initiatives, with significant momentum gained from network lifecycle automation. Approximately 20% of established service providers have initiated the adoption of DevOps and Agile practices.

2. **Multi-Vendor 5G Core Testing:** The rise in multi-vendor 5G core testing coincides with accelerated software releases, necessitating lab and test automation to support digital transformation efforts in OSS and lab modernization. The evaluation of advanced 5G core functionalities is expanding to encompass roaming, network data analytics function (NWDAF), and access traffic steering and switching (ATSSS).
3. **5G SA-Enabled Revenue:** The heightened testing of 5G SA-enabled devices will focus on performance and customer experience evaluations for new immersive voice and video services, while the collaborative efforts between service providers and device manufacturers aim to prioritize unlocking revenue opportunities facilitated by 5G SA.
4. **Transport Network Upgrades:** In anticipation for multifold increase on 5G traffic growth, leading service providers are embarking on 200/400G refresh cycles for IP core backbones. Moreover, the adoption of 400G is projected to reach critical mass by 2027, offering cost efficiency and reduced energy consumption to align with CapEx and ESG requirements.
5. **Non-Terrestrial Networks for Direct-to-Device 5G:** The increase in low Earth orbit (LEO) satellite testing underscores the exploration of direct-to-device (D2D) 5G services, emphasizing performance capabilities and addressing technical and regulatory hurdles.
6. **Rapid ROI from Private Networks:** The initial deployments of private networks in the commercial sector are showing promising results within the first six months. This has, in turn, sparked increased enthusiasm for the early Release 17 features, particularly the Reduced Capability (RedCap) functionality.
7. **Power Consumption Optimization:** Service providers and network equipment manufacturers (NEMs) are prioritizing testing power consumption and management across various infrastructure stacks under high-volume network function workloads. Promising results suggest potential power savings of 30-40%.

Overall, cloud providers, operators, and NEMs are spearheading 5G SA-based offerings, while the introduction of premium 5G SA services, such as secure network slices, VoNR, and reliable low-latency solutions for industrial applications, underscores the transformative potential of 5G SA networks.

Cloud-Native Operations

Cloud-native operations in 5G standalone enables telecom operators to rapidly test, deploy, and scale new services. Keeping this in mind, it is essential to emphasize collaboration with vendors to integrate new network technologies. This partnership boosts flexibility in current network operations through the integration of proactive monitoring and analytics across RAN, transport, and 5G core networks.

5G Core, which utilizes cloud-native technologies, facilitates cost-efficient upgrades and the deployment of new functionalities without service disruption. This enables service providers to swiftly create and deploy automated, customized connectivity services in hours, enhancing operational efficiency.

The adoption of 5G Core empowers service providers to offer superior network slicing and end-to-end service-level agreements (SLAs), while introducing service exposure and traffic steering functionalities for enhanced service differentiation. Edge computing support further optimizes latency and service reliability, elevating the end-user experience.

Transitioning to cloud-native telco architectures streamlines network lifecycle management, reducing errors and costs. Yet, achieving effective service assurance demands a novel approach, necessitating real-time orchestration and closed-loop network automation tailored for 5G standalone implementations.

Architectural transformation options for evolving to 5G SA include:

- The rapid deployment of standalone services with virtualized infrastructures, bypassing containerized architectures.
- The direct adoption of bare metal containerized architectures with dedicated virtualized microservices for each service.
- The implementation of a balanced blend, facilitating a seamless transition from virtualized to containerized microservices over time.

5G-Powered Automation

Automation, supported by 5G SA networks, facilitates the dynamic integration of partner offers into comprehensive service packages, aligning with the emerging B2B2X business model. This diversified approach adds value and enriches the customer experience. TR

Mobile operators recognize that unlocking advanced use cases hinges on the deployment of 5G SA cores, prompting a surge in global investments

The Rise of Intelligent Experiences: AI and Automation in Customer Interactions

Customers nowadays expect to have their needs addressed at the earliest convenience, which typically means immediately. How will AI and automation continue to disrupt enhanced customer experience in 2024?

Whether it's regarding a complaint or simply updating an ID for account verification, automated tasks are a must to retain and satisfy customers. In the consumer realm, there is a collective aversion towards enduring extensive waiting periods and navigating through cumbersome document submission processes for the completion of routine procedures. With AI and automation combined, processes become more seamless, understandable, and efficient.

Modern Customer Service

Faster response times, reduced customer friction, and expanded service hours and channels are the key advantages for an AI-powered customer service. Moreover, personalization can be done as businesses gain a better understanding of each customer's historical, social, and behavioral data. Product recommendations are catered as a result of data analytics. The more the user interacts with a brand—within an app for example—the algorithms can continuously learn and improve, anticipating the customer's behavior and providing highly relevant outputs. Consequently, each customer's journey establishes a deeper personal connection, fostering heightened levels of loyalty and trust.

Almost all companies, brands, and even government entities have implemented

chatbots and virtual assistants into their operations to quickly resolve problems and provide common support inquiries. This saves time for both the customer and employees when responding to FAQs. Otherwise, urgent situations can be rerouted to automated tickets based on the topic.

Furthermore, automated employee surveys and feedback forms can easily identify areas for improvement on both sides of the interactions, promptly knowing which areas are performing and which needs to be amended.

Key Areas to Shape Customer Experience

Long gone is the era of enduring tedious wait times and repetitive exchanges with customer service representatives. Envision a scenario where live website or app chatbots, empowered by advanced AI technology, are poised to provide round-the-clock assistance to customers. These digital helpers not only provide immediate responses but also guide users through complex processes with ease. Meanwhile, automated email systems ensure that every customer query receives a prompt and personalized reply.

However, that's just the tip of the iceberg. Interactive voice response (IVR) systems revolutionize customer calls, seamlessly directing inquiries to the appropriate department and minimizing wait times. Self-service facilities empower customers to find answers to their questions independently, providing information at their fingertips whenever they need it.

AI-powered tools also delve deep into customer data, enabling companies to craft tailored messages that resonate with each individual. Thanks to natural language processing (NLP) and sentiment analysis, communication not only becomes clear, but also becomes emotionally resonant, forging a deeper connection with customers.

Predictive and prescriptive analytics take things a step further, foreseeing future outcomes and prescribing the best actions to achieve them. With AI-guided journey mapping, companies also gain invaluable insights into the customer experience, pinpointing pain points and optimizing processes for maximum efficiency.

In the competitive arena of pricing strategies, dynamic pricing based on data analytics ensures that companies stay ahead of the curve, adapting to ever-changing market conditions with agility and precision. And for a truly immersive experience, virtual try-ons and augmented reality (AR) transport customers into a world of interactive engagement, revolutionizing the way they interact with products and services.

Telecom Perspective

Even if a telecommunications company offers the lowest prices in the market, customers who experience poor service, connectivity issues, or unexpected charges on their bills are unlikely to remain satisfied and loyal to their products.

That is why telcos utilize machine learning (ML) models for various commercial purposes such as predicting customer churn and optimizing pricing strategies. Moreover, they have increasingly adopted these models to address service-related issues such as broadband connectivity faults, billing discrepancies, and recurrent failures. By leveraging these technologies extensively, telcos can incorporate service-related concerns into their decision-making processes.

However, achieving true omnichannel capabilities remains a challenge for many telcos. This entails aligning all inbound, outbound, automated, and human-assisted channels seamlessly, integrating both commercial and service-related interactions across all channels.

For example, Ooredoo Qatar partnered with Reailize to revolutionize its network operations through the Continuous Assurance (CA) solution. This partnership was put to the test during the World Cup, where Ooredoo Qatar faced an unprecedented surge in data traffic exceeding 800 terabytes and over 12 million voice calls. Reailize combines automation, AI, and customer experience metrics to detect network anomalies, identify root causes of issues, and propose actions based on predicted customer impact.

Another notable instance was conducted in 2023 when e& UAE announced the launch of the world's first autonomous telecom store, named 'EASE' (Etisalat by e& Autonomous Store Experience). This innovative store is powered by AI and features advanced technologies to enhance the customer purchasing journey. The autonomous store aims to redefine retail in the UAE by integrating AI, machine learning, facial recognition, smart gates, robotics, smart shelves, and smart dispensing machines.

The store offers a streamlined Pay & Pick (PAP) journey, allowing customers to explore a range of etisalat by e& products, select their desired items, and have them swiftly delivered by smart dispensing machines.

Closing Note

In this era of innovation, customer service automation isn't just a convenience; it's a game-changer. By harnessing the power of AI and cutting-edge technology, companies can elevate the customer experience to new heights, building lasting relationships and driving success in the digital age.

As AI becomes increasingly integrated into customer experience strategies, it is imperative to address the ethical considerations associated with its implementation. In 2024, businesses that utilize AI transparently and responsibly will distinguish themselves. Prior to implementing generative AI, thorough checks and validations are essential to prevent errors. Ensuring the accuracy of the data fed into generative AI and confirming that the designed customer service process aligns with the AI's capabilities are crucial steps in effectively managing AI-driven customer service.

Thus, starting small is advisable. It is recommended to begin where tangible value and benefits can be measured. For starters, using clean data and involving a select group of loyal customers in the design process to ensure a pathway to success, could work best. TR

Steps Taken to Bridge the Standardization Gap Worldwide

Does bridging the standardization gap (BSG) play a pivotal role within the ITU's (International Telecommunication Union) mission to unite the global community through evolving technology? Among the strategic objectives highlighted by the ITU's standardization sector (ITU-T), BSG assumes a central position.

The primary aim of the BSG program is to rectify imbalances between member states, particularly developing countries, concerning their capacity to access, participate in, develop, and implement international standards set by the ITU.

"ITU fosters collaboration to support innovation on a global scale. Our work to bridge the standardization gap is central to our mission and values," commented Seizo Onoe, Director, TSB.

Aiming for a Holistic Approach

Notably, the mission's backbone is fortified by resources and partnerships. By actively seeking and curating thematic initiatives and partnerships, the goal of bridging the standardization gap is making progress. In terms of development, ITU-T Regional Groups spanning Africa, the Americas, the Arab region, Asia and the Pacific, and EECAT regions facilitate participation and engagement, aligning with the ITU's mission to bridge the standardization gap globally.

Similarly, when it comes to implementation, the ITU stands ready to aid countries in adopting established ITU-T Recommendations, advocating for their integration into national plans and policy frameworks where applicable. Embracing a

comprehensive approach, the ITU utilizes its support structure while nurturing collaboration to drive digital transformation across various thematic areas.

Driving Digital Transformation

The key thematic areas driving digital transformation encompass e-waste management, digital finance security, the development of smart sustainable cities, the utilization of AI for enhancing road safety, and the promotion of safe listening practices.

- **E-Waste**

E-waste, also known as waste electrical and electronic equipment (WEEE), is one of the most rapidly expanding waste streams globally. The surge in digital society and consumer demand for devices has led to a termed "tsunami of e-waste" by the UN.

Between 2010 and 2022, both the generation and documented recycling of e-waste increased significantly. However, immediate action is imperative to address the health and environmental risks posed by inadequate handling and disposal. Amidst challenges, appropriate recycling methods could yield economic returns exceeding USD 62.5 billion annually.

The ITU is actively engaged in global, regional, and national efforts to address e-waste challenges. In the same context, the Global E-waste Monitor 2024 serves as a vital resource for policymakers and the industry, offering insights into the global e-waste landscape. Despite progress, the growth rate of countries implementing e-waste policies has slowed. As of June 2023, only 42% of countries have these regulations in place, which is below the ITU's target of reaching 50% by the same year.

"We must seize the economic and environmental benefits of proper e-waste management; otherwise, the digital ambitions of our future generations will face significant risks," said Vanessa Gray, Head, Environment & Emergency Telecommunications Division, ITU Telecommunication Development Bureau.

Located within the Dubai Industrial Park, The Recycling Hub is the largest e-waste recycling facility globally, spanning 280,000 square feet. This plant is equipped to manage a diverse array of waste types, including WEEE, IT asset disposition (ITAD), refrigerant gas, and specialized waste. Concurrently, in partnership with the ITU, Saudi Arabia's Communications, Space, and Technology Commission (CST) has introduced the Development of Electronic Waste Management Regulations initiative.

- **Digital Finance Security**

Established by the Security, Infrastructure, and Trust working group as part of the Financial Inclusion Global Initiative (FIGI), the Digital Financial Services Security Lab, housed at the ITU, offers resources for security testing of mobile payment applications and supports the implementation of passwordless, strong, consumer authentication.

Overall, the digital finance services (DFS) landscape involves multiple stakeholders, leading to complex security challenges that extend beyond DFS providers to include customers, network providers, mobile phone manufacturers, and other third-party entities in the ecosystem.

To address these challenges, the DFS Security Assurance Framework offers a systematic approach to security risk management, helping DFS providers and mobile network operators assess threats, vulnerabilities, and implement appropriate security measures.

Given the attractiveness of the financial services industry to ransomware gangs and the prevalence of phishing attacks, which initiate over 90% of successful cyberattacks, robust digital security measures are imperative in the financial sector.

Recognizing this, there's a growing need for standardization to enhance interoperability in payment systems and prevent the creation of isolated environments.

- **United for Smart Sustainable Cities**

The United for Smart Sustainable Cities (U4SSC) is a global initiative spearheaded by the UN and coordinated by the ITU, UNECE, and UN-Habitat. Through thematic groups, the U4SSC develops action plans, technical specifications, case studies, and guidelines, offering policy direction for cities to enhance their sustainability and accelerate digital transformation. Focus areas encompass city platforms, urban economic resilience, AI integration, procurement strategies, and digital wellbeing.

A collaborative effort between UNECE and the ITU involving over 300 international experts resulted in the jointly developed definition of 'smart sustainable cities.' Such cities utilize ICTs and innovative approaches to enhance quality of life, urban efficiency, and competitiveness while ensuring holistic development across economic, social, environmental, and cultural realms for present and future generations.

Various elements contribute to the establishment of a smart and sustainable city, including social cohesion, human capital, and economic performance. Notably, European and US cities dominate the IESE ranking of the world's most sustainable and smart cities.

By and large, international standards play a pivotal role in the development of smart cities by facilitating effective data utilization and implementation. These standards cover diverse areas such as data management in cloud computing, the establishment of trustworthy data infrastructures, reliability of AI technologies, data governance, processing, sharing, and more.

- **AI for Road Safety**

The AI for Road Safety initiative aligns with the UN General Assembly Resolution on Enhancing Global Road Safety and the UN Secretary-

General's digital cooperation strategy. This initiative supports the UN Sustainable Development Goals (SDGs), particularly SDG target 3.6, which aims to reduce global deaths and injuries from road traffic accidents by half by 2030; and SDG Goal 11.2, which aims to provide safe, affordable, accessible, and sustainable transport systems for all by 2030.

Bearing this in mind, AI plays a crucial role in proactive traffic safety management by utilizing sensors and computer vision systems to gather data on road infrastructure conditions and traffic events across entire networks. Additionally, through predictive models, AI can identify high-risk crash locations based on learned patterns. In regions with precise and relevant data, AI can proactively identify dangerous locations before accidents occur.

For instance, earlier this year, the Sharjah Roads and Transport Authority (SRTA) enhanced 48 traffic lights across the city with artificial intelligence. This system utilizes sensors, cameras, and advanced algorithms to collect and analyze real-time traffic data, including vehicle counts, types, and speeds. Sophisticated algorithms then process the data to swiftly identify traffic flow patterns and trends, such as peak congestion times. Moreover, in 2023, Dubai's Roads and Transport Authority (RTA) revolutionized road maintenance and safety with the deployment of the latest AI technology.

However, the effectiveness of AI models in road network safety relies heavily on the provision of quality data on road assets, traffic, and events. Lack of data provision currently limits, and will continue to limit, the performance of AI models in this domain. This is a work in progress that will continue to be addressed in time.

- **Safe Listening**

According to World Health Organization (WHO) statistics from February 2024, it is projected that by 2050, nearly 2.5 billion people will experience some degree of hearing loss, with at least 700 million requiring hearing rehabilitation. Additionally, over 1 billion young adults are at risk of permanent hearing loss due to unsafe listening practices.

Safe listening hinges on three factors: decibels, time, and distance. Higher decibel levels lead to shorter listening durations. Increasing distance from the audio source can mitigate the effects of high sound levels, enabling longer listening periods.

To address the rising issue of sound-induced hearing loss from recreational exposure to loud sounds, the WHO's "Make Listening Safe" Initiative has partnered with the ITU to convene governments, health professionals, academia, and industry stakeholders. This collaboration aims to explore how ICTs can promote safe listening through policy briefs, international standards, and awareness campaigns, ensuring that people of all ages can enjoy various audio experiences without compromising their hearing.

ITU-T Q28/16, in collaboration with WHO and other experts, spearheads the development of technical standards for safe listening devices, such as mobile phones. These standards will enable users to control their exposure to loud sounds and make informed listening choices.

To facilitate the effective implementation of these standards, WHO, ITU-T, and ITU-D's Digital Inclusion Program have developed a Toolkit for Safe Listening Devices and Systems. This toolkit offers guidelines for governments, private sector entities, and civil society organizations to ensure practical implementation of the standard through public policies and industry adoption, promoting responsible enjoyment of audiovisual content and preventing sound-induced hearing loss.

The increasing popularity of video gaming and esports—captivating up to 3 billion enthusiasts globally—has led to increased concerns about prolonged and loud audio exposure, particularly related to hearing damage and loss. Earlier this year, the ITU and WHO initiated a joint effort to develop a global standard for safe listening in video gaming and esports activities, which involves hosting a series of technical workshops.

The ITU's commitment to driving digital transformation across thematic areas like e-waste management, digital finance security, smart sustainable cities, AI-enabled road safety, and safe listening practices underscores its dedication to fostering collaboration and innovation. Within its mission to unite the global community through evolving technology, bridging the standardization gap (BSG) stands as a pivotal objective highlighted by the ITU's standardization sector (ITU-T), emphasizing its central role in advancing global connectivity and interoperability. TR

Within its mission to unite the global community through evolving technology, bridging the standardization gap (BSG) stands as a pivotal objective highlighted by ITU-T

du Enters Global Top 25 Telecom Brands, Brand Valued at USD 2.4 Billion

du, commercially rebranded from Emirates Integrated Telecommunications Company (EITC), reached a significant milestone in its brand strength, achieving a brand strength index (BSI) of 82.5 points.

According to the 2024 Brand Finance rankings, the company has not only maintained its AAA- rating but has also risen to become the third-strongest brand in the UAE and seventh-strongest in the Middle East. This significant growth has propelled du into the Global Top 25 Telecom brands, a notable ascent from its previous ranking at 33rd place last year.

The company's strategic initiatives and consistent focus on innovative telecommunications solutions have significantly increased its brand value by 13% year-on-year, from USD 2.198 billion to an impressive USD 2.475 billion. This marks not only a significant increase in financial valuation but also reinforces du's ongoing commitment to excellence and innovation in the competitive telecom sector.

Commenting on this milestone, Fahad Al Hassawi, CEO at du, said, "The du vision, which underpins our strategy to deliver value and unmatched experiences to our customers, has fortified our brand against both local and international benchmarks."

This surge in brand strength and value is driven by du's proactive approach to integrating cutting-edge technologies and customer-centric services, which significantly enhances user experiences.

The ranking is also attributed to du's enhanced brand strength across various index attributes, including the quality of its products combined with its value for money and innovative methods to address customers' needs, thus, positioning the company as a joint leader in these domains.

Notably, du's recent initiatives in expanding 5G capabilities and enhancing digital transformation services have set new benchmarks across the industry.

"Keeping pace with generational and market developments, we have continuously adapted our approach to enhance customer satisfaction in alignment with our brand ethos," the du CEO concluded.

Telecom Egypt Q1 Results: Strong Growth Momentum Sets the Tone for 2024

Proudly reporting the continuation of Telecom Egypt's growth momentum at the beginning of the year, Mohamed Nasr Eldin, Managing Director and Chief Executive Officer, commented, "Our Q1 2024 operational and financial results reflect the resilience of our business in the face of macroeconomic challenges."

Q1 2024 Key Highlights

Telecom Egypt's top line increased by 25% year-over-year (YoY), reaching EGP 17.5 billion, recording the highest quarterly revenue to date. The consolidated Q1 2024 revenue was driven by continued growth in data, which accounted for 62% of total revenue growth, followed by capacity sales and IDD, contributing 17% and 11% respectively to revenue growth.

Moreover, the operator's net profit reportedly reached EGP 3.9 billion, with a 22% margin, marking a modest 2% increase YoY, as the robust financial performance was partially offset. Conversely, Telecom Egypt's operating profit landed at EGP 3.6 billion, down 5% YoY due to 41% higher D&A costs YoY.

The operator's EBITDA also grew 19% YoY, amounting to EGP 7.3 billion, with a notable 42% margin. This performance underscores the company's robust organic growth, including the impact of the strategic price adjustments.

"We remain committed to enhancing our free cash flow in the period ahead through several strategic initiatives, including the phasing out of our CapEx, without humbling the growth momentum we have achieved," the CEO continued.

These notable results illustrate this commitment; the in-service CapEx, excluding the license fee, landed at EGP 1.6 billion (representing 9% of revenues), while cash CapEx, including the license fee, reached EGP 15.0 billion, recording an 86% cash CapEx to sales ratio.

Additionally, the net debt to EBITDA ratio (excluding vendor finance) was 2.1x in Q4 2023, up from 1.9x. This rise occurred despite a 62% quarter-over-quarter (QoQ) increase in gross debt due to the revaluation of foreign-currency debt.

Zain KSA Plans Major 5G Expansion With SAR 1.6 Billion Investment

Zain KSA is injecting SAR 1.6 billion to expand its infrastructure, 5G network, and digital services ecosystem. Part of an integrated expansion plan, this step aligns with Zain KSA's strategy to achieve digital inclusion across the Kingdom and enable an advanced digital infrastructure that provides the best customer experience.

Empowering Digital Transformation

Commenting on the announcement, Zain KSA CEO, Eng. Sultan bin Abdulaziz Al-Deghaither, stated, "We are pleased to announce this huge investment to expand our network as an extension of our approach to harnessing the best technical capabilities and resources to serve the community after launching the largest 5G network in the Middle East, Europe and Africa, and third-largest globally."

The plan will see more than 66% of the Kingdom's populated area covered with 5G services and solutions, increasing the number of Zain KSA's 5G network sites around the Kingdom to more than 7,000.

"This new network expansion aligns with our strategy of leveraging the latest technologies to empower a real sustainable digital transformation. It will also broadly impact our customers, enhancing the digital experience of individuals and enterprises and catalyzing the Kingdom's transformation journey, ensuring its readiness for Industry 4.0," added the CEO.

45% of the new expansion plan will support 5G-Advanced technologies, increasing the network's capacity and providing higher speeds with record response times. This will ensure a unique digital experience for individuals and support enterprises in keeping pace with Industry 4.0 requirements, while also empowering smart cities.

Full 5G in Holy Sites

Through targeted investments, Zain KSA aims to expand its 5G network from covering 66 cities to covering 122 cities and governorates across the Kingdom, including Makkah and the Holy Sites. Zain KSA will be the first telecoms operator to secure full 5G coverage in the Holy Sites through all its towers.

Omantel Announces Major Cloud and E-Commerce Collaboration With Hyperscalers

During COMEX 2024, Omantel proudly announced its strategic partnership with two hyperscalers: Amazon Web Services (AWS) and Google Cloud.

Omantel and AWS will collaborate to establish a sovereign cloud services center and build and operate an integrated e-commerce platform in Oman, which is projected to be valued at OMR 24 million.

On the other hand, Omantel and Google Cloud will set up the first distributed cloud edge service in the Middle East, Turkey and Africa (META) region to provide generative AI and data analytics solutions.

Commenting on this recent milestone, Omantel CEO, Talal Said Al Mamari, said, "At Omantel, we always strive to have an outstanding participation in the premier and largest tech event in the Sultanate of Oman, COMEX. This year, through our participation, we announced strategic partnerships with global companies, Amazon Web Services and Google. This reaffirms our commitment to being an integrated provider of innovative technical solutions in the Sultanate of Oman and the region."

The recently unveiled partnership between Omantel and AWS also includes the establishment of a cloud center of excellence (CCoE). Together, the entities aim to provide generative AI (GenAI) solutions, as outlined in a plan unveiled earlier this year during MWC 2024.

The establishment of the CCoE and sovereign cloud capabilities will expedite Oman's strategic vision, which centers around digital transformation. This initiative will empower both public and private sector organizations to innovate more rapidly and enhance customer service through cloud-enabled solutions.

Sharing his remarks on the recent partnership, Mohamed Afifi, Head of Sales, GCC and Levant, Worldwide Public Sector, AWS, stated, "This collaboration marks a significant step forward in cloud technology, providing Omani organizations with a secure, scalable, and compliant cloud environment tailored to local regulatory requirements."

Utilizing a sovereign cloud, businesses can confidently transition to cloud services, leveraging AWS' cutting-edge technology and Omantel's robust infrastructure. Moreover, reduced latency and improved performance will be achieved by keeping data and workloads closer to end-users.

Unveiling 'walletii': Ooredoo's Next-Gen Fintech Solution Debuts in Oman

'walletii by Ooredoo,' a new state-of-the-art fintech solution, has officially made its debut in Oman at the 33rd edition of the COMEX Global Technology Show. This launch marks a significant milestone in Ooredoo's strategy to extend the successful Ooredoo Money platform from Qatar to the broader MENA region.

Commenting on the launch, Aziz Aluthman Fakhroo, Group CEO, Ooredoo, said, "We thank the Central Bank of Oman for awarding us with the license to operate 'walletii.' This endorsement allows us to contribute significantly to the fintech sector in Oman. Our goal is to provide consumers with an easy, secure, and cost-effective financial tool that upgrades their everyday lives."

First Mobile Money App with Remittance Marketplace

Unveiled by Ooredoo Fintech (OFTI)—a wholly-owned subsidiary of Ooredoo Group, and Ooredoo Oman—'walletii' translates to "my wallet" in Arabic, reflecting its purpose as a user-friendly mobile wallet designed to upgrade and simplify financial transactions for consumers and merchants.

For the first time in Oman, 'walletii' will be the inaugural mobile money app offering a remittance marketplace, enabling users to choose from multiple providers to secure the best rate for their transactions.

Scheduled to launch later this summer in Oman, the 'walletii' app will enable users (regardless of whether they are Ooredoo customers) to make payments and send or receive money both domestically and internationally, while earning rewards easily and securely.

The app will also feature chat-like payments for a more intuitive and seamless user experience. Additionally, 'walletii' users will be rewarded for their everyday transactions through an integrated loyalty program, enhancing customer engagement and satisfaction.

Ooredoo Fintech: A Market Leader

Mirko Giacco, CEO of Ooredoo Fintech, expressed his enthusiasm regarding the new venture, stating that, "walletii by Ooredoo was designed to deliver superior usability and exceptional customer experience, upgrading how people manage their finances in Oman. By offering a seamless and secure digital wallet experience, we aim to empower consumers and businesses alike, driving financial inclusion and innovation across the region."

The establishment of Ooredoo Fintech as a wholly-owned fintech holding company highlights a strategic move by Ooredoo Group, which continues to solidify its position as the leading digital infrastructure provider operating in core telecom services, data centers, and fintech.

Umniah Launches First Startupbootcamp MENA Challenge

Aligned with its recent partnership with Startupbootcamp, Umniah has launched the first leg of its entrepreneur-driven challenges through 'The Tank' platform. Under the sponsorship of His Excellency Ahmad Hanandeh, Minister of Digital Economy and Entrepreneurship, Jordan's progress in fostering a conducive environment for startups and entrepreneurs was highlighted during the event.

Chief Digital and Information Technology Officer, Ehab Hafez, remarked, "At Umniah, we're thrilled to harness the entrepreneurship ecosystem innovation in ML and AI to enhance customer experiences and personalize services."

Wajeeha Al-Husseini, Director of Brand and Corporate Communication at Umniah, and the corporate communication team, organized the event.

Improving Jordan's Entrepreneurial Ecosystem

In March 2024, Umniah officially partnered with Startupbootcamp to manage and enhance The Tank—the company's business incubator—with the aim of strengthening Jordan's entrepreneurial ecosystem.

Together, Umniah and Startupbootcamp will conduct six-week challenges focusing on key areas such as 5G, edge computing, cybersecurity, cloud computing, AI and machine learning, communication technologies, software-defined networking, and IoT. Participants will be guided through idea development and pitch preparation, culminating in a final presentation.

Commenting on this partnership, Faisal Qamhiyah, CEO of Umniah, said, "This partnership reaffirms our commitment to supporting Jordanian startups and recognizing the pivotal role of entrepreneurship in boosting the competitiveness of the national economy amid rapidly evolving market dynamics. Updating our strategy to align with emerging technologies and evolving market and consumer needs is essential to ensure that The Tank att

The Wireless Leap: Why 5G FWA is the Future of Broadband

Imagine a telecom realm entwined with high-speed internet, without the hassle of cables—this is the promise of Fixed Wireless Access (FWA). With FWA, the delays of fiber-optic installations and the limitations of DSL are a notion of the past. Powered by 5G technology, homes and businesses are set to enter a new era of unparalleled flexibility and speed.

Over the past three years, the number of service providers offering Fixed Wireless Access (FWA) has steadily increased. By 2023, nearly 80% of global service providers had adopted FWA. According to Ericsson's Fixed Wireless Access Insights, FWA connections are projected to grow significantly, reaching 330 million by 2029. This will constitute 18% of all fixed broadband connections and generate approximately USD 75 billion in revenue for service providers.

FWA data traffic is expected to surge as well, nearing 159 exabytes by 2029, which will represent nearly 30% of total mobile network data traffic. In the Middle East, there has been robust 5G FWA momentum, particularly in Oman, Saudi Arabia, and the UAE wherein service providers are actively promoting home internet solutions based on either fiber or 5G FWA and are transitioning 4G FWA connections to 5G.

Regionally, over 80% of service providers in North America, Western Europe, Central and Eastern Europe, and the Middle East and Africa offer FWA. As of November 2023, there are 121 service providers globally with 5G FWA offerings. Notably, 51 of these (42%) are located in emerging markets, lead by the Middle East with 16 service providers offering 5G FWA services.

Network Evolution

Fixed Wireless Access (FWA) deployments offer three key advantages over fiber deployments: faster time-to-market, a more favorable financial investment profile, and the ability to leverage existing mobile infrastructure. The enhanced speed, capacity, and coverage of FWA are achieved through various technologies such as 5G standalone (5G SA) networks, carrier aggregation, massive MIMO solutions, and the utilization of new spectrum in mid-band TDD and mmWave frequencies.

The superior performance of 5G serves as the cornerstone of FWA success, enabling the provision of fiber-like services on a large scale. To fully leverage the potential of 5G, service providers are increasingly adopting 5G Standalone (5G SA) networks with dedicated cores and advanced air interfaces, facilitating differentiated services and enabling premium gigabit FWA for new and advanced use cases.

In regions like EMEA and Asia, 5G-Advanced technology provides FWA with a competitive edge over fiber services, offering connection rates of 500 Mbps to 1 Gbps, comparable to fiber, but at reduced deployment costs, particularly in areas with lower population densities. Leading service providers are also implementing Network and RAN Slicing to capitalize on 5G monetization opportunities, delivering differentiated performance tailored to specific connectivity needs, including high throughput, reliability, and low latency requirements.

The integration of mmWave technology further enhances gigabit FWA network performance and user experiences, enabling three times the capacity and extended range. Thus, FWA users benefit from significantly higher upload speeds and capacity, facilitated by massive MIMO and uplink carrier aggregation.

Ongoing 5G FWA Momentum

From a telecom player's perspective, there are several reasons why there is ongoing momentum for 5G Fixed Wireless Access (FWA):

1. High-Speed Internet Access: 5G FWA offers high-speed internet access compared to traditional fixed-line broadband, making it an attractive option for both urban and rural areas where laying down fiber infrastructure might be expensive or time-consuming.
2. Quick Deployment: Deploying 5G FWA infrastructure is faster and more cost-effective compared to laying down fiber-optic cables. Telecom companies can leverage their existing 5G infrastructure or build new small cell sites to offer high-speed internet access to customers rapidly.
3. Last-Mile Connectivity: 5G FWA provides an efficient solution for bridging the last-mile connectivity gap, especially in areas where traditional wired infrastructure is lacking or insufficient.
4. Scalability, Flexibility and Mobility: 5G FWA networks are highly scalable, allowing telecom players to expand their coverage areas and accommodate a growing number of subscribers without significant infrastructure upgrades. 5G FWA also offers mobility, allowing users to access high-speed internet on-the-go.
5. Diverse Use Cases: Beyond residential broadband, 5G FWA can also support various use cases such as enterprise connectivity, IoT applications, smart cities, and industrial automation, expanding revenue opportunities for telecom companies.
6. Government Initiatives and Support: Governments in many countries are supporting the deployment of 5G infrastructure, including FWA, through regulatory reforms, subsidies, and incentives. This support encourages telecom players to invest in and expand their 5G networks.

> Powered by 5G technology, homes and businesses are set to enter a new era of unparalleled flexibility and speed

Overall, the combination of high-speed internet access, quick deployment, scalability, flexibility, and support from governments creates a favorable environment for telecom players to capitalize on the momentum of 5G FWA and meet the increasing demand for broadband connectivity.

The appeal of Fixed Wireless Access (FWA) varies by region due to differing geographical, economic, and technological factors. Here's an overview of what makes each region appealing for FWA:

North America – United States and Canada

There is a strong investment in 5G infrastructure by major telecom players such as Verizon, T-Mobile, and AT&T which supports widespread FWA deployment and bridges the internet accessibility gap. Moreover, a high consumer demand for faster and more reliable internet services is evident as more people work and learn from home.

Europe

In many parts of Europe, deploying fiber can be expensive and slow due to historical city layouts and regulatory challenges. Hence, FWA offers a faster deployment alternative. European governments and the EU are continually supporting digital initiatives, providing funding and regulatory frameworks that favor FWA deployment.

Asia Pacific

Within developed markets like South Korea, Japan and Australia, the high adoption rates of new technologies make FWA an appealing solution to meet the demand for high-speed internet. Similarly, in emerging markets like India and the rest of Southeast Asia, FWA helps expand high-speed internet to underserved regions as a cost-effective alternative to fixed internet.

Middle East

In GCC countries like the UAE and Saudi Arabia, FWA plays a crucial role in smart city projects, facilitating the connection of numerous Internet of Things (IoT) devices and ensuring reliable internet access. Additionally, there is also strong governmental support and funding for 5G and digital transformation projects.

Africa

As a mobile-first market, high mobile phone penetration and a preference for wireless solutions makes FWA a natural fit in this area. FWA can provide high-speed internet where traditional infrastructure is lacking.

Latin America

As LATAM's digital economy grows, the demand for reliable, high-speed internet increases, making FWA an attractive solution. Many regions still struggle with broadband access and FWA can quickly extend high-speed internet to underserved areas.

Overall, the specific appeal of FWA in each region is influenced by a combination of geographical challenges, economic conditions, technological readiness, and government policies aimed at improving digital connectivity.

Leveraging 5G FWA

Here are some examples to illustrate the global momentum behind FWA as telecom operators leverage 5G technology to provide high-speed, reliable internet access to underserved and unserved areas, enhancing digital connectivity worldwide.

In the Middle East, operators made significant strides in 5G FWA deployment. In 2021, Nokia and Mobily successfully piloted 4G and 5G fixed wireless access (FWA) network slicing, the first sliced FWA deployment in the world. In 2021, du introduced its FWA business and despite du's lower fiber penetration rate compared to its competitors, FWA resulted in a doubling of user numbers by 2023.

Bearing this in mind, du and Huawei will continue to work together in improving the manufacturing industry with 5G-Advanced, and converging FWA and FTTH for better value and services.

During Q1 2024, stc Kuwait announced the Middle East's inaugural commercial deployment of 5G RedCap Fixed Wireless Access (FWA) service.

As of recent updates, Verizon and T-Mobile have been aggressively expanding their 5G Home Internet service, which uses FWA technology to deliver high-speed internet to residential customers.

Telstra in Australia is also expanding its 5G FWA offerings to deliver high-speed internet to homes and businesses in areas where fixed-line options are limited. Moreover, KT Corporation has been actively deploying 5G FWA services to enhance broadband connectivity in South Korea.

Notably, Rain has been pioneering 5G FWA in South Africa, expanding coverage in major cities like Johannesburg and Cape Town, while Vodafone has launched 5G FWA services in several European markets, including Germany, Italy, and Spain. TR

> From a telecom player's perspective, there are several reasons why there is ongoing momentum for 5G FWA

Tackling Algorithmic Discrimination in AI

Since the introduction of the internet, algorithms have long been a part of our daily lives. Algorithms permeate various aspects of our daily lives, spanning from internet searches, entertainment platforms, and social media to self-driving cars, visual recognition systems, translation tools, and smart assistants/speakers. These algorithms play a pivotal role in numerous economic sectors, shaping countless decisions made by humans on a daily basis.

Although they are just mathematical equations, their objectivity is compared to that of humans as, ultimately, they are created by humans. This is where the phenomenon of algorithmic bias begins to emerge.

For instance, some cameras equipped with blink detection features wouldn't take pictures of many Asians because the "software thought their eyes were never open." Furthermore, AI-powered voice assistant services face challenges in accurately understanding variations in native accents, and translation tools often associate specific jobs with particular genders when translating sentences containing gender-neutral pronouns from languages such as Turkish, Finnish, and Chinese.

Additionally, cases such as Google's photo-recognition tool mistakenly tagging a picture of two black individuals as gorillas and crime-predicting algorithms inaccurately labeling black individuals as habitual

offenders more often than white individuals serve as illustrations of the social biases inherent in algorithms.

Treading on Thin Ice

Algorithmic bias is inherent in the functioning of artificial intelligence (AI) algorithms, which utilize machine and deep learning technology to enable computers to make decisions based on data provided by humans.

While AI developers suggest that algorithmic procedures can simplify activities such as recruitment and mitigate bias, studies have shown that algorithms cannot eliminate discrimination if the underlying data is unfair. This creates the potential for pervasive inequality, spanning biases in online recruitment tools, word associations, online advertisements, criminal justice, finance, and beyond.

Amidst the ongoing dialogue on algorithmic fairness, the societal repercussions of biased AI systems are vast and multifaceted, with harmful impacts that extend to individual rights and social cohesion. Biased AI, resulting from flawed algorithm design or data collection processes can lead to discriminatory decision-making where individuals are adversely affected based on their gender, race, sexual orientation, and other attributes.

For instance, the collected data may not be fully representative of the population they are meant to model. Consequently, this leads to systematic disparities. This type of bias is often perpetuated when data is interpreted in a way that reinforces the interpreter's preconceived notions, resulting in the proliferation of existing prejudices.

These biases can spill over to various sectors such as employment, finance, and law enforcement, perpetuating existing stereotypes and unintentionally reinforcing social biases, resulting in flawed decision-making. For example, in fraud detection, biased AI can associate first names from other cultures with fraudulent accounts. Furthermore, recruiting tools may disregard some segments of the population for certain jobs, etc.

Fundamental Challenge

According to experts, "unbiased algorithms" rely on the mathematical formulation of fairness and causality, meaning the concept of causality, which is pivotal for fair decision-making, must be translated into precise mathematical language that information systems (IS) can utilize. This has, so far, been an uphill battle for both researchers and practitioners.

Additionally, legal and ethical frameworks are critical for eliminating bias in AI systems through a multi-faceted approach that can be complex and expansive. However, such frameworks have emerged as necessary tools to both recognize and address the ethical and social dimensions of bias, discrimination, and fairness, according to industry experts.

To mitigate this issue, experts recommend the implementation of technical measures, such as unbiased dataset frameworks and improved algorithmic transparency, as well as management measures like internal, corporate ethical governance and external oversight.

International legal bodies and organizations are essential in fostering a unified global strategy to address algorithmic bias. The ICT industry is eagerly anticipating the United Nations' Global Digital Compact findings on artificial intelligence, particularly its perspective on algorithmic discrimination, which is expected to be unveiled in September of this year.

How Can ICT Help to Fight Algorithm Biases?

The ITU recognizes that AI can generate poor or inappropriate purposes or unintended outcomes due to poorly labeled data. It recommends the standardization of data sets as well as training courses on the ethical applications of AI. It is crucial to implement rigorous data quality control processes, including the renewal of data sets to ensure the accuracy of statistical patterns and relationships, and to conduct regular verification and audits of the AI process, which can serve as safeguards against the perpetuation of societal biases.

As AI technology expands its reach across various industries, promising enhancements in efficiency, scalability, speed, and precision, the ICT sector emerges as a significant beneficiary of these advancements. It bears the responsibility to diligently identify and address biases within its AI-powered applications, adopting a strategy of "algorithmic hygiene."

Embracing innovative methodologies over conventional associative or causal inference techniques is imperative, ensuring a comprehensive adoption across all fronts. This approach emphasizes equitable exposure through meticulous data collection and management mechanisms, fostering fair and just outcomes.

In conclusion, by 2050, two-thirds of the world's population will be living in urban areas, which places a renewed focus on urban living to ensure that the cities of the future are secure, sustainable and inclusive. Hence, a seamless integration of human connections and technological innovation is crucial for the functioning of a modern digital economy. Unbiased algorithms must, thus, be incorporated as an irreplaceable component of this digital evolution. TR

Unbiased algorithms must, thus, be incorporated as an irreplaceable component of this digital evolution

5G-Advanced: Catalyzing Transformative Digitalization in the Middle East

A recent gathering of global ICT leaders in Dubai prompted the dissection of the multifaceted progression from 5G to 5G-Advanced. Both the technological advancements and the practical implications of this transition were explored.

High-profile speakers and guests were in attendance, including regulatory authorities from the Middle East represented by the UAE's Telecommunications and Digital Government Regulatory Authority (TDRA), industry groups represented by GSMA and WBBA, ICT solution providers, enterprises, analysts, ecosystem partners, and media members. Eng. Saif Bin Ghelaita, Executive Director, Technology Development Affairs, TDRA, and other notable speakers at the forum included Jawad J. Abbassi, Head of MENA, GSMA; Martin Creaner, DG, WBBA; Khalid Murshed, CTIO, e& UAE; Karim Benkirane, CCO, du; Cao Ming, President of Wireless Solution, Huawei; Liu Zhiyong, Deputy Chief Engineer of China Telecom; and Dr. Philip Song, CMO, Huawei Carrier Business.

The Commercialization of 5G-Advanced

During his keynote, Eng. Saif Bin Ghelaita, Executive Director, Technology Development Affairs, TDRA, said, "The commercialization of 5G-Advanced is imminent due to the readiness of both standards and the ecosystem. The TDRA intends to develop a national plan for the 5G-Advanced network and is committed to promoting the planning and allocation of abundant spectrum to further advance mobile network development. In the symphony of 5G-Advanced, collaboration harmonizes progress. Let our collective efforts resonate across borders. We are not merely architects of networks; we are stewards of progress. "

During the event, the UAE launched 5G-A country and announced plans for the UAE to set sail for 5G-A nationwide.

In line with its economic vision, the UAE places great importance on ICT infrastructure construction and technology development. The country was an early adopter of 5G technology, and its deployment has already reaped numerous benefits. The UAE has plans underway for the successful deployment of 5G-Advanced.

Implementing Next-Gen Experiences

Furthermore, the Middle East Glasses-free 3D Industry Initiative was announced by Zain Group, Omantel, LAiPIC AI, LITITONG, LANSHEN 3D, and others. This initiative seeks to standardize glasses-free 3D technologies, build ecosystem capabilities, and incubate innovative applications using 5G and 5G-A, artificial intelligence (AI), and computing network capabilities. The ultimate goal is to create a next-gen experience for users and new value for the industry at large. The high speed and low latency of 5G and 5G-A networks, the powerful processing capability of the computing network, and the power of AI capabilities will further bolster the real immersion and interaction convenience of glasses-free 3D, bringing users a new visual experience upgrade.

This next phase in mobile network evolution is not just an incremental upgrade; it embodies a leap forward in integrating artificial intelligence, improving network flexibility, and enabling more complex and varied use cases. From smart cities to advanced industrial applications, 5G-Advanced is expected to be a catalyst for innovative digital solutions across sectors, sparking a revolution in the way the Middle East connects and communicates.

Cisco Appoints Zayan Sadek to Lead MEA Service Provider Business

Zayan is a seasoned ICT executive with over 24 years of experience with multinational technology vendors. He is a results-oriented and motivational leader with a proven track-record of leading teams, developing talents and promoting an inclusive, diverse, and conscious culture.

Zayan joined Cisco in 2007 and has held several managerial and leadership positions since then. During this tenure, he has played a pivotal role in implementing Cisco's strategic vision and expanding its footprint in the service provider market within the region.

Together with his team, he has spearheaded initiatives aimed at enhancing Cisco's market share. Moreover, he has diligently cultivated robust and trusted partnerships with key service providers, collaborating closely with them on their digital transformation initiatives and go-to-market strategies.

This multifaceted approach underscores his commitment to driving sustainable growth and fostering mutually beneficial relationships in the industry. Zayan is based in Dubai, UAE.

Digital Empowerment: Netcracker and Ooredoo Qatar Forge Stronger Ties

Netcracker will extend its long-term partnership with Ooredoo Qatar, wherein the Middle East-based operator will be utilizing Netcracker's Digital BSS Product Suite and Managed Services for its Revenue Management and CRM solutions. This will support B2C and B2B customers across a wide range of telecom and other services, including ICT, IoT and Cloud.

"Ooredoo Qatar is at the forefront of creating a customer-focused network and delivering excellence in customer experience, which we are proud to help support," said Mervat El Dabae, EMEA Regional Vice President at Netcracker. "We value our long-standing partnership and look forward to working closely together for even greater success."

Delivering Elevated Experiences

The partnership extension will provide Ooredoo Qatar with improved agility and time-to-market as the operator takes the lead in making Qatar one of the best-connected countries in the world. By entrusting its solutions and support services to Netcracker, Ooredoo Qatar will be able to focus on its goals of empowering its customers by delivering an elevated experience, including simplified journeys and touchpoints.

"Our renewed partnership with Netcracker allows us to stay at the vanguard of technological innovation and market responsiveness," said Thani Ali Al-Malki, Chief Business Officer at Ooredoo Qatar. "By leveraging Netcracker's expertise, we can deliver superior service to our customers. This collaboration is crucial as we lead the way towards digital transformation across multiple areas, significantly contributing to Qatar's vision of becoming one of the world's most connected and digitally empowered nations."

This engagement will also expand to other industries including fintech and entertainment as Ooredoo Qatar continues its forward-looking initiatives and innovative digital offerings to maintain its position as a technology leader in Qatar.

Ericsson Catalyzes Digitalization: New Office, New Leader, and New Era in Jordan's ICT Scene

Ericsson has announced the opening of its new office in Amman and the appointment of Marwan Omari as General Manager of Ericsson Jordan, reaffirming Ericsson's commitment to Jordan and reinforcing its position within the country's dynamic ICT industry.

Kevin Murphy, Vice President and Head of Ericsson Levant Countries at Ericsson Middle East and Africa, commented, "2023 has been a landmark year for Ericsson and the local Information and Communications Technology landscape in Jordan. We are proud to have played an instrumental role in the introduction of 5G networks to the Kingdom, together with our local partners. This has laid the foundation for a connected, efficient, and innovative future and paved the way for sustainable economic growth."

Democratizing Digitalization

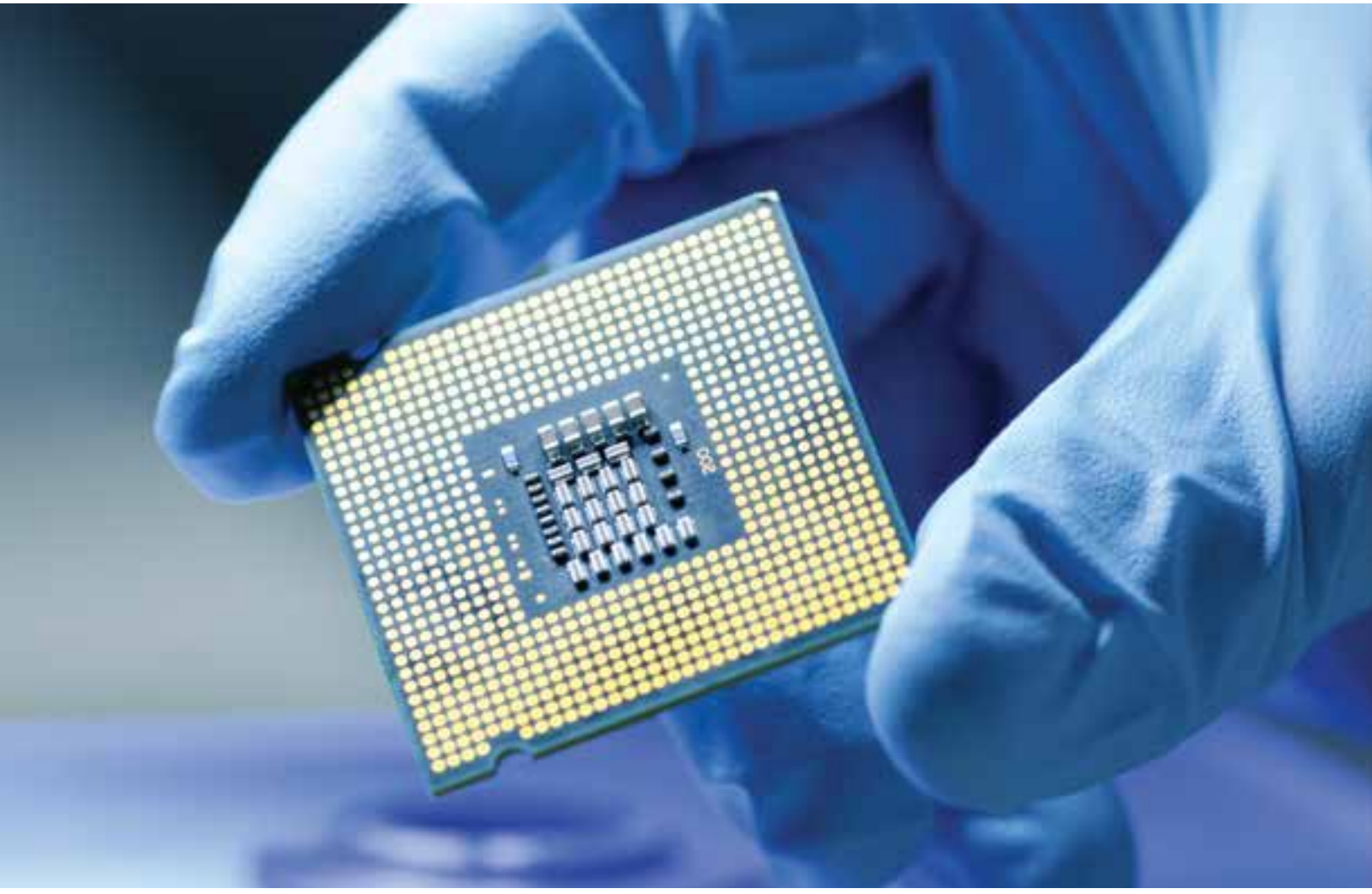
The opening of the office, with the company's leadership team present, demonstrates Ericsson's long-standing commitment to the digitalization of the Kingdom and aims to fortify the country's technological framework and resonate with its Economic Modernization Vision.

The new office will strengthen Ericsson's efforts in nurturing local talent and propelling the adoption of cutting-edge technologies.

Furthermore, through the establishment of this office, Ericsson will continue to explore avenues that create positive societal and environmental impact through innovative ICT solutions.

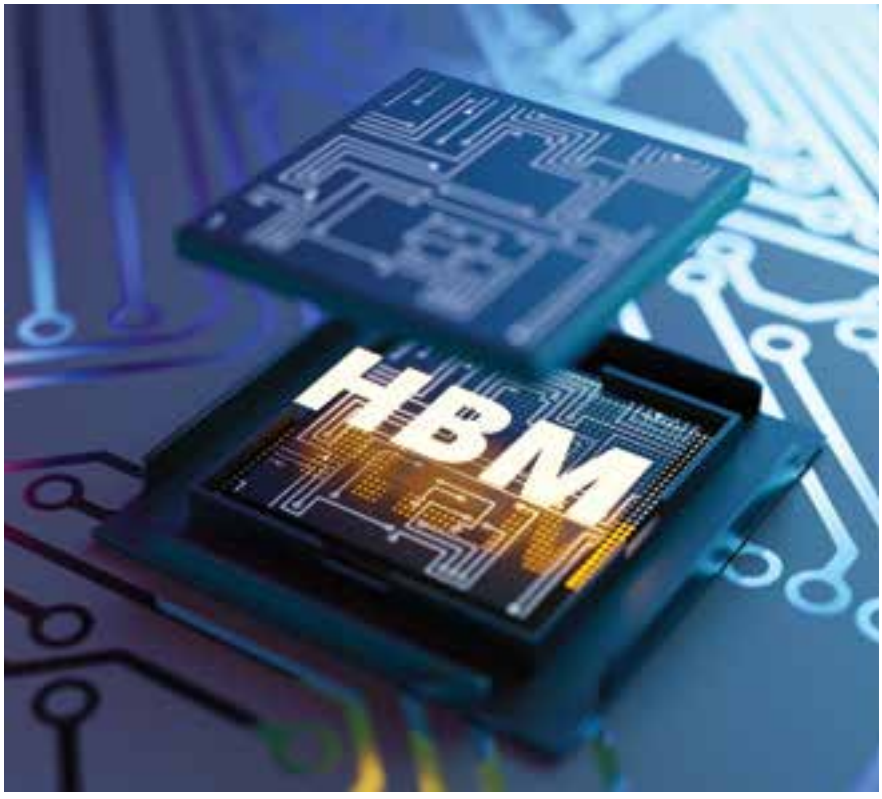
"Building on our success, we are delighted to open our new office in Amman that will ideally position us to usher in a new era of digital connectivity in the country in collaboration with our valued partners. We are also delighted to announce Marwan Omari as the General Manager for Ericsson Jordan. Marwan has been instrumental in bringing Ericsson Jordan to where it stands today, and under his leadership we are confident in our future in Jordan," Murphy concluded.

Ericsson has a rich history in Jordan, dating back to its inaugural operations in 1983. Presently, the company boasts a workforce of over 70 individuals in the country and maintains strong partnerships with local communication service providers (CSPs).



Staying Curious: Developments in Memory Chip Technology

Never-ending human curiosity has brought about the advancement and evolution of information technology to its current form. With this ever-expanding information exchange taking place through telecom networks and its affiliations, AI is finding its way into businesses, promising to improve operational efficiencies and ultimately enrich the customer experience at every touchpoint. From autonomous driving to hyper-personalized healthcare, the amount of data generation from such activities is staggering.



According to Statista, the volume of data created, captured, copied, and consumed worldwide grew over the previous decade from 2 zettabytes to 64.2 zettabytes. As such, this surge in data volume is testing the capacity of computer memory chips to process them into useful information.

Modern computers have separate memory chips for computing and data storage. However, the connections between the two are limited to handle the growing volumes of data, thus, creating a critical communication 'bottleneck,' according to experts. Furthermore, the silicon-based transistors, which form the foundation of underlying devices, are not progressing at a rate parallel to addressing the surge in data volume.

Breakthrough Attempts

Confronted with these challenges, engineers at MIT took action in 2017 by developing a prototype chip that integrates over 1 million resistive random-access memory (RRAM) cells—a nonvolatile memory technology that operates by altering the resistance of a solid dielectric material—and 2 million carbon nanotube field-effect transistors. This innovative approach resulted in a new, densely packed 3D computer architecture featuring interleaving layers of logic and memory.

Importantly, this advancement has effectively overcome the limitation of transferring data between separate chips. However, achieving such an architecture is not feasible with existing silicon-based technology, as the circuits are limited to 2D, presenting significant fabrication and design challenges. Work is underway to improve the core nanotechnologies while exploring the new 3D computer architecture.

Battle for Memory

Given the demand for High Bandwidth Memory (HBM) driven by AI chips, South Korean memory giant, SK Hynix, is reportedly planning to upgrade part of its dynamic random-access memory (DRAM) production equipment at its Wuxi plant to the fourth-generation of a 10-nanometer process this year, according to research group, TrendForce. In its upcoming iteration, SK Hynix's fifth-generation HBM (HBM3E) product boasts a maximum capacity of 36 GB (288 gigabits), achieved by stacking 12 chips of 24 GB DRAM.

Likewise, Micron Technology, the world's third-largest chip maker, announced that its high-bandwidth memory (HBM) chips—renowned for their ultrafast performance and crucial role in AI application development—are completely sold out for the entirety of 2024. Moreover, a significant portion of Micron's supply for 2025 has already been allocated.

Samsung Electronics, the world's top memory chipmaker, plans to introduce three-dimensional (3D) DRAM. This technology is expected to revolutionize the artificial intelligence (AI) industry by 2025 and lead the global AI semiconductor market (which is currently dominated by SK Hynix Inc).

A 3D DRAM chip triples the capacity per unit area by stacking cells vertically rather than placing them horizontally. Furthermore, high bandwidth memory (HBM) employs vertical interconnections to link multiple DRAM chips.

The 3D DRAM design enables an increase in capacity within a single chip area, as it can accommodate more cells within the same space. The basic capacity of 3D DRAM is 100 gigabytes (GB), nearly triple the 36 GB maximum capacity of the currently available DRAM.

The global 3D DRAM market is expected to reach USD 100 billion by 2030, according to industry sources. Meanwhile, industry watchers are closely observing the sprouting 3D DRAM market.

Key Drivers

One of the key factors driving the semiconductor memory market is the increasing use of memory-based

elements in technologically advanced products, such as smartphones, wearable devices, and electronic gadgets. In this segment, Chinese tech giant, Huawei, released the Mate 60 smartphone, which utilizes a 7-nanometer process chip, which is considered highly advanced.

Semiconductors are increasingly being used in automotive and electronic systems, including flash read-only memory (ROM) and DRAM, contributing to the market's growth. The utilization of the Internet of Things (IoT) and edge computing in smart city projects as well as industrial applications is also impacting the market.

Furthermore, there is a growing demand for semiconductor memory chips with large storage capacities to cater to the expanding colocation data centers and hyperscale data environments in industrialized nations. This surge in demand is being propelled by the need for robust connectivity, efficient data management, and expansive storage capabilities to handle the massive volumes of corporate data generated by mega facilities.

In Conclusion

From the implementation of biometric systems for immigration purposes at international airports to predicting natural disasters like forest fires and floods, the role of AI is poised to be all-pervasive, across industrial sectors. The semiconductor memory market size was valued at USD 172.0 billion in 2023 and is expected to rise to USD 354.5 billion by 2033; and sales are expected to expand at a significant CAGR of 7.5% during the forecast period, according to the latest market findings.

In the race for AI supremacy, Japan has approved subsidies worth 590 billion yen (USD 3.9 billion) for chip foundry venture, Rapidus, to rebuild the country's chip manufacturing base. Consequently, billions of dollars are being invested by chip makers including Nvidia, Qualcomm, IBM and more, in order to enhance

the prerequisite resources for chip manufacturing, including human skill development.

Interestingly, within the semiconductor market, the supply chain plays a critical role in the production process. Ensuring equitable access to advanced chip-making technology is essential for boosting production efficiency, reducing costs, and saving time. This equitable access will be pivotal in enhancing the market competitiveness of semiconductor manufacturing countries. Furthermore, restrictions on the import and export of resources between semiconductor player countries will remain a challenge in terms of the growth of the industry.

It will be interesting to see if Rapidus can rival Taiwan Semiconductor Manufacturing Co (TSMC), the world's largest contract chipmaker, whose expertise in developing semiconductors remains undisputed. The company earned 60% (or nearly USD 17 billion) of semiconductor foundry revenue in Q1 2023. TR

> One of the key factors driving the semiconductor memory market is the increasing use of memory-based elements in technologically advanced products, such as smartphones, wearable devices, and electronic gadgets

Sky High Connectivity: The Dawn of 5G NTN Integration

How can satellites augment 5G networks by addressing coverage and tackling complex use cases beyond ground-based infrastructure? As per its definition, non-terrestrial networks (NTN) represent a flourishing market, marked by diverse technical and commercial strategies.

Typically, partnerships between telcos and satellite operators focus on various areas such as rural and enterprise broadband, IoT/M2M applications, satellite-to-cellphone connectivity, emergency communications, and backhaul services. According to GSA findings, there is a consistent uptick in the utilization of satellite services to provide 5G connectivity.

With the current progress, rural broadband is, so far, proving to be the single biggest driver of 5G NTN momentum, accounting 57% of GSA's identified partnerships in involving satellite connectivity. Furthermore, the increasing need for broadband, voice and data services will drive 5G NTN in direct-to-device (D2D) technology developments as well as emergency response when terrestrial networks are disrupted.

Satellite-Based NTN

As satellite-based non-terrestrial networks (NTN) gain momentum, Juniper Research estimates that NTN could yield up to USD 1.7 billion in revenue for telecom operators. Network operators could also generate USD 17 billion of additional revenue from 3GPP compliant 5G satellite networks between 2024 and 2030.

Anticipated in 2024, the inaugural commercial launch of a 5G satellite network is poised to pave the way for over 110 million operational 3GPP-compliant 5G satellite connections by the year 2030. To capitalize on this growth, operators are urged to prioritize partnerships with satellite network operators (SNOs).

An NTN operation involves several components: user equipment (UE), satellites, satellite gateways, base stations (gNB), core networks (CN), and servers. Addressing challenges posed by long distances, rapid movement, and extensive coverage in satellite communication scenarios, NTN incorporates an air interface

enhancement protocol. This protocol integrates cutting-edge technologies including scheduling time sequence management, HARQ function orchestration, delay compensation, frequency compensation, and enhanced mobility management for swift air-to-ground (A2G) handover.

5G NTN Use Cases and Benefits

These deployments require a lot of investment, however, they aim to increase the coverage, capacity and capabilities offered. Being based on 5G technology, the 5G NTN will play a huge role in the future 5G ecosystem. Integrating 5G terrestrial deployments with 5G NTNs facilitates the attainment of core 5G objectives, such as delivering seamless coverage, high-speed data transmission, minimal latency, energy efficiency, and robust communication reliability.

5G NTN deployments present diverse use cases, bolstering connectivity across a spectrum of devices. Furthermore, these deployments can serve as backhaul solutions for remote sites, encompassing existing 4G/5G installations or alternative technologies like Wi-Fi.

Illustrating this synergy, China Telecom, ZTE, and SpaceIoT have pioneered the inaugural deployment of a 5G NTN, leveraging it in a maritime context. This breakthrough enables satellite-ground interaction and data transfer across various marine scenarios, facilitating real-time monitoring of water quality, temperature, and humidity, while facilitating emergency rescue missions on uninhabited islands.

In February 2024, five non-terrestrial network (NTN) providers united to establish the Mobile Satellite Services Association (MSSA), with the aim of fostering a global direct-to-device (D2D) ecosystem for linking satellite services with mobile devices. MSSA highlighted that mobile satellite services, operating within licensed spectrum, promptly offer narrowband IoT services. Additional advantages cited include an established regulatory framework, absence of interference with terrestrial networks, and ample spectrum availability for advancing 5G-NR services.

Last year, stc penned an agreement with US-based Omnispace to develop satellite-to-phone communications services using space-based 5G connectivity in its home market of Saudi Arabia. The operator, which won a spectrum auction for NTN in the 2100MHz band, will use the SNO's 3GPP-compliant NTN to deliver "cost-effective" broadband connectivity beyond its existing land-based network, which will benefit business clients in the agriculture, finance and automotive sectors, among others.

5G NTN Standardization

3GPP Release 18 specifications defined the supported frequency bands for 5G NTN satellite device access. In NTN FR1 (Frequency Range 1), which spans 410 MHz to 7125 MHz, there are two key bands: n255 (NTN 1.6GHz) and n256 (NTN 2GHz). These comprise the 5G NTN band allocations for the L-band and S-band, adhering to established satellite band terminology. Conversely, the NTN FR2 (Frequency Range 2) spans 17300 MHz to 30000 MHz and falls within the Ka-band satellite band. Regarding 5G NTN, three satellite bands are currently proposed: n510, n511, and n512.

Satellites operating within FR1 of the NTN band provide direct connectivity to outdoor handheld devices, as well as devices mounted on cars or drones, through the 5G NR standard. Additionally, they connect outdoor IoT devices via the 4G NB-IoT/eMTC standard. Those operating in FR2 can furnish broadband connectivity to local networks via very small aperture terminals (VSAT) mounted on building rooftops or Earth station in motion (ESIM) terminals on mobile platforms like vehicles, trains, vessels, or aircraft.

The upcoming phase supported by Release 19 amplifies NTN performance and expands its use cases. The aim is to enhance coverage, optimize capacity, introduce multicast and broadcast services (MBS), incorporate regenerative payload, and extend support to Reduced Capability (RedCap) terminals.

By harnessing satellite-based solutions alongside terrestrial networks, 5G NTN fosters global connectivity, emphasizing disaster recovery, resilience, and smart city endeavors. It encompasses space-based 5G, catering to various sectors such as telecommunications, aerospace and defense, and remote sensing. Continuously evolving, 5G NTN will shape the future of wireless communication channels, fortified with encryption and eavesdropping protection.

5G NTN Trend and Outlook

Having said that, a 5G NTN solution, in full compliance with the 3GPP standard, has distinct advantages in terminal penetration, industrial integration and service variety, and will lead the satellite-ground converged network trend.

In the current landscape of 5G NTN, IoT-NTN short messages and IoT services emerge as frontrunners. Looking ahead, mobile phones equipped to handle 5G NTN-NR voice and data broadband services will establish direct connections with satellites. This forthcoming phase of NTN technology promises services akin to those of NTN-IoT but on a significantly larger scale. It will directly integrate smartphones and other 5G devices into non-terrestrial service frameworks. Operating at low Earth orbit (LEO) altitudes, NTN-NR satellites will facilitate low-data services, voice calls, and messaging across diverse application scenarios.

One of the common 5G NTN types is air-to-ground (A2G) networks. An example of this is SCIT Group's SkyFive which offers A2G internet broadband services in the aviation sector, catering to both commercial airlines and business/private jets.

Moving forward, 5G-Advanced will act as a catalyst, extending connectivity to new frontiers and supporting NTN networks. This expansion ensures that connectivity becomes more accessible, reaching untapped market segments and promoting innovation across various domains. TR

AWS to Invest EUR 15.7 Billion in Spanish Data Center Expansion

This marks a significant move by a leading US cloud provider to enhance its European infrastructure. The investment will primarily focus on expanding cloud infrastructure in Aragon, as this region is expected to generate 40% of the employment opportunities resulting from the investment and contribute over half of the anticipated EUR 21.6 billion increase in Spain's GDP.

Why Has AWS Selected Spain?

The Minister for Digital Transformation and Public Function, José Luis Escrivá, stated, "Amazon Web Services' decision to choose Spain places us at the forefront of technology innovation and artificial intelligence in Europe and confirms, once again, Spain's ability to support technology talent and quality jobs in the long term. This new commitment by AWS spotlights our country's attractiveness as a strategic tech hub in southern Europe, and the connectivity, climate and energy conditions that make us an attractive location to the world's most innovative companies. That AWS data centers are 100% powered with renewable energy is absolutely aligned with the AI Government Strategy approved just [a] few days ago."

AWS stated that its investment will uplift local businesses by supporting 17,500 jobs. This plan signifies a substantial escalation from the EUR 2.5 billion spent on facilities in the region in 2021.

The US-based company emphasized that this initiative aligns with the regional government's strategy to establish itself as a prominent technology hub both nationally and across Europe.

ITU's Digital Push: USD 4.8 Billion Boost for US, Canada and South Africa

ITU, the UN Agency for Digital Technologies, announced USD 4.8 billion dollars in investment commitments toward global connectivity. The new commitments announced cover the US, Canada, and South Africa.

AT&T has pledged an additional USD 3 billion to assist 25 million individuals in the most challenging-to-connect areas of the United States, aiming to achieve and maintain connectivity by 2030.

Meanwhile, the Government of Canada is directing its focus towards investing in computing infrastructure to bolster AI businesses and researchers within the country through the CAD 2 billion (USD 1.46 billion) AI Compute Access Fund. Additionally, an extra commitment of CAD 400 million (USD 292 million) will be allocated to drive AI adoption across Canada's economy. This initiative aims to aid small and medium-sized enterprises (SMEs) in integrating AI into their operations, facilitating skills development for workers, and establishing the Canadian AI Safe Institute to enhance understanding and protection against the risks associated with advanced AI systems.

Furthermore, Microsoft has introduced a new pledge, marking its fifth commitment to the P2C. This pledge will focus on supporting projects and fostering partnerships to accelerate the inclusion and representation of people with disabilities in technology systems, designs, and features, including AI.

Elle International has also made three pledges totaling USD 106 million to enhance the quality of life for 20 million women and girls in South Africa.

UAE, France to Jointly Explore AI Use Cases Across Sectors

The Abu Dhabi Artificial Intelligence and Advanced Technology Council (AIATC) and the French Ministry of Economy, Finance and Industrial and Digital Sovereignty jointly signed a Memorandum of Understanding on artificial intelligence (AI).

This agreement builds on the strengths of the strategic partnership between the UAE and France, and aims to develop the artificial intelligence ecosystems of both countries through a combination of investment programs and collaborations that foster the responsible development and deployment of AI.

The agreement was signed by Khaldoon Khalifa Al Mubarak, Chairman of the Executive Affairs Authority, member of the Abu Dhabi Executive Council and member of AIATC; and Bruno Le Maire, French Minister of Economy, Finance and Industrial and Digital Sovereignty.

The partnership will cover the following areas of collaboration:

- **Data Center and Supercomputing Infrastructure Buildout:** This initiative will make cost-competitive AI training and inferencing capacity available to both French and European enterprises, as well as foster partnerships with international and local cloud and computing capacity operators, thus, enabling innovation and R&D.
- **Investment in the UAE, French, and Global AI Ecosystem:** The UAE and France will explore investment opportunities in start-ups and investment funds focused on AI models, artificial intelligence applications in key sectors (health, financial services, software, retail, industry), and next-generation hardware.
- **Manufacturing and Sourcing Cooperation:** The partnership will explore opportunities for the bilateral production and offtake of semiconductors, including leading-edge and essential chips for AI applications.
- **Talent Pipeline:** The two countries will explore an education initiative that will offer best-in-class AI training to nurture and develop talent across the UAE and French AI ecosystems.

UK's GBP 100M Investment in Ethical AI Governance

The United Kingdom is charting a pioneering path in artificial intelligence (AI), embarking on a transformative journey with a GBP 100 million investment dedicated to regulating this technology. Announced in February 2024, this landmark commitment underscores the UK's steadfast ambition to not just keep pace with the AI revolution but to lead it, while ensuring accountability and ethical deployment.

The UK AI market is expected to grow at a 28.30% annual rate (CAGR 2024-2030), reaching USD 26.89 billion by 2030, according to Statista. Public awareness of AI appears to have increased over the last year; 72% of adults could provide at least a partial explanation of AI in the Office for National Statistics (ONS) Opinions and Lifestyle Survey (OPN) collected in May 2023, compared to 56% in the Centre for Data Ethics and Innovation's Public Attitudes to Data and AI Tracker Survey (PADAI) collected from June to July 2022.

An Agile Regulatory Framework

In a bid to navigate the intricate terrain of AI governance, the UK government advocates for an "agile" regulatory framework, departing from conventional methodologies. This approach is guided by a set of core principles designed to foster responsible innovation.

"AI is moving fast, but we have shown that humans can move just as fast," UK Secretary of State for Science, Innovation and Technology, Michelle Donelan, said in a statement. "By taking an agile, sector-specific approach, we have begun to grip the risks immediately."

The government announced that nearly GBP 90 million will be allocated to the hubs, which will focus on the use of AI in areas such as healthcare, chemistry, and mathematics, as well as a partnership with the United States on responsible AI. Another GBP 10 million will assist regulators in addressing the risks and capitalizing on the opportunities of AI, such as developing practical tools to monitor risks in sectors ranging from telecoms and healthcare to finance and education.

Japanese Consortium Completes 5G Trial from the Stratosphere

SKY Perfect JSAT Corporation, NTT DOCOMO, INC., the National Institute of Information and Communications Technology (NICT), and Panasonic Holdings Corporation (Panasonic HD) have successfully completed the world's first 5G communication verification test in the 38 GHz band from an altitude of approximately 4 km on board a Cessna aircraft.

The verification test serves as a simulation of the eventual use of High-Altitude Platform Stations (HAPS). HAPS is an unmanned aircraft which is able to fly the stratosphere for extended periods of time, and is equipped with repeaters and other technology to provide radio coverage over a 100-200 km diameter, allowing better connectivity in areas such as the sky, sea and mountainous regions.

Moreover, the demonstration aims to showcase the practical implementation of 5G feeder links and backhaul lines specifically designed for High Altitude Platform Stations (HAPS). By demonstrating these advanced technologies, the project intends to highlight how HAPS can effectively support and enhance 5G network infrastructure.

This includes establishing reliable high-speed connections between the stratosphere and ground stations, thereby expanding the reach and capabilities of 5G networks, especially in remote or underserved areas. The successful implementation of these technologies could pave the way for more robust and versatile telecommunications solutions, leveraging the unique advantages of HAPS to deliver consistent and widespread connectivity.

Mexican Regulator Favors Entry of New Operators with Spectrum Auction

The Mexican spectrum auction proposal for 5G aims to bring new operators into Mexico, according to Alejandro Navarrete, head of the Radio Spectrum Unit at the Federal Institute of Telecommunications (IFT).

During a media briefing, Navarrete highlighted that, unlike other countries, Mexico currently has only four major operators with national coverage.

In the Mexican market, radio spectrum costs are exceptionally high, which significantly impacts the success of an auction.

"Even if the auction fees were set to zero, the payment for spectrum rights would still represent more than 60% of the international median in some frequency bands," explained Navarrete.

For instance, a small operator winning spectrum in the auction would need to pay annual rights fees before acquiring equipment or having customers. Unfortunately, previous auctions have remained unsuccessful due to this financial barrier.

To mitigate the risk of an unsuccessful auction, the current proposal introduces mechanisms. However, Navarrete acknowledges that the risk remains as long as the fees remain high.

The goal is to make the auction attractive to new participants while also allowing established operators to acquire the spectrum of their choice.

To achieve this, the proposal suggests a new geographical subdivision, including 320 Partial Service Areas similar to those existing in the United States, where there are approximately one thousand Partial Economic Areas.

TCS: 80% of Latin American Executives Implement AI for Business Improvement

An astonishing 80% of Latin American executives have already implemented artificial intelligence (AI) to enhance existing revenue streams or create new ones, according to the Global TCS AI in a business study by Tata Consultancy Services (TCS).

These leaders are actively redefining their companies, workforce, and customer acquisition strategies, thanks to the catalytic role played by AI.

The survey, conducted among 1,300 CEOs and senior executives from 24 countries, including Mexico, Brazil, Colombia, and Chile, revealed that Latin American and North American executives are the most enthusiastic about the potential impact of AI on their businesses.

"AI has the capacity to transform businesses beyond what we can imagine today. Specifically, GenAI, by harnessing the computational power of data, cloud, and AI, there emerges a force capable of generating unprecedented changes in the business environment and creating a new paradigm for the modern market. Companies that adopt this technology early can offer exponential value to their customers," commented Marcelo Wurmann, CEO of TCS Latin America.

In Latin America, 67% of entrepreneurs view AI favorably, while in North America, that perception stands at 63%.

Furthermore, 95% of Latin American companies have planned, ongoing, or completed AI implementations in their corporate functions, and two-thirds of respondents in Latin America recognize the potential impact of AI on their business.

Singapore to Invest in National Quantum Strategy, Launches Green DC Roadmap

Singapore will invest around SGD 300 million into its National Quantum Strategy (NQS) to accelerate the growth of the quantum industry in the country. This investment is expected to establish Singapore as a leading hub for the development and implementation of quantum technologies in the next five years.

The NQS is funded by the NRF, managed by the National Quantum Office (NQO), and hosted by the Agency for Science, Technology and Research (A*STAR). It will prioritize four funding initiatives centered around four strategic thrusts: scientific excellence, engineering capabilities, talent, innovation and enterprise partnerships.

Scientific Excellence: NQS will elevate the Centre for Quantum Technologies (CQT) into a national R&D center with nodes in partner institutions, uniting research talent to drive national quantum priorities.

Engineering Capabilities: The Quantum Engineering Programme 3.0 (QEP 3.0) will be expanded with the National Quantum Sensor Programme (NQSP) to foster industry-research collaboration in key areas. The National Quantum Processor Initiative (NQPI) will also develop local quantum processor capabilities.

Talent: The National Quantum Scholarships Scheme (NQSS) will fund 100 PhD and 100 Master's students over five years to build a quantum-ready workforce.

Innovation & Enterprise Partnerships: Investments will create a vibrant quantum ecosystem through industry partnerships and local enterprise support. The National Quantum Computing Hub (NQCH) will enhance innovation and collaboration, translating R&D into practical solutions. The National Quantum Safe Network Plus (NQSN+) will offer commercial quantum-safe solutions by year-end.

China's Recent Semiconductor Investment Sparks Debate

China has recently announced a USD 47.5 billion state-backed investment for semiconductors, which has, in turn, sparked conversations among influencers online.

Insights obtained from GlobalData's Social Media Analytics Platform revealed that China's recent action is viewed by influencers as a calculated move in response to increasing trade tensions with the US. However, the discussion has also brought attention to concerns about market oversupply, price volatility, and geopolitical risks.

Shreyasee Majumder, Social Media Analyst at GlobalData, emphasized that the influencers recognized China's efforts to strengthen its position in the chip war, while also advocating for a balanced approach to promote sustainable growth without compromising domestic market dynamics.

"A few of them are concerned that such massive investments by multiple countries striving for self-sufficiency could result in market oversupply, leading to volatile prices and impacting the profitability of companies," Majumder added.

GlobalData's Social Media Analytics Platform has collected various viewpoints from prominent influencers on the subject.

Sandip Sabharwal, owner of Asksandipsabharwal.com, thinks that oversupply and volatile prices are possible in the next two to three years. Sabharwal said that it may be beneficial for consumers but not for companies making large scale investments.

— 2024 —

DTW24 – Ignite

DTW24 - Ignite will explore the dynamic path of the AI Native journey. Learn from the industry players and experts about the fundamentals and best practices of this ever-evolving technology to unleash the power of AI for transformative innovation.

Place: Bella Centre,Copenhagen, Denmark

18 - 20 JUNE

Riding the Wave of Generative AI

In this virtual panel, we will explore GenAI's impact across various sectors, particularly focusing on telecom, and discover practical ways to integrate this technology into operations and business strategies.

Place: Virtual

9 JULY

Capacity Europe

Capacity Europe is the most trusted and largest European event, which has evolved from being the largest gathering of fiber network operators to a critical touch point for all connectivity enablers.

Place: Intercontinental at the O2, London, UK

capacity EUROPE 2024

15 - 17 OCTOBER

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